ICoLA by KSoLA
International Congress on Lipid & Atherosclerosis

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

New Perspectives in Lipid and Atherosclerosis: Exploring Innovations

September 26(Thu)-28(Sat), 2024

CONRAD Seoul, Republic of Korea

ABSTRACT BOOK

보건의료전문가용

DAEWOONG

Safe and Effective Treatment for Dyslipidemia

Litorvazet® Tab

Litorvazet tab [Ezetimibe / Atorvastatin]

10/5, 10/10, 10/20, 10/40mg

Atorvastatin + 국내 유일 오리지널 Ezetimibe

4가지 용량의 아토젯®으로 더욱 강력한 LDL-C 수치 조절을 경험해보세요.[1-3,*,a]

ATOZET® tablet 10/10 mg | ATOZET® tablet 10/20 mg | ATOZET® tablet 10/40 mg | ATOZET® tablet 10/80 mg

지질치료 경험이 없는 원발성 고콜레스테롤혈증 환자(n=628) 대상 연구 결과, 아토르바스타틴 단일 용량 대비 아토젯은 모든 용량에서 더 큰 LDL-C 감소 효과가 나타났습니다. 기저시점 대비 LDL-C 감소율 비교: Ezetimibe/Atorvastatin 10/10 mg vs. Atorvastatin 10 mg = -53% vs. -37%; Ezetimibe/Atorvastatin 10/20 mg vs. Atorvastatin 20 mg = -54% vs. -42%; Ezetimibe/Atorvastatin 10/40 mg vs. Atorvastatin 40 mg = -56% vs. -45%; Ezetimibe/Atorvastatin 10/80 mg vs. Atorvastatin 80 mg = -61% vs. -54%; [Primary endpoint result] Mean change in direct LDL-C from baseline : Ezetimibe/Atorvastatin overall vs. Atorvastatin overall = -54.5% vs. -42.4%(P<0.01).[3]

Atozet®

*아토젯®은 요양급여 적용기준에 따르면 고콜레스테롤혈증 환자에 1차로 투여 가능 하며(First), 아토젯®은 오리지널 에제티미브가 포함된 아토르바스타틴/에제티미브 복합제입니다.[1]

Study design*. This prospective, randomized, double-blind, placebo-controlled, balanced-parallel group trial was conducted to test the primary hypothesis that the coadministration of ezetimibe with atorvastatin would result in a significantly greater reduction in LDL-C than atorvastatin alone. 628 patients(aged ≥18 years) with baseline LDL-C 145 to 250 mg/dL and triglycerides ≤350 mg/dL were randomly assigned to receive 1 of the following for 12 weeks: ezetimibe(10 mg/d, n=65); atorvastatin(10, 20, 40, or 80 mg/d, n=248), ezetimibe(10 mg) plus atorvastatin(10, 20, 40, or 80 mg/d, n=255); or placebo(n=60). The primary efficacy end point was the percentage reduction in direct LDL-C from baseline to final assessment for the intent-to-treat population.[3]

References 1. 식품의약품안전처. 아토젯 제품 허가사항. Available at <https://nedrug.mfds.go.kr/searchDrug?sort=&sortOrder=false&searchYn=true&page=1&searchDivision=detail&itemName=&entpName=&ingrName1=%EC%95%84%ED%86%A0%EB% A5%B4%EB%B0%94%EC%8A%A4%ED%83%80%ED%8B%B4&ingrName2=%EC%97%90%EC%A0%9C%ED%8B%B0%EB%AF%B8%EB%B8%8C> Accessed 29 Nov, 2023. **2.** 요양급여의 적용기준 및 방법에 대한 세부사항. 고시 제2021-245호(2021.10.1 시행). **3.** Ballantyne CM, *et al*. The effect of ezetimibe coadministered with atorvastatin in 628 patients with primary hypercholesterolemia. *Circulation*. 2003;107:2409-2415.

Selected Safety Information 아토젯®정 (에제티미브/아토르바스타틴) 10/10, 10/20, 10/40, 10/80 mg [효능·효과] 원발성 고콜레스테롤혈증(이형접합 가족형 및 비가족형) 또는 혼합형 이상지질혈증 환자의 상승된 총 콜레스테롤(total-C), LDL-콜레스테롤(LDL-C), 아포 B 단백(Apo B) 및 트리글리세라이드(TG) 및 non-HDL-콜레스테롤을 감소시키고, HDL-콜레스테롤(HDL-C)을 증가시키기 위한 식이요법의 보조제로서 투여한다. 동형접합 가족형 고콜레스테롤혈증(HoFH) 환자의 상승된 총콜레스테롤 및 LDL-콜레스테롤을 감소시키기 위한 다른 지질저하 치료(예, LDL-Apheresis)의 보조제로서, 또는 다른 지질 저하 치료가 유용하지 않은 경우 투여한다. **[용법·용량]** 이 약은 식사와 관계없이 1일 1회 투여한다. 이 약을 투여하기 전 또는 투여 중인 환자는 반드시 표준 콜레스테롤 저하식을 지속적으로 해야 한다. 이 약의 투여량은 환자의 LDL-콜레스테롤의 기저치, 권장되는 치료 목표치 및 환자의 반응에 따라 조절되어야 한다. 원발성 고콜레스테롤혈증 이 약의 용량 범위는 1일 10/10 mg~10/80 mg이다. 초회 용량으로 1일 10/10 mg 또는 10/20 mg이 권장된다. LDL-콜레스테롤 감소가 더 많이(55% 이상) 요구되는 환자의 경우, 초회 용량으로 1일 10/40 mg이 권장 된다. 이 약의 투여를 시작한 후 또는 용량을 적정한 후에는 2주 이상의 간격을 두고 혈중 지질 수치를 확인한 후 그에 따라 용량을 조절한다. 동형접합 가족형 고콜레스테롤혈증 환자의 권장 용량은 1일 10/40 mg 또는10/80 mg이다. 이 약은 다른 지질 저하치료(예, LDL-Apheresis)의 보조제로서 또는 다른 지질 저하 치료가 유용하지 않는 경우 투여한다. **[사용상의 주의사항] [금기]** 아토젯정의 주성분 또는 구성성분에 과민증인 환자, 활동성 간질환 환자 또는 혈청 아미노전이효소 수치가 원인불명으로 지속적으로 높은 증상을 수반한 환자('5. 일반적 주의' 참조), 근질환 환자, 임부 또는 임신하고 있을 가능성이 있는 여성 및 수유부('7. 임부 및 수유부에 대한 투여' 참조), 글레카프레비르 및 피브렌티스비르를 투여 중인 환자, 이 약은 유당을 함유하고 있으므로, 갈락토오스 불내성(galactose intolerance), Lapp 유당분해효소 결핍증(Lapp lactase deficiency) 또는 포도당- 갈락토오스 흡수 장애(glucose-galactose malabsorption)등의 유전적인 문제가 있는 환자 **[경고]** 1) 아토르바스타틴 및 동일 계열의 다른 약물에서 미오글로빈뇨에 의한 이차적인 급성 신부전을 동반하는 횡문근융해가 드물게 보고되었다. 따라서 급성의 심각한 근육병증을 나타내는 환자 또는 횡문근융해에 의해 이차적으로 신부전이 발생될 수 있는 위험으소에, 중증 급성 감염, 저혈압, 주요 외과수술, 외상, 중증의 대사, 내분비 및 전해질 장애, 조절되지 않는 발작을 가진 환자는 이 약의 치료를 일시적으로 브레이크 또는 중단해야 한다('5. 일반적 주의' 참조). **[신중 투여]** 1) 알코올 중독자 또는 간질환의 병력이 있는 환자 2) 중등증 또는 중증의 간기능 장애 환자 3) 다음과 같은 근육병증/횡문근융해에 걸리기 쉬운 요인을 가진 환자 (1) 신기능 손상 또는 신장에 병력 (2) 갑상선기능저하증(2) 유전적인 근질환 병력 또는 가족력 (4) 스타틴 계열 또는 피브레이트 계열 약물에 대한 근육 독성의 병력 (5) 간질환의 병력 또는 상당량의 알코올을 섭취하는 경우 (6) 70세를 초과하는 고령자로 횡문근융해의 요인을 가진 경우 (7) 혈중 약물 농도가 증가할 수 있는 경우 4)피브레이트 계열 약물을 병용투여하는 환자 5) 중증 근육 무력증 또는 안근 무력증 환자(같은 종류 또는 다른 종류의 스타틴계 약물을 투여했을 때 재발한 사례가 보고되었다.) **[이상반응]** 아토젯정(에제티미브와 아토르바스타틴)에 대한 위약 대조 임상시험에서 투여 기간의 중앙값은 12주였으며 628명의 환자(위약군 범위: 만 19-86세, 여성 59%, 코카시안: 85%, 흑인 6%, 히스패닉 5%, 아시아인: 3%) 중 이상반응으로 투여를 중단한 환자는 이 약 투여군에서 6%, 위약 투여군에서 5%였다. 위약군보다 이 약 투여군에서 높은 비율로 발생하여 약물 투여 중단의 원인이 된 가장 흔한 이상반응은 근육통(0.8%), 복통(0.8%), 간 효소 상승(0.8%)이었으며, 가장 흔하게 보고된 이상반응은 ALT 증가(5%), AST 증가(4%), 근 골격계 통증(4%)이었다. 아토르바스타틴에서 수집된 정보의 근 골격계 및 결합조직에서 근육 파열, 매우 드물게 루푸스양 증후군이 추가 보고되었다. 일부 스타틴계 약물 투여와 관련하여 중증 근육 무력증 또는 안근 무력증의 유발 또는 악화가 보고되었다 ('3. 다음 환자에는 신중히 투여할 것' 항 참조). **[일반적 주의]** 1) 근육병증/횡문근융해 근육병증/횡문근융해에 걸리기 쉬운 요인을 가진 환자('3. 다음 환자에는 신중히 투여할 것' 항 참조)의 경우, 투여를 시작하기 전에 CPK 수치를 측정하여 신중히 투여해야 한다. 이러한 환자들에서 치료의 위해성은 유익성과 함께 고려되어야 하며 임상적 모니터링이 권장된다. 담도마이신과 HMG-CoA 환원 요소 억제제를 병용투여하였을 때 근육병증 및/또는 횡문근융해가 보고되었다 담도마이신 및 HMG-CoA 환원 효소 억제제 각각 단독 투여 시 근육병증 및/또는 횡문근융해가 발생할 수 있으므로 병용투여 시 주의를 기울여야 한다. 담도마이신을 투여 중인 환자에서 일시적으로 이 약의 투여를 중단하는 것을 고려해야 한다 ('6. 상호작용' 항 참조) 2) 중증 근육 무력증/안근 무력증 드물게 스타틴계 약물이 중증 근육 무력증 또는 안근 무력증을 유발하거나 악화시킬 수 있다('4. 이상반응'항 참조). 이 약은 이러한 상태의 환자에게 주의해서 사용해야 한다. (3. 다음 환자에는 신중히 투여할 것'항 참조). 중증 근육 무력증 또는 안근 무력증이 유발되거나 악화된 경우 투여를 중단해야한다. 3) 간효소 이 약 투여 시작 전에 간 효소 검사를 실시해야 하고 임상적으로 간 손상의 징후 또는 증상이 나타나는 환자의 경우, 간기능 검사를 반복해야 한다. 트랜스아미나제가 상승한 환자들의 경우, 이상 증상이 개선될 때까지 모니터링해야 한다. 트랜스아미나제가 정상상한치의 3배 이상 지속적으로 증가하는 경우, 이 약의 용량을 감량하거나 투여를 중단할 것을 권장한다. 아토르바스타틴을 포함하여 스타틴을 복용한 환자에서의 시판 후 조사 결과, 치명적 그리고 비치명적 간부전이 드물게 보고되었다. 이 약으로 치료하는 동안 임상적 증상과 함께 중증의 간 손상 그리고/또는 고빌리루빈혈증 또는 황달이 발생한 경우, 즉시 이 약의 치료를 중단한다. 다른 병인이 확인되지 않을 경우, 이 약을 재투여하지 않는다. 이 약을 알코올 과다 복용 환자 그리고/또는 간질환의 병력이 있는 환자에게 투여 시 주의해야 한다. 활성 간질환 또는 원인이 밝혀지지 않는 혈청 트랜스아미나제의 지속적 상승이 있는 환자에게는 이 약을 투여하지 않는다.('2. 다음 환자에는 투여하지 말 것' 항 참조) **[상호작용]** 이 약의 주성분인 아토르바스타틴과 에제티미브 병용투여 시 임상적으로 유의한 약동학적 상호작용은 나타나지 않았다. 이 약의 주성분인 아토르바스타틴은 CYP3A4에 의해 대사 되며 간 흡수 약물수송체인 OATP1B1과 같은 수송체 단백질의 기질이다. 그러므로 아토르바스타틴과 CYP3A4 저해제 또는 수송체 단백질 억제제 병용투여 시 아토르바스타틴의 혈장농도 및 근육 병증의 위험이 증가할 수 있다. 따라서 피브락산 유도제 또는 에제티미브와 같이 근육병증을 유발할 수 있는 약물과 이 약을 병용투여 하는 경우에도 이러한 위험이 증가할 수 있다. **[임부 및 수유부에 대한 투여]** 1) 동맥경화증은 만성질환이며, 임신 중 지질저하제 투여를 중지해도 원발성 고콜레스테롤혈증의 장기 치료 결과에 영향을 주지 않는다. 또한 콜레스테롤과 콜레스테롤 생합성 경로의 다른 생성물은 스테로이드, 세포막 합성 등의 태아 발달에 필수적인 성분이다. 아토르바스타틴을 포함한 HMG-CoA 환원효소저해제가 콜레스테롤 합성 및 콜레스테롤 생합성경로의 다른 생성물을 감소시킬 우려가 있으므로 임부 또는 수유부에게 이 약을 투여해서는 안된다. 임부에 대한 이 약의 안전성은 확립되어 있지 않기 때문에 임신이 확인되면 즉시 투여를 중지하고 환자에게 태아에 대한 잠재적 위험성을 알려야 한다. 가임 여성에게는 임신 가능성이 거의 없는 경우, 태아에 미칠 수 있는 잠재적 위험성 및 임신 중 투여를 지속하더도 임상적 유익성이 없다는 점을 알려준 후에만 투여한다. 2) 이 약의 구성성분이 모유로 분비되는지 여부는 확인되지 않았으므로, 이 약으로 인한 잠재적 유익성이 유아에 대한 잠재적 위험성을 상회하지 않는 한 이 약을 수유부에게 투여해서는 안된다. **[소아에 대한 투여]** 이 약은 소아에 대한 안전성 및 유효성이 확립되어 있지 않으므로 투여가 권장되지 않는다. **[고령자에 대한 투여]** 고령자(만 65세 이상)은 근육병증에 걸리기 쉬운 요인 중 하나이므로 이 약을 고령자에게 투여 시 주의를 기울여야 한다. 고령자에서 이 약의 용량 조절은 필요하지 않다. **[간장애 환자에 대한 투여]** 활동성 간질환 또는 간 아미노산달효소 수치가 원인불명으로 지속적으로 높은 환자에는 이 약을 투여하지 않는다('2. 다음 환자에는 투여하지 말 것'('5. 일반적 주의 참조). **[신장애 환자에 대한 투여]** 신장애에 대한 병력은 횡문근융해 발생의 위험인자가 될 수 있다. 이런 환자들은 콜레스 효과에 대한 면밀한 모니터링이 도움이 될 수 있다('5. 일반적 주의 참조). **개정일 2023년 10월 11일**

KR-ATO-115553 01/2026

[수입자/품목허가권자/판매자]
ORGANON

우)03142 서울특별시 종로구 종로1길 50, 4층 (전화) 1577-8582
https://www.organon.com/korea

[판매자]
종근당

종근당 서울특별시 서대문구 충정로 8 (충정로 3가)
TEL 02-2194-0300 FAX 02-2194-0369 소비자상담실 : 080-6776-080(수신자부담)
제품상세정보 : www.ckdpharm.com 참조

보건의료전문가용

싱그릭스주 대상포진바이러스백신(유전자재조합) GSK

싱그릭스와 함께 싱글벙글
당뇨병/고혈압 환자의 대상포진 예방을[1] 부탁해!

*싱그릭스 효능 효과[7]:
대상포진 (HZ; herpes zoster)의 예방
- 만 50세 이상의 성인
- 만 18세 이상에서 질병 혹은 치료로 인한 면역저하 또는 면역억제로 인하여 대상포진의 위험이 높거나 높을 것으로 예상되는 사람 (예, 자가조혈모세포이식자, 고형암, 혈액암, 고형장기 이식 환자)

당뇨병, 고혈압 환자가 대상포진에 걸릴 경우 ▶▶

당뇨병 환자가 대상포진에 걸린 경우
뇌졸중, 심근경색 발병 위험 53% 증가[2]
*비 당뇨병 환자 대비

당뇨병, 고혈압, 이상지질혈증 환자가 대상포진에 걸린 경우
관상동맥질환 발병 위험 2.9배 증가[3]
*3가지 동반질환 비보유자 대비

심근경색 과거력 있는 환자가 대상포진에 걸린 경우 30일 이내에
심근경색 발병 위험 121배 증가[4]
*심근경색 과거력이 없는 환자 대비

50세 이상에서 **97.2%의 예방효과**를 입증[5]한 대한감염학회 **우선권고 대상포진 백신[6], 싱그릭스**

[Study Design[2]]: A nationwide population-based retrospective, cohort study using the National Health Insurance Service health claims data in Korea to investigate the impact of treatment (antiviral agents, steroids, antithrombotics, and statins) on the risk of cardiovascular events after herpes zoster. The study included patients with a first-ever diagnosis of herpes zoster between 2003 and 2014, with no prior cardiovascular event. The study analyzed the exposure to treatment within ±7 days of herpes zoster diagnosis. Follow-up continued until the primary outcome (composited of myocardial infarction and stroke), death, or December 31, 2015. (N= 84,993)
[Study Design[3]]: This study evaluated the risk of cardiovascular diseases in patients with herpes zoster. Using Taiwan's National Health Insurance claims data, 19,483 patients diagnosed with herpes zoster between 1998 and 2008, as well as 77,932 subjects without herpes zoster, were identified. Both cohorts were followed up until the end of 2010 to measure the incidence of arrhythmia and coronary artery disease.
[Study Design[4]]: A retrospective cohort study which included patients aged 18 years and older who received care at a Veterans Affairs facility between 2015 and 2020. The study investigated time to myocardial infarction within 30 days post-zoster infection and the impact of patient-specific risk factors and herpes zoster vaccination on post-index date myocardial infarction development. Time to myocardial infarction was measured from either 30 days post-zoster infection in the zoster cohort or a primary care appointment in the control cohort. (N=2,165,584)

Reference 1. Oostvogels L, et al. Medical conditions at enrollment do not impact efficacy and safety of the adjuvanted recombinant zoster vaccine: a pooled post-hoc analysis of two parallel randomized trials. Hum Vaccin Immunother. 2015;15(12):2865-2872. 2. Kim J, et al. Association Between the Risk for Cardiovascular Events and Treatment for Herpes Zoster. Clin Infect Dis. 2021 Sep 7;73(5):758-764.
3. Wu PY, et al. Increased risk of cardiovascular events in patients with herpes zoster: a population-based study. J Med Virol. 2014 May;86(5):777-7. 4. Parameswaran G, et al. Increased Myocardial Infarction Risk Following Herpes Zoster Infection. Open Forum Infect Dis. 2023 Mar 25;10(4):ofad137. 5. Lal H, et al. Efficacy of an adjuvanted herpes zoster subunit vaccine in older adults. N Engl J Med. 2015;372(22):2087-2096. 6. 대한감염학회 성인예방접종 개정안. 대상포진(2023) 7. 싱그릭스 국내제품설명서.

[Integrated safety information[7]] 1. 다음 환자에는 투여하지 말 것: 이 백신의 구성 성분에 과민반응이 있는 자 2. 다음 환자에게는 신중히 투여할 것 1) 급성 중증 열성 질환을 앓고 있는 자(급성 경증 상기도감염 등은 제외) 또는 급성 감염이 있는 경우, 이 백신의 접종을 연기할 필요는 없다.) 2) 혈소판 감소증이나 다른 혈액응고장애 가 있는 환자(근육주사 시 출혈이 일어날 수 있으므로 주의하여 투여하여야 한다.) 3. 약물이상반응 ① 만 50세 이상의 성인 만 50 세 이상 성인 약 17000 명이 17 건의 임상시험에서 최소 1 회 이 백신을 투여 받았다. 이 백신의 안전성은 만 50 세 이상 성인 29,305 명을 대상으로 실시한 2 건의 주요 3상 위약 대조 임상시험 ZOE-50 (Zoster-006) 및 ZOE-70 (Zoster-022)의 데이터를 통합하여 평가되었다. 시험대상자들은 ① 2 개월 접종 일정에 따라 이 백신 (N = 14645)이 또는 위약 (N = 14660)을 최소 1회 투여 받았다. 예상된 약물이상반응 만 70 세 이상 시험대상자에 비해 만 50-69 세 시험대상자에서 주사부위 통증 및 홍반, 피로, 근육통, 두통, 발열, 설 및 위장관증상의 발생률이 더 높았다. 이들 약물 이상반응 대부분은 모두 지속되지 않았다 (지속시간 중간값 2- 3일). 중증 약물 이상반응으로 보고된 반응은 1 - 2일간 지속되었다. ② 만 18세 이상의 질병 혹은 치료로 인한 면역저하 또는 면역억제로 대상포진의 위험이 높거나 높을 것으로 예상되는 자 (이하 '면역저하자 (immunocompromised)'로 지칭함) 예상된 약물이상반응 자가조 혈모세포이식 환자를 대상으로 한 연구 Zoster-002에서 이 백신 투여 후 7일 이내 만 18-49세 만 50세 이상에서 각각 보고된 예상된 국소 약물이상반응은 통증 (87.5%, 82.7%), 발적 (29.9%, 34.6%), 그리고 종창 (20.5%, 18.0%)이었고, 예상된 전신 약물이상반응은 피로 (64.1%, 53.8%), 근육통 (57.8%, 52.4%), 두통 (43.9%, 30.1%), 위장관증상 (21.1%, 28.2%), 발열 (31.4%, 24.6%) 그리고 열 (27.8%, 17.8%)이었다(최소 1회 증상을 보고한 대상자의 백분율 기준). 4. 일반적 주의 1) 이 백신을 혈관내로 또는 피내로 투여하지 않는다. 2) 이 백신은 수두의 예방을 적응증으로 하지 않는다. 3) 다른 백신과 마찬가지로, 백신 접종 후 아나필락시스 반응이 일어날 경우에 대비하여 적절한 의학적 치료 와 감독이 항상 준비되어 있어야 한다. 4) 만 65세 이상을 대상으로 한 시판 후 관찰 연구(미국, 2017.10.01. ~ 2020.02.29.)에서, 이 백신 접종 후 42일 동안 급성·아데노증후군의 발생 위험 증가가 관찰되었다(백신 투여율 1,000,000 dose 당 발생 건수가 약 3건 증가). 이 백신 투여와의 인과관계를 판단하기에는 정보가 충분하지 않다. 5. 임부 및 수유부에 대한 투여 1) 임부: 임부에서 이 백신을 사용한 자료는 없다. 동물시험에서는 임신, 배태자 발달, 분만 또는 출생 후 발달과 관련하여 직접적 또는 간접적인 유해한 영향이 나타나지 않았다. 예방적 조치로서, 임신 중에는 이 백신의 사용을 피하는 것이 좋다. 2) 수유: 이 백신의 임종이 수유 중인 영아나 모체에 미치는 영향은 연구된 바 없다. 이 백신이 사람의 모유로 분비되는지 여부는 알려져 있지 않다. 3) 수태능: 동물시험에서 수컷 또는 암컷의 수태능 관련에 직접적 또는 간접적인 유해한 영향이 나타나지 않았다.

싱그릭스주
[대상포진바이러스백신(유전자재조합)]
Product Information
처방하시기 전 QR 코드 또는 식품의약품안전처 의약품통합정보시스템 (http://nedrug.mfds.go.kr)을 통해 상세제품정보를 참조하시기 바랍니다.

수입판매원 : (주)글락소스미스클라인, 서울특별시 용산구 한강대로 92 Tel. 080-901-4100
공동판매원 : GC녹십자 | 경기도 용인시 기흥구 이현로30번길 107 (보정동), 광동제약㈜ | 서울 서초구 서초중앙로 85 가산빌딩
GSK 제품 사용 중 발생한 이상사례(부작용)는 080-901-4100 또는 kr-medical-drug-safety@gsk.com으로 보고해 주시기 바랍니다.

PM-KR-SGX-BROC-240013 May 2024

ICoLA by KSoLA
International Congress on Lipid & Atherosclerosis

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

New Perspectives in Lipid and Atherosclerosis: Exploring Innovations

September 26(Thu)-28(Sat), 2024

CONRAD Seoul, Republic of Korea

ABSTRACT BOOK

Welcome Message

Dear Colleagues,

On behalf of the organizing committee, we extend a warm and heartfelt welcome to the 13th International Congress on Lipid & Atherosclerosis (ICoLA 2024), taking place at the Conrad Seoul, Republic of Korea, from September 26(Thu) to 28(Sat), 2024. We are thrilled to gather such a distinguished assemblage of experts in the field of lipid and atherosclerosis research in the vibrant, dynamic city of Seoul.

This year's congress, themed "New Perspectives in Lipid and Atherosclerosis: Exploring Innovations," promises an enriching journey into the frontiers of research and development. We will engage in stimulating discussions around the latest advancements, unveil pioneering innovations, and foster impactful collaborations that propel us towards a healthier future.

ICoLA 2024 features an exceptional lineup of internationally renowned speakers who will share their invaluable insights and ignite thought-provoking dialogues. A diverse range of sessions, including key lectures, main symposia, joint symposia, committee sessions, special sessions, oral & mini-oral presentations, will provide a platform for knowledge exchange, collaboration, and inspiration, particularly for young researchers to showcase their works and connect with established leaders in this field.

ICoLA 2024 transcends merely being a scientific gathering; it embodies a vibrant community of passionate individuals dedicated to advancing our understanding of lipids and atherosclerosis. We invite you to actively participate in this stimulating intellectual exchange, forge new collaborations, and contribute to shaping the future of this vital field.

We sincerely hope that you have a truly special experience at the congress. Once again, welcome to ICoLA 2024!

Sincerely,

Ick-Mo Chung
President, The Korean Society of Lipid and Atherosclerosis (KSoLA)

Jaetaek Kim
Chairman, Board of Directors, The Korean Society of Lipid and Atherosclerosis (KSoLA)

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

CONTENTS

Program at a Glance

[Day 1] September 26(Thu), 2024

(K): Korean Session

	Room 1	Room 2	Room 3	Room 4		
12:00~	Registration					
13:00~14:30	**Research Group Session (K) – TRL/LP(a) Research TFT Session** Lipoprotein(a): Unraveling its Mysteries and Implications	**Committee Session 1 (K)** Clinical Research Award Session	**Committee Session 2 (K)** Basic Research Committee Workshop	**VAS-KSoLA Joint Symposium** Dyslipidemia Guidelines: Similarity and Difference between Asian Countries (Room 4, 5F)	**Committee Session 3 (K)** Publication Committee Session: 2024 JLA Best Paper Award (Park Studio, 5F)	**Dyslipidemia Management Policy Session (K)** Significance and Interval of Cholesterol Testing in National Health Examinations (Studio 1,2,3, 6F)
14:30~14:40	Break					
14:40~16:10	**Oral Presentation 1**	**Oral Presentation 2**	**Oral Presentation 3**	**FH/Severe Dyslipidemia 1** JAS-KSoLA Joint Symposium on FH and Severe Dyslipidemia 1		
16:10~16:20	Break					
16:20~17:50	**ASPC-KSoLA Joint Symposium** Comprehensive Cardiovascular Prevention: CAC and Beyond	**EAVA-KSoLA Joint Symposium** Premature Atherosclerosis: What's Going On?	**Committee Session 4 (K)** Publication Committee Workshop: Research with AI Tools	**FH/Severe Dyslipidemia 2** JAS-KSoLA Joint Symposium on FH and Severe Dyslipidemia 2		
18:10~	Welcome Reception (Studio 1,2,3, 6F)					

Program at a Glance

[Day 2] September 27(Fri), 2024

(K): Korean Session

	Room 1	Room 2	Room 3	Room 4
07:30~08:30	Breakfast Symposium 1 (K)	Breakfast Symposium 2	Breakfast Symposium 3	Breakfast Symposium 4
08:30~10:00	**Symposium 1** New Antidyslipidemic Agents on the Horizon	**Symposium 2** Recent Advances in Metaflammation and Atherosclerosis Research	**Symposium 3 (K)** Nutrition Management and Related Systems Using AI	**Latin America-KSoLA Joint Symposium** Genetics and Environment Related to ASCVD
10:00~10:10	Break			
10:10~10:20	Opening Address			
10:20~11:00	**Special Lecture 1** Unrecognized role for insulin/IGF-1 signaling in the heart			
11:05~11:45	**Plenary Lecture 1** Inflammation and atherosclerosis: from theory to practice			
11:45~12:00	Coffee Break			
12:00~13:00	Luncheon Symposium 1 (K)	Luncheon Symposium 2	Luncheon Symposium 3	Luncheon Symposium 4
13:00~14:30	**Symposium 4** New Therapeutic Strategies for Metabolic Diseases	**Symposium 5** Comprehensive Cardiac Rehabilitation for Secondary Prevention of Atherosclerotic CVD	**Symposium 6** MASLD, Type 2 Diabetes, and Atherosclerotic Cardiovascular Disease	**OSLA-KSoLA Joint Symposium** Addressing Unmet Needs among High-Risk Patients with Atherosclerotic Cardiovascular Disease with Novel Lipid-Lowering Therapies
14:40~15:50	Mini-Oral Presentation 1			
15:50~16:30	**Keynote Lecture 1** Lipoprotein(a) in cardiovascular disease			
16:30~16:50	Coffee Break			
16:50~18:20	**2024 KSoLA Awards for Scientific Excellence & Young Investigator (K)**	**AAS-KSoLA Joint Symposium** Diabetes and Vascular Dysfunction	**Symposium 7** Role of Diets for Cardiometabolic Health	**MSA-KSoLA Joint Symposium** Metabolic Aspect of Atherosclerosis

Program at a Glance

[Day 3] September 28(Sat), 2024

(K): Korean Session

	Room 1	Room 2	Room 3	Room 4
07:50~08:50	Breakfast Symposium 5	Breakfast Symposium 6	Breakfast Symposium 7 (K)	Breakfast Symposium 8
08:50~10:20	**JAS-KSoLA Joint Symposium** Clinical Implication of Multi-Agonists in Cardiometabolic Diseases	**Symposium 8** Advances in Adipose Tissue Biology	**KNS-KSoLA Joint Symposium (K)** Current Knowledge and Future Perspectives in Dietary Fat Intake for Vascular Health	**Symposium 9** Biomechanical Factors in Atherosclerosis: Mechanisms and Clinical Implications
10:20~10:40	Coffee Break			
10:40~11:20	**Plenary Lecture 2** Lipid metabolism in thermogenic adipose tissues			
11:25~12:05	**Keynote Lecture 2** Recent advances in the treatment of dyslipidemia with PCSK9 therapy and a look into potential new options in the next 10 years			
12:05~12:20	Break			
12:20~13:20	Luncheon Symposium 5	Luncheon Symposium 6 (K)	Luncheon Symposium 7 (K)	
13:30~14:40	Mini-Oral Presentation 2			
14:40~15:20	**Special Lecture 2** Dissecting dietary approaches targeting lipid biomarkers			
15:20~15:40	Coffee Break			
15:40~17:10	**TSLA-KSoLA Joint Symposium** Remnant Cholesterol in the Statin Era	**SHVM-KSoLA Joint Symposium** Insights into Metabolic and Cardiovascular Dynamics	**Symposium 10** The Roles of Innate Immune Cells in Cardiovascular Disease	**EAS-KSoLA Joint Symposium** Novel Therapeutic Targets in Atherosclerosis
17:10~	Closing Ceremony			

Program in Detail

Key Lectures p. 47

Plenary Lecture 1

Sep 27(Fri) 11:05–11:45 | Room 1,2,3 (3F)

CHAIRPERSON : Jaetaek Kim (Chung-Ang University, Republic of Korea)

11:05–11:45 **Inflammation and atherosclerosis: from theory to practice**
Paul M Ridker (Harvard Medical School, USA)

Plenary Lecture 2

Sep 28(Sat) 10:40–11:20 | Room 1,2,3 (3F)

CHAIRPERSON : Jin Han (Inje University, Republic of Korea)

10:40–11:20 **Lipid metabolism in thermogenic adipose tissues**
Joerg Heeren (University of Hamburg, Germany)

Keynote Lecture 1

Sep 27(Fri) 15:50–16:30 | Room 1,2,3 (3F)

CHAIRPERSON : Ki Hoon Han (University of Ulsan, Republic of Korea)

15:50–16:30 **Lipoprotein(a) in cardiovascular disease**
Børge G. Nordestgaard (Copenhagen University, Denmark)

Keynote Lecture 2

Sep 28(Sat) 11:25–12:05 | Room 1,2,3 (3F)

CHAIRPERSON : Sang-Hyun Kim (Seoul National University, Republic of Korea)

11:25–12:05 **Recent advances in the treatment of dyslipidemia with PCSK9 therapy and a look into potential new options in the next 10 years**
R. Scott Wright (Mayo Clinic, USA)

Special Lecture 1

Sep 27(Fri) 10:20–11:00 | Room 1,2,3 (3F)

CHAIRPERSON : Ick-Mo Chung (Ewha Womans University, Republic of Korea)

10:20–11:00 **Unrecognized role for insulin/IGF-1 signaling in the heart**
Jaetaek Kim (Chung-Ang University, Republic of Korea)

Special Lecture 2

Sep 28(Sat) 14:40–15:20 | Room 1,2,3 (3F)

CHAIRPERSON : Jeongseon Kim (National Cancer Center, Republic of Korea)

14:40–15:20 **Dissecting dietary approaches targeting lipid biomarkers**
Sung Nim Han (Seoul National University, Republic of Korea)

Main Symposia p. 73

Symposium 1

Sep 27(Fri) 08:30–10:00 | Room 1 (3F)

New Antidyslipidemic Agents on the Horizon

CHAIRPERSON : Sang-Hak Lee (Yonsei University, Republic of Korea)

08:30–08:50 **Cutting-edge LP(a)-lowering therapies: how will they impact our practice?**
Yu Mi Kang (Havard Medical School/TIMI Study Group, USA)

08:50–09:10 **Cutting-edge triglyceride-lowering therapies: can we close the gap in hypertriglyceridemia management?**
Andre Zimerman (Moinhos de Vento Hospital and College of Health Sciences, Brazil)

09:10–09:30 **Cutting-edge LDL-lowering therapies: where will the next-generation PCSK9 inhibitors stand?**
Kyung Woo Park (Seoul National University, Republic of Korea)

09:30–10:00 **Panel Discussion**
Nam Hoon Kim (Korea University, Republic of Korea)
Jong-Chan Youn (The Catholic University of Korea, Republic of Korea)
Dong-Hyuk Cho (Korea University, Republic of Korea)

Symposium 2

Sep 27(Fri) 08:30–10:00 | Room 2 (3F)

Recent Advances in Metaflammation and Atherosclerosis Research

CHAIRPERSONS : Jin Han (Inje University, Republic of Korea)
Sung Joon Kim (Seoul National University, Republic of Korea)

08:30–08:50 **Protective roles of BLT2 receptor on the plasma membrane disruption–induced epithelial cell damage**
Takehiko Yokomizo (Juntendo University, Japan)

08:50–09:10 **Mechanistic insights into the cardioprotective effects of empagliflozin in myocardial infarction: metabolomic analysis of the emmy trial**
Mahmoud Abdellatif (University of Graz, Austria)

09:10–09:30 **TM4SF19–mediated lysosomal activity of macrophages in metaflammation**
Yun–Hee Lee (Seoul National University, Republic of Korea)

09:30–10:00 **Panel Discussion**
Yong Joo Ahn (POSTECH, Republic of Korea)
Juhyun Song (Chonnam National University, Republic of Korea)
Joo–Hui Han (Woosuk University, Republic of Korea)

Symposium 3 (K)

Sep 27(Fri) 08:30–10:00 | Room 3 (3F)

Nutrition Management and Related Systems Using AI

CHAIRPERSONS : Hyojee Joung (Seoul National University, Republic of Korea)
Eun Mi Kim (Kangbuk Samsung Hospital, Republic of Korea)

08:30–08:50 **Advancing precision nutrition: addressing nutritional challenges for Koreans**
Hyunjung Lim (Kyung Hee University, Republic of Korea)

08:50–09:10 **Personalized artificial intelligence nutritional management platform**
Saningun Lee (Dr.diary, Republic of Korea)

09:10–09:30 **Development of AI–based care system of precision nutrition for health**
Jiyoung Kim (NUSEUM–LAB, Republic of Korea)

09:30–10:00 **Panel Discussion**
Shin Ok Park (Noom Korea, Republic of Korea)
Jean Kyung Paik (Eulji University, Republic of Korea)
Youngmin Han (Yonsei University, Republic of Korea)

Symposium 4

Sep 27(Fri) 13:00–14:30 | Room 1 (3F)

New Therapeutic Strategies for Metabolic Diseases

CHAIRPERSONS : YongSeek Park (Kyung Hee University, Republic of Korea)
Chanbae Park (Ajou University, Republic of Korea)

13:00–13:20	**Cardiac-specific SERCA overexpression improves cardiac and systemic glucose metabolism during diabetes** **Véronique Anne Lacombe** (Oklahoma State University, USA)
13:20–13:40	**ADAMTS4 elicits myeloid-derived immune cell recruitment and liver fibrogenesis in metabolic dysfunction-associated steatotic liver disease** **Won Kim** (Seoul National University, Republic of Korea)
13:40–14:00	**Gene and cell therapies for metabolic disease** **Il Minn** (University of Texas Southwestern Medical Center, USA)
14:00–14:30	**Panel Discussion** **Jeonghan Kim** (The Catholic University of Korea, Republic of Korea) **Hyeongseok Kim** (Chungnam National University, Republic of Korea) **Chang-Myung Oh** (GIST, Republic of Korea)

Symposium 5

Sep 27(Fri) 13:00–14:30 | Room 2 (3F)

Comprehensive Cardiac Rehabilitation for Secondary Prevention of Atherosclerotic CVD

CHAIRPERSONS : Ick-Mo Chung (Ewha Womans University, Republic of Korea)
Chul Kim (Inje University, Republic of Korea)

13:00–13:15	**How can we recover atherosclerotic cardiovascular disease?** **Ick-Mo Chung** (Ewha Womans University, Republic of Korea)
13:15–13:35	**Cardiac rehabilitation: A high value service in need of disruptive innovation** **Randal J. Thomas** (Mayo Clinic, USA)
13:35–13:55	**Nutritional strategies for the prevention and management of cardiometabolic conditions** **Qi Sun** (Harvard Medical School, USA)
13:55–14:10	**Exercise strategies for optimal cardiovascular recovery: key considerations for cardiovascular disease and type 2 diabetes** **Kyuwan Lee** (Ewha Womans University, Republic of Korea)
14:10–14:30	**Panel Discussion** **Hyun-Jae Kang** (Seoul National University, Republic of Korea) **Jong-Chan Youn** (The Catholic University of Korea, Republic of Korea) **Jungeun Lee** (Seoul National University, Republic of Korea) **Jong-Young Lee** (Sungkyunkwan University, Republic of Korea)

Symposium 6

Sep 27(Fri) 13:00–14:30 | Room 3 (3F)

MASLD, Type 2 Diabetes, and Atherosclerotic Cardiovascular Disease

CHAIRPERSONS : Sung Rae Kim (The Catholic University of Korea, Republic of Korea)
Cheol-Young Park (Sungkyunkwan University, Republic of Korea)

13:00–13:20	**MASLD and type 2 diabetes: are they different disease entities?** **Kyung-Soo Kim** (CHA University, Republic of Korea)
13:20–13:40	**MASLD and ASCVD: epidemiologic and genetic associations** **Martijn Brouwers** (Maastricht University, Netherlands)
13:40–14:00	**Does targeting MASLD reduce cardiovascular risk?** **Jae Seung Lee** (Yonsei University, Republic of Korea)
14:00–14:30	**Panel Discussion** **Yong-ho Lee** (Yonsei University, Republic of Korea) **Jae-Han Jeon** (Kyungpook National University, Republic of Korea) **Yun Kyung Cho** (University of Ulsan, Republic of Korea)

Symposium 7

Sep 27(Fri) 16:50–18:20 | Room 3 (3F)

Role of Diets for Cardiometabolic Health

CHAIRPERSONS : Min-Jeong Shin (Korea University, Republic of Korea)
Oh Yoen Kim (Dong-A University, Republic of Korea)

16:50–17:10	**Cardiovascular protective effects of a healthy dietary pattern with carotenoids rich food consumption** **Jung Eun Kim** (National University of Singapore, Singapore)
17:10–17:30	**Insights into dietary polyphenols in disorders of lipid metabolism** **Bohkyung Kim** (Pusan National University, Republic of Korea)
17:30–17:50	**Plant-based diets and human cardiometabolic health** **Qi Sun** (Harvard Medical School, USA)
17:50–18:20	**Panel Discussion** **Minjoo Kim** (Hannam University, Republic of Korea) **Kyong Park** (Yeungnam University, Republic of Korea) **Jeong-Hwa Choi** (Keimyung University, Republic of Korea)

Symposium 8

Sep 28(Sat) 08:50–10:20 | Room 2 (3F)

Advances in Adipose Tissue Biology

CHAIRPERSONS : Joerg Heeren (University of Hamburg, Germany)
Young Mi Park (Ewha Womans University, Republic of Korea)

08:50–09:10 **Cold-activated HuR fuels brown fat thermogenesis via fatty acid utilization**
Jae Myoung Suh (KAIST, Republic of Korea)

09:10–09:30 **Targets of a novel anti-diabetic drug Imeglimin**
Motoharu Awazawa (National Center for Global Health and Medicine (NCGM), Japan)

09:30–09:50 **Role of obesogenic memory in obesity-related cardiovascular diseases**
Kae Won Cho (Soonchunhyang University, Republic of Korea)

09:50–10:20 **Panel Discussion**
Yun-Hee Lee (Seoul National University, Republic of Korea)
Jae-Han Jeon (Kyungpook National University, Republic of Korea)
Su Myung Jung (Sungkyunkwan University, Republic of Korea)

Symposium 9

Sep 28(Sat) 08:50–10:20 | Room 4 (5F)

Biomechanical Factors in Atherosclerosis: Mechanisms and Clinical Implications

CHAIRPERSONS : Kyong Soo Park (Konkuk University, Republic of Korea)
Donghoon Choi (Yonsei University, Republic of Korea)

08:50–09:10 **Shear stress on endothelial cell and its molecular cascade to accelerated atherosclerosis**
Chang-Hoon Woo (Yeungnam University, Republic of Korea)

09:10–09:30 **HEG1 protects against atherosclerosis by regulating stable flow-induced KLF2/4 expression in endothelial cells**
Hanjoong Jo (Emory University, USA)

09:30–09:50 **Perspectives in predicting rapid plaque progression and future coronary events**
Kwan Yong Lee (The Catholic University of Korea, Republic of Korea)

09:50–10:20 **Panel Discussion**
Yoo-Wook Kwon (Seoul National University, Republic of Korea)
Seung-Hwan Lee (The Catholic University of Korea, Republic of Korea)
Kyung-Sun Heo (Chungnam National University, Republic of Korea)

Symposium 10

Sep 28(Sat) 15:40–17:10 | Room 3 (3F)

The Roles of Innate Immune Cells in Cardiovascular Disease

CHAIRPERSONS : Goo Taeg Oh (Ewha Womans University, Republic of Korea)
Jae-Hoon Choi (Hanyang University, Republic of Korea)

15:40–16:00 **Refined cardiovascular risk prediction with immune-cell biomarkers**
Andreas Zirlik (Medical University of Graz, Austria)

16:00–16:20 **Control of airway inflammation by lipid metabolism in dendritic cells**
Yeonseok Chung (Seoul National University, Republic of Korea)

16:20–16:40 **Macrophage metabolism in foam cell formation**
Andrew Murphy (Baker Heart and Diabetes Institute, Australia)

16:40–17:00 **Extracellular vesicles as mediators of innate immunity in atherothrombosis**
Christoph J. Binder (Medical University of Vienna, Austria)

Joint Symposia p. 119

VAS-KSoLA Joint Symposium

Sep 26(Thu) 13:00–14:30 | Room 4 (5F)

Dyslipidemia Guidelines: Similarity and Difference between Asian Countries

CHAIRPERSONS : Tien Hoang Anh (Hue University of Medicine and Pharmacy, Vietnam)
Eun-Jung Rhee (Sungkyunkwan University, Republic of Korea)

13:00–13:20 **Highlights of the Vietnam Atherosclerosis Society guideline on lipid disorders**
Tien Hoang Anh (Hue University of Medicine and Pharmacy, Vietnam)

13:20–13:40 **The target LDL-C levels in Korean dyslipidemia guidelines**
Hack-Lyoung Kim (Seoul National University, Republic of Korea)

13:40–14:00 **Cardiovascular disease risk prediction in the Korean population**
Hokyou Lee (Yonsei University, Republic of Korea)

14:00–14:30 **Panel Discussion**
Kim Ngoc Thanh (Hanoi Medical University, Vietnam)
Yun Kyung Cho (University of Ulsan, Republic of Korea)
Jun Hwan Cho (Chung-Ang University, Republic of Korea)

ASPC-KSoLA Joint Symposium

Sep 26(Thu) 16:20-17:50 | Room 1 (3F)

Comprehensive Cardiovascular Prevention: CAC and Beyond

CHAIRPERSONS : Sungha Park (Yonsei University, Republic of Korea)
Eun-Jung Rhee (Sungkyunkwan University, Republic of Korea)

16:20-16:40	**Role of CAC in prevention of ASCVD** **Khurram Nasir** (Houston Methodist DeBakey Heart & Vascular Center, USA)
16:40-17:00	**Clinical implication and limitations of CAC testing** **Jang Hoon Lee** (Kyungpook National University, Republic of Korea)
17:00-17:20	**Role of imaging in CV prevention – beyond CAC** **Sang-Eun Lee** (Ewha Womans University, Republic of Korea)
17:20-17:50	**Panel Discussion** **Min Jung Lee** (University of Ulsan, Republic of Korea) **SungWan Chun** (Soonchunhyang University, Republic of Korea) **Jun Hwan Cho** (Chung-Ang University, Republic of Korea)

EAVA-KSoLA Joint Symposium

Sep 26(Thu) 16:20-17:50 | Room 2 (3F)

Premature Atherosclerosis: What's Going On?

CHAIRPERSONS : Ashraf Reda (Menofia University, Egypt)
Soon Jun Hong (Korea University, Republic of Korea)

16:20-16:40	**Premature atherosclerosis, Egyptian data** **Ashraf Reda** (Menofia University, Egypt)
16:40-17:00	**Premature atherosclerosis, archived case scenarios** **EL Sayed Farag** (Zagazig University, Egypt)
17:00-17:20	**Metabolic risk factors and ASCVD in young Korean adults** **Su-Yeon Choi** (Seoul National University, Republic of Korea)
17:20-17:50	**Panel Discussion** **Hoyoun Won** (Chung-Ang University, Republic of Korea) **Jung-Hee Lee** (Yonsei University, Republic of Korea) **Jun Hwa Hong** (Eulji University, Republic of Korea)

Latin America-KSoLA Joint Symposium

Sep 27(Fri) 08:30-10:00 | Room 4 (5F)

Genetics and Environment Related to ASCVD

CHAIRPERSONS : Rodrigo Alonso (Center for Advanced Metabolic Medicine and Nutrition, Chile)
In-Kyung Jeong (Kyung Hee University, Republic of Korea)

08:30-08:45	**Atherosclerotic risk factors and CVD after cancer: growing unmet needs** **Hokyou Lee** (Yonsei University, Republic of Korea)
08:45-09:00	**Familial hypercholesterolemia in Latam region; how have we progressed in the last decade?** **Rodrigo Alonso** (Center for Advanced Metabolic Medicine and Nutrition, Chile)
09:00-09:15	**Lipoprotein(a): past, present, and future insights** **Pablo Corral** (Fasta University, Argentina)
09:15-09:30	**Dietary intervention and CVD: which is the best diet in Latin America?** **Alvaro Avezum** (Sao Paulo University, Brazil)
09:30-10:00	**Discussion**

OSLA-KSoLA Joint Symposium

Sep 27(Fri) 13:00-14:30 | Room 4 (5F)

Addressing Unmet Needs among High-Risk Patients with Atherosclerotic Cardiovascular Disease with Novel Lipid-Lowering Therapies

CHAIRPERSONS : Khamis Al Hashmi (Sultan Qaboos University, Oman)
Seonghoon Choi (Hallym University, Republic of Korea)

13:00-13:20	**Addressing residual risk in diabetes in the Gulf region** **Khalid Al Rasadi** (Sultan Qaboos University, Oman)
13:20-13:40	**Addressing unmet needs in familial hypercholesterolemia in Oman** **Khalid Al Waili** (Sultan Qaboos University, Oman)
13:40-14:00	**Anti-inflammatory therapeutics for atherosclerosis: beyond LDL-C lowering** **Nam Hoon Kim** (Korea University, Republic of Korea)
14:00-14:30	**Panel Discussion** **Kyuho Kim** (The Catholic University of Korea, Republic of Korea) **Sang Min Park** (Eulji University, Republic of Korea) **Minjae Yoon** (Seoul National University, Republic of Korea)

AAS-KSoLA Joint Symposium

Sep 27(Fri) 16:50-18:20 | Room 2 (3F)

Diabetes and Vascular Dysfunction

CHAIRPERSONS : Georges Grau (The University of Sydney, Australia)
Hyuk-Sang Kwon(The Catholic University of Korea, Republic of Korea)

16:50-17:10 **Targeting inflammation to lessen diabetes-associated cardiovascular complications**
Judy B. de Haan (Baker Heart and Diabetes Institute, Australia)

17:10-17:30 **Endothelial dysfunction in diabetic kidney disease**
Jae-Han Jeon (Kyungpook National University, Republic of Korea)

17:30-17:50 **Vascular dysfunction in cerebral malaria: a peculiar case of immuno-thrombosis, underpinned by extracellular vesicles**
Georges Grau (The University of Sydney, Australia)

17:50-18:20 **Panel Discussion**
Jin Hwa Kim (Chosun University, Republic of Korea)
Jang Won Son (The Catholic University of Korea, Republic of Korea)
Eun-Hee Cho (Kangwon National University, Republic of Korea)

MSA-KSoLA Joint Symposium

Sep 27(Fri) 16:50-18:20 | Room 4 (5F)

Metabolic Aspect of Atherosclerosis

CHAIRPERSONS : Hyun-Jae Kang (Seoul National University, Republic of Korea)
Min Kyong Moon (Seoul National University, Republic of Korea)

16:50-17:10 **Organokines and atherosclerosis**
Kyung Mook Choi (Korea University, Republic of Korea)

17:10-17:30 **Ectopic fat dynamics: unraveling the interplay between myosteatosis and cardiometabolic health**
Yun Kyung Cho (University of Ulsan, Republic of Korea)

17:30-17:50 **MASLD, obesity and atherosclerosis**
Lee-Ling Lim (University Malaya Medical Centre, Malaysia)

17:50-18:20 **Panel Discussion**
Yeoree Yang (The Catholic University of Korea, Republic of Korea)
Youngwoo Jang (Gachon University, Republic of Korea)
Chang Hee Jung (University of Ulsan, Republic of Korea)

JAS-KSoLA Joint Symposium

Sep 28(Sat) 08:50-10:20 | Room 1 (3F)

Clinical Implication of Multi-Agonists in Cardiometabolic Diseases

CHAIRPERSONS : Jung-Hyun Noh (Inje University, Republic of Korea)
Byung-Wan Lee (Yonsei University, Republic of Korea)

08:50-09:10 **Efficacy and safety of tirzepatide, a GIP and GLP-1 dual agonist, in persons with type 2 diabetes**
Yasuo Terauchi (Yokohama City University, Japan)

09:10-09:30 **Upcoming multi-agonists for cardio-metabolic disease**
Chang Hee Jung (University of Ulsan, Republic of Korea)

09:30-09:50 **A potential mechanism of a dual GLP-1/GIP receptor agonist**
Yong-ho Lee (Yonsei University, Republic of Korea)

09:50-10:20 **Panel Discussion**
Shinae Kang (Yonsei University, Republic of Korea)
Osung Kwon (The Catholic University of Korea, Republic of Korea)
Dae Young Cheon (Hallym University, Republic of Korea)

KNS-KSoLA Joint Symposium (K)

Sep 28(Sat) 08:50-10:20 | Room 3 (3F)

Current Knowledge and Future Perspectives in Dietary Fat Intake for Vascular Health

CHAIRPERSONS : Hye Young Kim (Yong In University, Republic of Korea)
Jeongseon Kim (National Cancer Center, Republic of Korea)

08:50-09:10 **Associations of dietary lipid intake with cardiovascular disease in Koreans based on nutritional epidemiology studies**
Jung Hyun Kwak (Inje University, Republic of Korea)

09:10-09:30 **Fat intake and atherosclerotic cardiovascular diseases**
Youngwoo Jang (Gachon University, Republic of Korea)

09:30-09:50 **Dietary advanced glycation end products and vascular function**
Yoona Kim (Gyeongsang National University, Republic of Korea)

09:50-10:20 **Panel Discussion**
Yuri Kim (Ewha Womans University, Republic of Korea)
Jun Hwan Cho (Chung-Ang University, Republic of Korea)

TSLA-KSoLA Joint Symposium

Sep 28(Sat) 15:40-17:10 | Room 1 (3F)

Remnant Cholesterol in the Statin Era

CHAIRPERSONS : Byung Jin Kim (Sungkyunkwan University, Republic of Korea)
Young Joon Hong (Chonnam National University, Republic of Korea)

15:40-16:00 **How does remnant cholesterol related to cardiometabolic multimorbidity**
Jun Hwa Hong (Eulji University, Republic of Korea)

16:00-16:20 **Epidemiologic evidence of hyper TG or remnant cholesterol on CVD**
Donna Shu-Han Lin (Shin Kong Wu Ho-Su Memorial Hospital, Taiwan)

16:20-16:40 **Treatments targeting remnant cholesterol or hyperTG in Asians: do we have an option?**
Youngwoo Jang (Gachon University, Republic of Korea)

16:40-17:10 **Panel Discussion**
Je Sang Kim (Bucheon Sejong Hospital, Republic of Korea)
Ye Seul Yang (Seoul National University, Republic of Korea)
Hye Jin Yoo (Korea University, Republic of Korea)

SHVM-KSoLA Joint Symposium

Sep 28(Sat) 15:40-17:10 | Room 2 (3F)

Insights into Metabolic and Cardiovascular Dynamics

CHAIRPERSONS : Chi Dae Kim (Pusan National University, Republic of Korea)
Hyoung Kyu Kim (Inje University, Republic of Korea)

15:40-16:00 **Regulation of the sphingosine 1-phosphate receptor 1 in nonalcoholic hepatosteatosis**
Tae-Sik Park (Gachon University, Republic of Korea)

16:00-16:20 **Plasma ceramides in the prediction of cardiovascular disease**
Linda Peterson (Washington University, USA)

16:20-16:40 **Mechanisms contributing to pregnancy-induced cardiac growth**
Helen E. Collins (University of Louisville, USA)

16:40-17:10 **Panel Discussion**
Yong Sook Kim (Chonnam National University, Republic of Korea)
Sun-Hee Woo (Chungnam National University, Republic of Korea)
Yin Hua Zhang (Seoul National University, Republic of Korea)

EAS-KSoLA Joint Symposium

Sep 28(Sat) 15:40-17:10 | Room 4 (5F)

Novel Therapeutic Targets in Atherosclerosis

CHAIRPERSONS : Myung-A Kim (Seoul National University, Republic of Korea)
Kyung Woo Park (Seoul National University, Republic of Korea)

15:40-16:00 **Gene editing for dyslipidemia and atherosclerosis**
Giuseppe Danilo Norata (University of Milan, Italy)

16:00-16:20 **Intravascular multi-modal imaging-assisted targeted theranostic strategy on atherosclerotic plaque**
Jin Won Kim (Korea University, Republic of Korea)

16:20-16:40 **LDL burden: a fresh look to cardiovascular prevention**
Alberico L. Catapano (University of Milan and IRCCS Multimedica, Milan, Italy)

16:40-17:10 **Panel Discussion**
Hee-Dong Kim (Soonchunhyang University, Republic of Korea)
Dong-Hyuk Cho (Korea University, Republic of Korea)
Jung-Joon Cha (Korea University, Republic of Korea)

Committee Sessions p. 171

Committee Session 1 (K)

Sep 26(Thu) 13:00-14:30 | Room 2 (3F)

Clinical Research Award Session

CHAIRPERSONS : Sungha Park (Yonsei University, Republic of Korea)
Seung-Hwan Lee (The Catholic University of Korea, Republic of Korea)

13:00-13:20 **Association of triglyceride-to-HDL cholesterol ratio with type 2 diabetes in young adults: a longitudinal study from South Korea**
Min-Kyung Lee (Hanyang University, Republic of Korea)

13:20-13:40 **Incidence, predictor, and long-term clinical outcomes of intolerance of high-intensity statin in Korean patients with atherosclerotic cardiovascular disease: data from 2 randomized clinical trials**
Sung-Jin Hong (Yonsei University, Republic of Korea)

13:40-14:00 **Optimal lipid levels according to the characteristics of diabetes mellitus**
Mee Kyoung Kim (The Catholic University of Korea, Republic of Korea)

14:00-14:30 **Panel Discussion**
Eun Young Lee (The Catholic University of Korea, Republic of Korea)
Ji-Yong Jang (National Health Insurance Service Ilsan Hospital, Republic of Korea)
Jun Hwa Hong (Eulji University, Republic of Korea)

Committee Session 2 (K)

Sep 26(Thu) 13:00–14:30 | Room 3 (3F)

Basic Research Committee Workshop

CHAIRPERSONS : **Minho Shong** (KAIST, Republic of Korea)
Jun Namkung (Yonsei University, Republic of Korea)

13:00–13:20	**Regulatory mechanism by SREBP-1c in metabolic dysfunction-associated steatohepatitis** **Seung-Soon Im** (Keimyung University, Republic of Korea)
13:20–13:40	**Long-term metabolic programming by perinatal hypothalamic-pituitary hormones** **Jun Young Hong** (Yonsei University, Republic of Korea)
13:40–14:00	**The novel roles of intracellular Ca2+ and Phosphoinositide coupling for metabolic signaling and diseases** **Byung-Chul Oh** (Gachon University, Republic of Korea)
14:00–14:30	**Panel Discussion** **KyeongJin Kim** (Inha University, Republic of Korea) **Hong-Yeoul Ryu** (Kyungpook National University, Republic of Korea) **Kae Won Cho** (Soonchunhyang University, Republic of Korea)

Committee Session 3 (K)

Sep 26(Thu) 13:00–14:30 | Park Studio (5F)

Publication Committee Session: 2024 JLA Best Paper Award

CHAIRPERSONS : **Won-Young Lee** (Sungkyunkwan University, Republic of Korea)
Hyun Kang (Chung-Ang University, Republic of Korea)

13:00–13:15	**Autophagy enhancers regulate cholesterol-induced cytokine secretion and cytotoxicity in macrophages** **So Yeong Cheon** (Konkuk University, Republic of Korea)
13:15–13:30	**Lipid-lowering efficacy of combination therapy with moderate-intensity Statin and Ezetimibe versus high-intensity Statin monotherapy: A randomized, open-label, non-inferiority trial from Korea** **Hyejung Choi** (Hallym University, Republic of Korea)
13:30–13:45	**Higher non-high-density lipoprotein cholesterol was higher associated with cardiovascular disease comparing higher LDL-C in nine years follow up: cohort study** **Sangmo Hong** (Hanyang University, Republic of Korea)
13:45–14:00	**Clinical characteristics of patients with statin discontinuation in Korea: A nationwide population-based study** **Kyung-Soo Kim** (CHA University, Republic of Korea)
14:00–14:15	**Metformin reduces the progression of atherogenesis by regulating the Sestrin2-mTOR pathway in obese and diabetic rats** **Nagaraj Manickam** (Madras Diabetes Research Foundation (MDRF), India)
14:15–14:25	**Discussion**
14:25–14:30	**JLA Award Ceremony**

Special Sessions p. 187

Research Group Session (K) – TRL/LP(a) Research TFT Session

Sep 26(Thu) 13:00–14:30 | Room 1 (3F)

Lipoprotein(a): Unraveling its Mysteries and Implications

CHAIRPERSONS : Sang-Hyun Kim (Seoul National University, Republic of Korea)
Byung Jin Kim (Sungkyunkwan University, Republic of Korea)

13:00–13:15	**Lipoprotein(a) metabolism: unlocking its secrets** **Jang Hoon Lee** (Kyungpook National University, Republic of Korea)
13:15–13:30	**Unveiling the dark side: LP(a)-associated OxPLs and their role in fueling atherosclerosis** **Youngwoo Jang** (Gachon University, Republic of Korea)
13:30–13:45	**Beyond genetics: unraveling the multifaceted influences shaping LP(a) concentrations** **Sang Min Park** (Eulji University, Republic of Korea)
13:45–14:00	**Navigating the LP(a) labyrinth: illuminating measurement challenges and methodological odyssey** **Sang-Guk Lee** (Yonsei University, Republic of Korea)
14:00–14:30	**Panel Discussion** **Sangwoo Park** (University of Ulsan, Republic of Korea) **Minjae Yoon** (Seoul National University, Republic of Korea) **Ki-Hyun Jeon** (Seoul National University, Republic of Korea) **Jung Hyun Choi** (Pusan National University, Republic of Korea)

FH/Severe Dyslipidemia 1

Sep 26(Thu) 14:40–16:10 | Room 4 (5F)

JAS-KSoLA Joint Symposium on FH and Severe Dyslipidemia 1

CHAIRPERSON : Sang-Hak Lee (Yonsei University, Republic of Korea)
PANEL : Jae Hyoung Park (Korea University, Republic of Korea)

14:40–15:00	**Clinical and molecular risk factors in severe FH** **Soo Heon Kwak** (Seoul National University, Republic of Korea)
15:00–15:10	**Discussion**
15:10–15:30	**The current status of HoFH in Japan** **Mariko Harada-Shiba** (Osaka Medical & Pharmaceutical University, Japan)
15:30–15:40	**Discussion**
15:40–15:48	**Prevalence and clinical characteristics of FH in patients with ACS in Japan: insight from the EXPLORE-J study** **Yasuaki Takeji** (Kanazawa University, Japan)
15:48–15:55	**Q&A**
15:55–16:03	**Omics markers of FH** **Dae Young Cheon** (Hallym University, Republic of Korea)
16:03–16:10	**Q&A**

FH/Severe Dyslipidemia 2

Sep 26(Thu) 16:20–17:35 | Room 4 (5F)

JAS–KSoLA Joint Symposium on FH and Severe Dyslipidemia 2

CHAIRPERSON : Sang-Hak Lee (Yonsei University, Republic of Korea)
PANEL : Kyuho Kim (The Catholic University of Korea, Republic of Korea)

16:20–16:40 **Polygenic background modifies risk of CAD in individuals with HeFH**
Injeong Shim (Massachusetts General Hospital, Broad Institute of MIT and Harvard, USA)

16:40–16:50 **Discussion**

16:50–17:10 **Differential diagnosis of severe hypercholesterolemia in clinical practice**
Hayato Tada (Kanazawa University, Japan)

17:10–17:20 **Discussion**

17:20–17:28 **Evaluation of Achilles Tendon Thickness by Ultrasonography as a Predictor of Coronary Artery Disease Severity in Non-Familial Hypercholesterolemia Patients**
Shimpei Fujioka (Osaka Medical & Pharmaceutical University, Japan)

17:28–17:35 **Q&A**

2024 KSoLA Awards for Scientific Excellence & Young Investigator (K)

Sep 27(Fri) 16:50–18:20 | Room 1 (3F)

CHAIRPERSONS : Ick-Mo Chung (Ewha Womans University, Republic of Korea)
Jaetaek Kim (Chung-Ang University, Republic of Korea)

16:50–16:55 **2024 KSoLA Award Ceremony for Scientific Excellence**

16:55–17:00 **2024 KSoLA Award Ceremony for Young Investigator**

17:00–17:20 **Treatment target discovery from cardio-protective phenotype**
Sang-Hak Lee (Yonsei University, Republic of Korea)

17:20–17:25 **Q&A**

Satellite Symposia p. 207

Breakfast Symposium 1 (K)

Sep 27(Fri) 07:30–08:30 | Room 1 (3F)

CHAIRPERSON : Sang Hong Baek (The Catholic University of Korea, Republic of Korea)

07:30–07:50 **Cardiac biomarkers for patients with diabetes**
Chae Won Chung (Chung-Ang University, Republic of Korea)

07:50–08:00 **Panel Discussion**
Minjae Yoon (Seoul National University, Republic of Korea)
Yongin Cho (Inha University, Republic of Korea)

Breakfast Symposium 2

Sep 27(Fri) 07:30-08:30 | Room 2 (3F)

CHAIRPERSON : Jeong-taek Woo (Kyung Hee University, Republic of Korea)

07:30-07:50 **Timeless choice: evidenced-based lipitor more than 25 years**
Dae-Won Kim (The Catholic University of Korea, Republic of Korea)

07:50-08:00 **Panel Discussion**
Hee-Dong Kim (Soonchunhyang University, Republic of Korea)
Hun Jee Choe (Hallym University, Republic of Korea)

Breakfast Symposium 3

Sep 27(Fri) 07:30-08:30 | Room 3 (3F)

CHAIRPERSON : Hyun Ho Shin (Asan Chungmu Hospital, Republic of Korea)

07:30-07:50 **Treat-to-target LDL-C lowering strategy with Lipitor portfolio**
Jeehoon Kang (Seoul National University, Republic of Korea)

07:50-08:00 **Panel Discussion**
Seon Mee Kang (Soonchunhyang University, Republic of Korea)
Hyun-Jin Kim (Hanyang University, Republic of Korea)

Breakfast Symposium 4

Sep 27(Fri) 07:30-08:30 | Room 4 (5F)

CHAIRPERSON : Jeong Euy Park (Park Jeong Euy Internal Medicine Clinic, Republic of Korea)

07:30-07:50 **Lipid-lowering efficacy of combination therapy with moderate-intensity statin and ezetimibe versus high-intensity statin monotherapy**
Si-Hyuck Kang (Seoul National University, Republic of Korea)

07:50-08:00 **Panel Discussion**
Bukyung Kim (Kosin University, Republic of Korea)
Sung A Bae (Yonsei University, Republic of Korea)

Breakfast Symposium 5

Sep 28(Sat) 07:50-08:50 | Room 1 (3F)

CHAIRPERSON : Shung Chull Chae (Kyungpook National University, Republic of Korea)

07:50-08:10 **New evidence of Atorvastatin: optimal balance between efficacy and safety**
Jun Hwa Hong (Eulji University, Republic of Korea)

08:10-08:20 **Panel Discussion**
Jee Hee Yoo (Chung-Ang University, Republic of Korea)
Dae Young Cheon (Hallym University, Republic of Korea)

Breakfast Symposium 6

Sep 28(Sat) 07:50–08:50 | Room 2 (3F)

CHAIRPERSON : Hong Seog Seo (Seoul Red Cross Hospital, Republic of Korea)

07:50–08:10 **Beyond LDL-C: the role of fenofibrate in exploring non-HDL-C as a predictor of cardiovascular risk**
Soo Lim (Seoul National University, Republic of Korea)

08:10–08:20 **Panel Discussion**
Kyu-Yong Ko (Inje University, Republic of Korea)
Minyoung Lee (Yonsei University, Republic of Korea)

Breakfast Symposium 7 (K)

Sep 28(Sat) 07:50–08:50 | Room 3 (3F)

CHAIRPERSON : Ung Kim (Yeungnam University, Republic of Korea)

07:50–08:10 **Levacalm: safe and effective agent for all hypertension patients**
Jong-Young Lee (Sungkyunkwan University, Republic of Korea)

08:10–08:20 **Panel Discussion**
Joon Ho Moon (Seoul National University, Republic of Korea)
Jung-Joon Cha (Korea University, Republic of Korea)

Breakfast Symposium 8

Sep 28(Sat) 07:50–08:50 | Room 4 (5F)

CHAIRPERSON : Keeho Song (Konkuk University, Republic of Korea)

07:50–08:10 **Renal safety issues in dyslipidemia treatment: why is it important?**
Se Eun Park (Sungkyunkwan University, Republic of Korea)

08:10–08:20 **Panel Discussion**
Minkwan Kim (Yonsei University, Republic of Korea)
Joonyub Lee (The Catholic University of Korea, Republic of Korea)

Luncheon Symposium 1 (K)

Sep 27(Fri) 12:00–13:00 | Room 1 (3F)

CHAIRPERSON : Myung Ho Jeong (Gwangju Veterans Hospital, Republic of Korea)

12:00–12:20 **It's time to break therapeutic inertia in dyslipidemia treatment**
Young Sang Lyu (Chosun University, Republic of Korea)

12:20–12:30 **Panel Discussion**
Inki Moon (Soonchunhyang University, Republic of Korea)
Yeon-Kyung Choi (Kyungpook National University, Republic of Korea)

Luncheon Symposium 2

Sep 27(Fri) 12:00-13:00 | Room 2 (3F)

CHAIRPERSON : Chee Jeong Kim (Chung-Ang University, Republic of Korea)

12:00-12:20 **Cutting edge care of pitavastatin with ezetimibe combination therapy**
Chang Hee Jung (University of Ulsan, Republic of Korea)

12:20-12:30 **Panel Discussion**
You-Jeong Ki (Eulji University, Republic of Korea)
Nam Hoon Kim (Korea University, Republic of Korea)

Luncheon Symposium 3

Sep 27(Fri) 12:00-13:00 | Room 3 (3F)

CHAIRPERSON : Hyo-Soo Kim (Seoul National University, Republic of Korea)

12:00-12:20 **Efficacy and evidence of ezetimibe atorvastatin combination therapy**
Eun Young Lee (The Catholic University of Korea, Republic of Korea)

12:20-12:30 **Panel Discussion**
Hoyoun Won (Chung-Ang University, Republic of Korea)
Dong-Hwa Lee (Chungbuk National University, Republic of Korea)

Luncheon Symposium 4

Sep 27(Fri) 12:00-13:00 | Room 4 (5F)

CHAIRPERSON : Moon-Kyu Lee (Eulji University, Republic of Korea)

12:00-12:20 **Inflammation and its biomarkers & anti-inflammatory therapy in CVD**
Paul M Ridker (Harvard Medical School, USA)

12:20-12:30 **Panel Discussion**
Youngwoo Jang (Gachon University, Republic of Korea)
Dughyun Choi (Soonchunhyang University, Republic of Korea)

Luncheon Symposium 5

Sep 28(Sat) 12:20-13:20 | Room 1 (3F)

CHAIRPERSON : In-Ho Chae (Seoul National University, Republic of Korea)

12:20-12:40 **New era of siRNA; treatment paradigm shift in ASCVD**
R. Scott Wright (Mayo Clinic, USA)

12:40-12:50 **Panel Discussion**
Sang-Eun Lee (Ewha Womans University, Republic of Korea)
Jin Woo Jeong (Wonkwang University, Republic of Korea)

Luncheon Symposium 6 (K)

Sep 28(Sat) 12:20–13:20 | Room 2 (3F)

CHAIRPERSON : Young-Bae Park (Seoul National University, Republic of Korea)

12:20–12:40 **Why is Shingrix vaccination necessary for patients with diabetes and hypertension?**
Jong-Chan Youn (The Catholic University of Korea, Republic of Korea)

12:40–13:00 **Panel Discussion**
Dong-Hyuk Cho (Korea University, Republic of Korea)
Jong Han Choi (Konkuk University, Republic of Korea)

Luncheon Symposium 7 (K)

Sep 28(Sat) 12:20–13:20 | Room 3 (3F)

CHAIRPERSON : Hak Chul Jang (Seoul National University, Republic of Korea)

12:20–12:40 **Individual treatment strategy for dyslipidemia**
Jin Joo Park (Seoul National University, Republic of Korea)

12:40–12:50 **Panel Discussion**
Dong Oh Kang (Korea University, Republic of Korea)
Ye Seul Yang (Seoul National University, Republic of Korea)

Oral Presentations p. 239

Oral Presentation 1

Sep 26(Thu) 14:40–16:10 | Room 1 (3F)

CHAIRPERSONS : Kae Won Cho (Soonchunhyang University, Republic of Korea)
Jun Namkung (Yonsei University, Republic of Korea)

OP1-1 Saffron extract and reverse cholesterol transport: an innovative approach to atherosclerosis therapy

Yasmin Mohd Zainal Abidin Shukri[1*], Nurul Alimah Abdul Nasir[3], Iman Nabilah Abd Rahim[1], Noor Alicezah Mohd Kasim[1,2]

[1]Institute of Pathology, Laboratory and Forensic Medicine (I-PPerForM), Universiti Teknologi MARA, 47000 Sungai Buloh, Selangor, Malaysia, [2]Department of Pathology, Faculty of Medicine, Universiti Teknologi MARA, 47000 Sungai Buloh, Selangor, Malaysia, [3]Department of Pharmacology, Faculty of Medicine, Universiti Teknologi MARA, 47000 Sungai Buloh, Selangor, Malaysia

OP1-2 Comparative effects of alirocumab and evolocumab on protein and gene expression in stimulated human coronary endothelial cells

Rahayu Zulkapli[12,3*], Hapizah Nawawi[1,2], Suhaila Abd Muid[1,2], Seok Mui Wang[1,2]

[1]Institute of Pathology, Laboratory and Forensic Medicine (I-PPerForM), Universiti Teknologi MARA (UiTM), Sungai Buloh Campus, Jalan Hospital, 47000 Sungai Buloh, Selangor, Malaysia, [2]Faculty of Medicine, Universiti Teknologi MARA (UiTM), Sungai Buloh Campus, Jalan Hospital, 47000 Sungai Buloh, Selangor, Malaysia, [3]Faculty of Dentistry, Universiti Teknologi MARA (UiTM), Sungai Buloh Campus, Jalan Hospital, 47000 Sungai Buloh, Selangor, Malaysia

OP1-3 Obesity-induced imprinting of hematopoietic stem cells exacerbates atherosclerosis progression

Shindy Soedono[1,2*], Vivi Julietta[1], Maria Averia[1], Joo Yuha[1], Hadia Nawaz[2], Kae Won Cho[1,2]

[1]Department of Integrated Biomedical Science, Soonchunhyang University, Republic of Korea, [2]Soonchunhyang Institute of Medi-bio Science, Soonchunhyang University, Republic of Korea

OP1-4 Cardiovascular disease risk factors are adversely altered by an isocaloric high fat diet enriched with saturated compared to polyunsaturated fat in healthy humans

Nikola Srnic[1,3*], Elspeth Johnson[1], Sion Parry[1], Ferenc Mózes[2], Fredrik Karpe[1,4], Ladislav Valkovic[2], Lisa Heather[3], Leanne Hodson[1,4]

[1]Oxford Centre for Diabetes, Endocrinology, and Metabolism, University of Oxford, United Kingdom, [2]Oxford Centre for Clinical Magnetic Resonance Research, University of Oxford, United Kingdom, [3]Department of Physiology, Anatomy and Genetics, University of Oxford, United Kingdom, [4]NIHR Oxford Biomedical Research Centre, University of Oxford, United Kingdom

OP1-5 HK660S (β-lapachone) ameliorates diabetic cardiomyopathy by enhancing mitochondrial function through activation of NQO1/SOD1 pathway

Bui Van Nam[1,2*], Hyoung Kyu Kim[4], Han Jin[3]

[1]Presenter, Cardiovascular and Metabolic Disease Center, Physiology Department, Inje University, Vietnam, [2]Presenter, Stroke Department, 103 Hospital, Vietnam Military Medical University, Ha Noi, Vietnam, Vietnam, [3]Correspoding Author, Cardiovascular and Metabolic Disease Center, Physiology Department, Inje University, Republic of Korea, [4]Co-Authors, Cardiovascular and Metabolic Disease Center, Physiology Department, Inje University, Republic of Korea

OP1-6 Porphyromonas gingivalis infection induces dyslipidemia; changes in hepatic, intestinal, and oral microbiota

Eun Ji Min[1*], Young Mi Park[2]

[1]Department of Computational Medicine, Graduate School of Ewha Womans University, Ewha Womans University, Republic of Korea, [2]Department of Molecular Medicine, College of Medicine, Ewha Womans University, Republic of Korea

OP1-7 Circular RNA circSMAD4 regulates cardiac fibrosis by targeting miR-671-5p and FGFR2 in cardiac fibroblasts

Anna Jeong*, Yongwoon Lim, Yun-Gyeong Lee, Duk-Hwa Kwon, Sera Shin, Nakwon Choe, Hyun Kook

Department of Pharmacology, Chonnam National University, Medical School, Republic of Korea

Oral Presentation 2

Sep 26(Thu) 14:40-16:10 | Room 2 (3F)

CHAIRPERSONS : Young Mi Park (Ewha Womans University, Republic of Korea)
Bohkyung Kim (Pusan National University, Republic of Korea)

OP2-1 Purinergic adipocyte-macrophage crosstalk promotes inflammatory degeneration of thermogenic brown adipose tissue

Michelle Y. Jaeckstein[1*], Alexander W. Fischer[1], Tobias Stähler[2], Björn Rissiek[3], Markus Heine[1], Janina Behrens[1], Alexander Pfeifer[4], Friedrich Nolte[2], Joerg Heeren[1]

[1]Department of Biochemistry and Molecular Cell Biology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany, [2]Institute of Immunology, University Medical Center Hamburg-Eppendorf, Germany, [3]Department of Neurology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany, [4]Institute of Pharmacology and Toxicology, University Hospital Bonn, Bonn, Germany

OP2-2 Ret finger protein deficiency attenuates adipogenesis in HFD-induced obese mice

Yun-Gyeong Lee*, Duk-Hwa Kwon, Sera Shin, Anna Jeong, Hyun Kook

Department of Pharmacology, Chonnam National University Medical School, Republic of Korea

OP2-3 Differential regulatory effects of exercise and hypocaloric diet on adipose thermogenesis and inflammation in obese mice

Vivi Julietta[1*], Shindy Soedono[1], Eun Bi Ma[2], Joo Yuha[1], Maria Averia[1], Hadia Nawaz[3], Byung Chul Oh[4], Chan Hee Lee[5], Joo Young Huh[2], Kae Won Cho[1,3]

[1]Department of Integrated Biomedical Science, Soonchunhyang University, Republic of Korea, [2]College of Pharmacy, Chonnam National University, Republic of Korea, [3]Soonhunhyang Institute of Medi-bio Science (SIMS), Soonchunhyang University, Republic of Korea, [4]Department of Physiology, Gachon University, Republic of Korea, [5]Department of Biomedical Science, Hallym University, Republic of Korea

OP2-4 Telomere stabilization by metformin mitigates the progression of atherosclerosis via the AMPK-dependent p-PGC-1 alpha pathway

Jin Young Sung*, Seul Gi Kim, So-Young Park, Jae-Ryong Kim, Hyoung Chul Choi

Yeungnam University, Republic of Korea

OP2-5 PRDX5 exacerbates atherosclerosis via the TLR4/MyD88/NF-κB and P38 pathways in endothelial cells

Hyae Yon Kweon*, Eun Ju Song, Hye In Kong, Goo Taeg Oh

Life Science, Ewha Womans University, Republic of Korea

OP2-6 Prdx3 defends abdominal aortic aneurysm by suppressing vascular smooth muscle cell senescence

Moajury-Jung[2*], Seong Keun Sonn[1], Goo Taeg Oh[1]

[1]Heart-Immune-Brain Network Research Center, Department of Life Sciences, Ewha Womans University, Republic of Korea, [2]Division of Life Science, Ewha Womans University, Republic of Korea

Oral Presentation 3

Sep 26(Thu) 14:40-16:10 | Room 3 (3F)

CHAIRPERSONS : SungWan Chun (Soonchunhyang University, Republic of Korea)
Seung-Hwan Lee (The Catholic University of Korea, Republic of Korea)

OP3-1 A 10-year prospective cohort study of blood lipid variability, cognitive decline, and dementia in 9846 community-dwelling older adults

Zhen Zhou[1*], Chris Moran[1], Anne M. Murray[2], Sophia Zoungas[1], Mark Nelson[3], Stella Talic[1], Rory Wolfe[1], Robyn Woods[1], Joanne Ryan[1]

[1]School of Public Health and Preventive Medicine, Monash University, Australia, [2]Berman Center for Outcomes and Clinical Research, Hennepin Healthcare Research Institute, United States, [3]Menzies Institute for Medical Research, University of Tasmania, Australia

OP3-2 Low-density lipoprotein cholesterol estimation in youth: Sampson equation superior in predicting mid-adult carotid plaque

Yaxing Meng[1,2*], Feitong Wu[1,2], Juhani S. Koskinen[3,4,5,6], Markus Juonala[5,6], James Goode[1,2], Katja Pahkala[3,4,7], Suvi P. Rovio[3,4], Juha Mykkänen[3], Russell Thomson[8], Stephen R. Daniels[9], Mika Kähönen[10], Jorma S. A. Viikari[5,6], Olli T. Raitakari[3,4,11,12], Costan G. Magnussen[1,2,3,4]

[1]Baker Heart and Diabetes Institute, Australia, [2]Baker Department of Cardiometabolic Health, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Melbourne, Australia, [3]Research Centre of Applied and Preventive Cardiovascular Medicine, University of Turku, Finland, [4]Centre for Population Health Research, University of Turku and Turku University Hospital, Turku, Finland, [5]Division of Medicine, Turku University Hospital, Finland, [6]Faculty of Medicine, Satakunta Central Hospital, Finland, [7]Paavo Nurmi Centre, Unit of Health and Physical Activity, University of Turku, Finland, [8]Analytical Edge, Analytical Edge, Australia, [9]Department of Pediatrics, University of Colorado Anschutz Medical Campus,United States, [10]Department of Clinical Physiology, Tampere University Hospital and Faculty of Medicine and Health Technology, Tampere University, Finland, [11]Department of Clinical Physiology and Nuclear Medicine, Turku University Hospital, University of Turku, Finland, [12]InFLAMES Research Flagship, University of Turku, Finland

OP3-3 The impact of myosteatosis on cardiac function in a healthy population: insights from abdominal CT imaging

Yun Kyung Cho[1,2*], Myung Jin Kim[1,2], Eun Hee Kim[3], Min Jung Lee[3], Hyo-Jung Nam[3], Woo Je Lee[1,2], Hong-Kyu Kim[3], Chang Hee Jung[1,2]

[1]Department of Internal Medicine, Asan Medical Center, University of Ulsan College of Medicine, Republic of Korea, [2]Asan Diabetes Center, Asan Medical Center, Republic of Korea, [3]Health Screening and Promotion Center, Asan Medical Center, University of Ulsan College of Medicine, Republic of Korea

OP3-4 The impacts of diabetic retinopathy and chronic kidney disease on cardiovascular disease and all-cause mortality in patients with type 2 diabetes mellitus: findings from the UK Biobank cohort study

Yeon Soo Park[1,2*], Bo Kyung Koo[3], Soo Heon Kwak[2], Min Kyong Moon[1,3]

[1]Department of Internal Medicine, Seoul National University College of Medicine, Republic of Korea, [2]Department of Internal Medicine, Seoul National University Hospital, Republic of Korea, [3]Department of Internal Medicine, Seoul Metropolitan Government Boramae Medical Center, Republic of Korea

OP3-5 Cardiometabolic risk factors and lifestyle in Norwegian patients with a severe mental illness

Madeleine E Angelsen[1,2*], Emma Njålsdatter Johannessen[2], Kjetil Retterstøl[1], Dawn E. Peleikis[3]

[1]Department of Nutrition, University of Oslo, Norway, [2]Psychiatric Ward, Lovisenberg Diaconal Hospital, Norway, [3]Asker Municipality Psychiatric Ward, Vestre Viken HF, Norway

OP3-6 Non-calcified plaque on coronary CT angiography (CCTA) in asymptomatic South Asian individuals with zero CAC: insights from the South Asians CCTA (SACTA) study

Ayeeshik Kole[1*], Ronald D. Bass[1], Faraaz Azam[1], Shailesh Jaiswal[1], Parthvi B. Patel[1], Sneha Deodhar[1], Sina Rahmani[1], Theodoros Kelesidis[2], Amil Shah[1], Fernando Kay[3], Amit Khera[1], Parag Joshi MD[1], Anand Rohatgi[1]

[1]Department of Internal Medicine, Division of Cardiology, University of Texas Southwestern Medical Center, Dallas, Texas, United States, [2]Department of Internal Medicine, Division of Infectious Diseases and Geographic Medicine, University of Texas Southwestern Medical Center, Dallas, Texas, United States, [3]Department of Radiology, Division of Cardiothoracic Imaging, University of Texas Southwestern Medical Center, Dallas, Texas, United States

Mini-Oral Presentations p. 255

Mini-Oral Presentation 1-A

Sep 27(Fri) 14:40-15:40 | Mini-Oral A (Studio 5, 6F)

MODERATOR : Eun-Hee Cho (Kangwon National University, Republic of Korea)

MOP1-A-1 Sex difference in reverse cholesterol transport in hepatic CDKAL1-deficient mices

Ji Eun Lee[1*], Hyeonji Lee[1], Dayeon Kyun[4], Sang-Hak Lee[3], Soo-jin Ann[2]

[1]Graduate Program of Biomedical Engineering, Yonsei University Graduate School, Seoul, Republic of Korea, [2]Integrative Research Center for Cerebrovascular and Cardiovascular Diseases, Yonsei University College of Medicine, Seoul, Republic of Korea, [3]Division of Cardiology, Department of Internal Medicine, Yonsei University College of Medicine, Seoul, Republic of Korea, [4]Yonsei University Graduate School, Seoul, Republic of Korea

MOP1-A-2 Preventing stroke from cerebral cavernous malformations using diet induced microbiome modification

Jaesung Peter Choi*

Centre for Inflammation, University of Technology Sydney (UTS) & Centenary Institute, Australia

MOP1-A-3 Interplay of lipid uptake and lipid production in brown adipose tissue

Janina Behrens*, Michelle Y. Jaeckstein, Markus Heine, Jörg Heeren, Ludger Scheja

Department of Biochemistry and Molecular Cell Biology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

MOP1-A-4 Potential renoprotective effects of Boerhaavia diffusa mediated through reduction of lipids and oxidative stress in chronic kidney disease

On Ying Angela Lee*, Martin Ho Yin Yeung

The Department of Health Technology and Informatics, The Hong Kong Polytechnic University, China

MOP1-A-5 Metabolic and thermogenic regulation disorders in brown adipose tissue due to UBXN4 deficiency

Seon Bu Yang*, Jaetaek Kim

Endocrinology and Metabolism, Department of Internal Medicine, College of Medicine, Chung-Ang University, Republic of Korea

MOP1-A-6 Lipophagy as therapeutic approach for obesity and metabolic dysfunction associated fatty liver disease

Tae Hyun Bae[1,2*], Joo-Won Park[3]

[1]Cellular Degradation Biology Research Center, College of Medicine, Seoul National University, Republic of Korea, [2]Department of Biomedical Sciences, College of Medicine, Seoul National University, Republic of Korea, [3]Department of Biochemistry, College of Medicine, Ewha Womans University, Republic of Korea

MOP1-A-7 A bibliometric analysis of cardiovascular disease: risk factors, therapies, and the rise of PCSK9 inhibitors

Nurmala Widya Absari*, Esna Taqwaningtyas, Ratna Amalia Fairuz

GP, UII, Indonesia

MOP1-A-8 Microcurrent wave mitigates mouse intracranial arterial dolichoectasia development

Dong Rak Kwon*

Department of Rehabilitation Medicine, Catholic University of Daegu School of Medicine, Daegu, Republic of Korea

Mini-Oral Presentation 1-B

Sep 27(Fri) 14:40-15:40 | Mini-Oral B (Studio 6, 6F)

MODERATOR : In-Kyung Jeong (Kyung Hee University, Republic of Korea)

MOP1-B-1 Prevalence and treatment gaps of hyperlipidaemia among patients with type 2 diabetes in Malaysia

Anis S. Abd Raof[1*], Zanariah Hussein[2], Nurain Md Noor[2], Norlaila Mustafa[3], Rohana Abdul Ghani[5], Wan Mohamad Wan Bebakar[6], Siew-Pheng Chan[1], Lee-Ling Lim[1,7,8]

[1]Department of Medicine, Faculty of Medicine, University of Malaya, Malaysia, [2]Department of Medicine, Hospital Putrajaya, Malaysia, [3]Department of Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia, Malaysia, [5]Department of Medicine, Faculty of Medicine, Universiti Teknologi MARA, Malaysia, [6]School of Medical Sciences, Universiti Sains Malaysia, Malaysia, [7]Department of Medicine and Therapeutics, The Chinese University of Hong Kong, Prince of Wales Hospital, Hong Kong SAR, China, [8]Asia Diabetes Foundation, Shatin, Hong Kong, China

MOP1-B-2 Prevalence of metabolic syndrome in patients with subclinical and overt hypothyroidism visiting tertiary care centre of western Nepal

Binaya Tamang*, Buddhi Raj Pokhrel, Amit Chandra Jha, Narayay Gautam

Department of Biochemistry, Universal College of Medical Sciences, Nepal

MOP1-B-3 Reference range of lipoprotein(a) in the Thai population at King Chulalongkorn Memorial Hospital

Wachirawit Thipkunok*, Poranee Ganokroj, Wachirawit

Laboratory Medicine, King Chulalongkorn Memorial Hospital, Thailand

MOP1-B-4 HIV-associated atherosclerosis data received by optical coherence tomography

Nuriiat Efendieva*

Cardiology, Pirogov Russian National Research Medical University, Russian Federation

MOP1-B-5 Echocardiographic evaluation of LV parameters and insulin resistance in non-diabetic STEMI patients

Javad Alizargar*

Medicine, Kashan University, Iran

MOP1-B-6 A novel therapeutic agent for inducing atherosclerosis regression: mechanistic insights into saffron extract

Iman Nabilah Abd Rahim[1,2*], Effat Omar[1,2], Suhaila Abdul Muid[1,3], Hapizah Nawawi[1,2], Noor Alicezah Mohd Kasim[1,2]

[1]Institute of Pathology, Laboratory and Forensic Medicine (I-PPerForM), Faculty of Medicine, Universiti Teknologi MARA, Sungai Buloh, Selangor, Malaysia, [2]Department of Pathology, Faculty of Medicine, Universiti Teknologi MARA, Sungai Buloh, Selangor, Malaysia, [3]Department of Biochemistry & Molecular Medicine, Faculty of Medicine, Universiti Teknologi MARA, Sungai Buloh, Selangor, Malaysia

MOP1-B-7 Triglyceride and glucose index at mid-pregnancy is a simple and easy-to-calculate marker associated with large for gestational age newborns in women with gestational diabetes mellitus

Kyung-Soo Kim*, Arim Choi, Hyunju Park, Soo-Kyung Kim, Yong-Wook Cho

Division of Endocrinology and Metabolism, Department of Internal Medicine, CHA Bundang Medical Center, CHA University School of Medicine, Republic of Korea

MOP1-B-8 Real-world effects of imeglimin on cardiovascular risk factors in Japanese patients with type 2 diabetes: a retrospective longitudinal study

Hisayuki Katsuyama*, Mariko Hakoshima, Hiroki Adachi, Hidekatsu Yanai

Department of Diabetes, Endocrinology and Metabolism, National Center for Global Health and Medicine Kohnodai Hospital, Japan

Mini-Oral Presentation 1-C

Sep 27(Fri) 14:40-15:40 | Mini-Oral C (Studio 7, 6F)

MODERATOR : Jin Han (Inje University, Republic of Korea)

MOP1-C-1 The potential of endothelial progenitor cells using Intravascular Therapeutic Microrobot System (ITMS) as a novel therapy of atherosclerosis

Anindya Amanda Damayanti*

Cardiology, Universitas Islam Indonesia, Indonesia

MOP1-C-2 Study on the mechanism of the Chuanxiong-Chishao pair and its active ingredients in preventing atherosclerosis by inhibiting ferroptosis

Miao Zhang*, Yin Cai

Department of Health Technology and Informatics, The Hong Kong Polytechnic University, China

MOP1-C-3 Asiatic acid protects against tumor necrosis factor alpha (TNF-α)-or hydrogen peroxide (H2O2)-stimulated oxidative stress in human aortic endothelial cells

Lai Yen Fong[1*], Jian Lee[1], Wei Chih Ling[1], Chin Theng Ng[3], Muhammad Nazrul Hakim Abdullah[4], Yang Mooi Lim[1], Yoke Keong Yong[5], Choy Hoong Chew[2]

[1]Department of Preclinical Sciences, M. Kandiah Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, Malaysia, [2]Department of Allied Health Sciences, Faculty of Science, Universiti Tunku Abdul Rahman, Malaysia, [3]Unit of Physiology, Faculty of Medicine, AIMST University, Malaysia, [4]Department of Biomedical Sciences, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia, [5]Department of Human Anatomy, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia

MOP1-C-4 The metabolic phenotype of intimal foamy macrophages is shaped by Hypoxia-Inducible Factor-2α in atherosclerotic lesions

Kyu Seong Park[1*], Gwanghun Kim[2], Sang-eun Park[1], Hyun Mu Shin[2], Hang-Rae Kim[2], Jae-Hoon Choi

[1]Department of Life Science, Hanyang University, Republic of Korea, [2]Department of Biomedical Sciences, Seoul National University College of Medicine, Republic of Korea

MOP1-C-5 Asiatic acid alleviates hypercholesterolemia and oxidative stress in high-fat diet-induced apolipoprotein E-knockout mice

Jian Lee[1*], Wei Chih Ling[1], Chin Theng Ng[3], Muhammad Nazrul Hakim Abdullah[4], Yang Mooi Lim[1], Yoke Keong Yong[5], Choy Hoong Chew[2], Lai Yen Fong[1]

[1]Department of Preclinical Sciences M. Kandiah Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, Malaysia, [2]Department of Allied Health Sciences, Faculty of Science, Universiti Tunku Abdul Rahman, Malaysia, [3]Unit of Physiology, Faculty of Medicine, AIMST University, Malaysia, [4]Department of Biomedical Science, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia, [5]Department of Human Anatomy, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia

MOP1-C-6 ANGPTL4 inhibits atherosclerosis by modulating the phenotypic transition of vascular smooth muscle cells

Dong Im Cho[1*], Yong Sook Kim[2], Hyang Hee Cho[1], Meeyoung Cho[1], Bo Gyeong Kang[1], Soo Ji Yoo[1], Jin Yoo[1], Injoo Hwang[1], Youngkeun Ahn[3]

[1]Cell Regeneration Research Center, Chonnam National University Hospital, Republic of Korea, [2]Biomedical Research Institute, Chonnam National University Hospital, Republic of Korea, [3]Department of Cardiology, Chonnam National University Hospital, Republic of Korea

MOP1-C-7 Echinochrome A inhibits HMGB1-induced vascular smooth muscle cell migration by suppressing osteopontin expression

Ju Yeon Kim*, Hyun Sung, Chi Dae Kim

Department of Convergence Medical Sciences, Department of Pharmacology, School of Medicine, Pusan National University, Republic of Korea

MOP1-C-8 STAT3 phosphorylation at the specific Y705 site is essential for the endothelial to mesenchymal transition induced by lipopolysaccharide

Yujin Jin*, Kyung-Sun Heo

College of Pharmacy, Chungnam National University, Republic of Korea

Mini-Oral Presentation 1-D

Sep 27(Fri) 14:40-15:40 | Mini-Oral D (Studio 8, 6F)

MODERATOR : Yun-Hee Lee (Seoul National University, Republic of Korea)

MOP1-D-1 Heparanase deficiency protects against atherosclerotic plaque development in ApoE knockout mice

Tien K. Nguyen[1*], Shane R. Thomas[2], Stephanie Paone[1], Amy A. Baxter[1], Alyce J. Mayfosh[1], Thanh Kha Phan[1], Enoch Chan[2], Karlheinz Peter[3], Ivan K. H. Poon[1], Mark D. Hulett[1]

[1]Department of Biochemistry and Chemistry, La Trobe Institute for Molecular Science, La Trobe University, Melbourne, Victoria 3086, Australia, [2]Department of Pathology, School of Biomedical Sciences, Faculty of Medicine & Health, University of New South Wales, Sydney, New South Wales 2052, Australia, [3]Atherothrombosis and Vascular Biology, Baker Heart and Diabetes Institute, Melbourne, Victoria, 3004, Australia

MOP1-D-2 Soluble uric acid induced trained immunity in monocytes: implications for atherosclerosis

Hyeok Jae Mun*, Myeong Ryeol Choi, Hyeon Ji Mun, Joo Young Kweon, Ji Yoon Park, Yong Joo Ahn

Medical Science and Engineering, School of Convergence Science and Technology, Pohang University of Science and Technology, Republic of Korea

MOP1-D-3 Protective effect of biofabricated curcumin silver nanoparticles against atherosclerosis in rodent model via modulating EGFR/PI3K/Akt/GSK-3β signaling pathway

Ekta Yadav*

Pharmacy, Sam Higginbottom University of Agriculture Technology and Sciences, India

MOP1-D-4 Markers of nonspecific systemic inflammation as criteria for destabilization of coronary heart disease

Valentyna Romanova*, Nataliia Kuzminova, Lidiia Romanova, Mykhailo Repetenko

Internal Medicine #1, National Pirogov Memorial Medical University, Vinnytsya, Ukraine

MOP1-D-5 The association between serum Mannose-Binding Lectin levels and polymorphism in ischemic stroke risk

Anyeasha Dutta*, Ravindra K Saran

Pathology, Govind Ballabh Pant Institute of Postgraduate Medical Education and Research, New Delhi, India

MOP1-D-6 Polymeric nanoparticles loaded Myricitrin modulates atherosclerosis in apolipoprotein-E deficient mice via altering gut microbiota and lipid gene metabolism (LXR-α/SREBP1 pathway)

Deepika Singh*

Pharmacy, Faculty of Health Sciences, SHUATS, India

MOP1-D-7 Emerging role of lncRNAs in the development of atherosclerosis and therapeutic potential

Anyeasha Dutta*, Ravindra K Saran

[1]Pathology, Govind Ballabh Pant Institute of Postgraduate Medical Education and Research, New Delhi, India

MOP1-D-8 Machine learning-driven decoding of lipid-modulated lncRNAs in macrophage polarization and atherosclerotic plaque instability

Rifaldy Fajar[1*], Roland Helmizar[2], Andi Nursanti Andi Ureng[3], Prihantini[4], Sahnaz Vivinda Putri[5], Elfiany Syafruddin[6]

[1]Mathematics and Computer Science, Karlstad University, Sweden, [2]Internal Medicine, Baiturrahmah University, Indonesia, [3]Pharmacy, Andini Persada College of Health Sciences, Indonesia, [4]Machine Learning for BioMedicine Laboratory, Bandung Institute of Technology, Indonesia, [5]Health Management Laboratory, International University Semen Indonesia, Indonesia, [6]Computational Science Research Team, Bulukumba Muhammadiyah University, Indonesia

Mini-Oral Presentation 1-E

Sep 27(Fri) 14:40-15:40 | Mini-Oral E (Studio 9, 6F)

MODERATOR : Chang-Myung Oh (GIST, Republic of Korea)

MOP1-E-1 Machine learning-driven predictive modeling of foam cell formation and atherosclerosis progression through lipid-responsive enhancer RNAs

Rifaldy Fajar[1*], Rini Winarti[2]

[1]Mathematics and Computer Science, Karlstad University, Sweden, [2]Computational Biology and Medicine Laboratory, Yogyakarta State University, Indonesia

MOP1-E-2 Sesame lignans as the platelet aggregation inhibitor in cardiovascular disease: investigation through computational approach

Reny Rosalina[1,2*], Rian Ka Praja[3], Dwi Hermayantiningsih[1]

[1]Department of Chemistry, Faculty Mathematics and Natural Sciences, University of Palangka Raya, Indonesia, [2]Biomedical Sciences Program, Khon Kaen University, Thailand, [3]Department of microbiology, Faculty of Medicine, University of Palangka Raya, Indonesia

MOP1-E-3 Enhanced reparative effects by PCSK9-dependent cardiac macrophages post-ischemia

Shin Hye Moon*, Goo Taeg Oh

Life Sciences, Ewha Womans University, Republic of Korea

MOP1-E-4 PCSK9 deficiency suppresses cardiac inflammation post-myocardial infarction by elevating atrial natriuretic peptide

Na Hyeon Yoon*, Goo Taeg Oh

Department of Life Science, Ewha Womans University, Heart-Immune-Brain Network Research Center, Republic of Korea

MOP1-E-5 Corticosterone alleviates stroke damage by Prdx1 antioxidant expression

Huiju Jo*, Goo Taeg Oh

Department of Life Science, Ewha Womans University, Republic of Korea

MOP1-E-6 Therapeutic mechanisms of the chuanxiong-chishao herbal pair against atherosclerosis: insights from GEO database and network pharmacology

Mankit Leung[2*], Miao Zhang[1]

[1]Department of Health Technology and Informatics, The Hong Kong Polytechnic University, China, [2]Fanling Chinese Medicine Training and Research Centre, Hong Kong Baptist University, China

MOP1-E-7 Histone deacetylase 8: novel therapeutic target for vascular calcification

Hae Jin Kee[1*], Seong Min Jeong[1], Doo Sun Sim[2], Myung Ho Jeong[2,3]

[1]Heart Research Center, Chonnam National University Hospital, Republic of Korea, [2]Cardiology, Chonnam National University Hospital, Republic of Korea, [3]Cardiology, Gwangju Veterans Hospital, Republic of Korea

MOP1-E-8 Atherosclerosis-preventing effects of Weissella cibaria KCTC3746

Ha Yeon Lim*, Young Mi Park

Basic Science, Ewha Womans University, Republic of Korea

Mini-Oral Presentation 1-F

Sep 27(Fri) 14:40-15:40 | Mini-Oral F (Studio 10, 6F)

MODERATOR : Seonghoon Choi (Hallym University, Republic of Korea)

MOP1-F-1 Virtual screening of Indonesian phytochemicals reveals hinokinin, dihydroguaiaretic acid, and deoxylapachol as novel GPR40 activators for type 2 diabetes mellitus

Dykall Naf'an Dzikri*, Okce Krisnawati, Patria Bayu Murdi, Veronica Bianca, Afrinda Graharani Sandra

Family Medicine, Puskesmas Tasikmadu, Indonesia

MOP1-F-2 In silico study: exploring Indonesian phytochemicals as DPP-IV inhibitors for Type II diabetes mellitus therapy

Cindy Ayudia Pramaesti[1*], Dykall Naf'an Dzikri[2]

[1]Student, Faculty of Medicine, Sebelas Maret University, Indonesia, [2]Family Medical Doctor, Tasikmadu Public Health Center, Indonesia

MOP1-F-3 Young onset type 2 diabetes among Filipino population

Cherry Ann Garcia Durante[1,2*]

[1]Nursing, Saint Dominic College of Asia, Philippines, [2]Nursing, University of Perpetual Help - Dr Jose G Tamayo Medical University, Philippines

MOP1-F-4 Incident and risk factors associated with perioperative cardiovascular complication in obese patients undergoing anesthesia: result from a secondary care hospital in Thailand

Piyanan Pinidsatira[*], Pakawan Kanjanan

Department of Anesthesiology, Songkhla Hospital, Thailand

MOP1-F-5 Impact of cigarette smoking on long-term clinical outcomes in patients with coronary chronic total occlusion lesions

Jihun Ahn[*]

Cardiology Department, Eulji University Daejeon Hospital, Republic of Korea

MOP1-F-6 Psychologically vulnerable patients with cardiovascular disease have poor health-related quality of life and physical activity

Mi Kyung Lee[1*], Ji Young Jung[2], Yong Jun Lee[3], Chang Geun Oh[3], Min Jung Kim[4], Sol Bin Yoon[4], Min Ji Kang[4], Justin Y. Jeon[3], Jong Nam Kim[4], Chan Joo Lee[5], Jong Young Lee[6], Hyun-Jae Kang[7], Ick-Mo Chung[8]

[1]Frontier Research Institute of Convergence Sports Science, Yonsei University, Republic of Korea, [2]Institute for Integrative Medicine, Ewha Womans University Hospital, Republic of Korea, [3]Department of Sport Industry Studies, Yonsei University, Republic of Korea, [4]Department of Educational Psychology, Seoul Women's University, Republic of Korea, [5]Division of Cardiology, Yonsei University College of Medicine, Republic of Korea, [6]Division of Cardiology, Kangbuk Samsung Hospital, Republic of Korea, [7]Division of Cardiology, Seoul National University Hospital, Republic of Korea, [8]Division of Cardiology, School of Medicine, Ewha Womans University, Republic of Korea

MOP1-F-7 Association of LDL cholesterol levels with the risk of cardiovascular outcome according to stages of chronic kidney disease

Su-Yeon Choi[1*], Namju Heo[1], Kyungdo Han[2]

[1]Department of Internal Medicine, Healthcare Research Institute, Gangnam Healthcare Center, Seoul National University Hospital, Seoul, Republic of Korea, [2]Department of Biostatistics, College of Medicine, The Soongsil University, Seoul, Republic of Korea

Mini-Oral Presentation 2-A

Sep 28(Sat) 13:30-14:30 | Mini-Oral A (Studio 5, 6F)

MODERATOR : Su Myung Jung (Sungkyunkwan University, Republic of Korea)

MOP2-A-1 Machine learning-based identification of estrogen therapy-induced lipidomic markers predicting subclinical atherosclerosis in transgender women

Andi Nursanti Andi Ureng[1*], Prihantini Prihantini[2*], Elfiany Syafruddin[3], Sahnaz Vivinda Putri[4], Rifaldy Fajar[5]

[1]Pharmacy, Andini Persada College of Health Sciences, Indonesia, [2]Machine Learning for BioMedicine Laboratory, Bandung Institute of Technology, Indonesia, [3]Computational Science Research Team, Bulukumba Muhammadiyah University, Indonesia, [4]Health Management Laboratory, International University Semen Indonesia,Indonesia, [5]Mathematics and Computer Science, Karlstad University, Sweden

MOP2-A-2 Investigating the lipid accumulation in apolipoprotein E deficiency-mediated chronic kidney disease

Martin Ho Yin Yeung[1,2*], Ching Yan Ho[1], Angela Zaneta Chan[2]

[1]The Department of Health Technology and Informatics, The Hong Kong Polytechnic University, China, [2]Department of Anatomical and Cellular Pathology, The Chinese University of Hong Kong, China

MOP2-A-3 Tao-Hong-Si-Wu decoction ameliorates hepatic lipid accumulation in female mice with heart failure and preserved ejection fraction via inhibition of SREBP1 signaling

QI Wensheng[1,2*], Liu Chang[1,2], Zhang Miao[1], Cai Yin[1]

[1]Department of Health Technology and Informatics, The Hong Kong Polytechnic University, China, [2]Department of Anesthesiology, The First Hospital of Jilin University, China

MOP2-A-4 Investigating the effect of fat quantity and composition on hepatocellular lipid metabolism, autophagy and triglyceride-rich lipoprotein processing

Felix Westcott[1,2*], Kaitlyn Dennis[1], Shilpa Nagarajan[1], Leanne Hodson[1]

[1]Oxford Centre for Diabetes, Endocrinology & Metabolism, University of Oxford, United Kingdom, [2]The Kennedy Institute of Rheumatology, University of Oxford, United Kingdom

MOP2-A-5 Integrative omics approaches to unraveling lipid metabolism and atherosclerosis

Pavithran Damodaran*

Medicine, ACS Medical College and Hospital, India

MOP2-A-6 The implication of a polymorphism in the methylenetetrahydrofolate reductase gene and risk of ischemic stroke in Indian population

Dr Asgar Ali*

Biochemistry, All India Institute of Medical Sciences, India

MOP2-A-7 Cereblon's role in dermal fibroblast proliferation and myofibroblast differentiation

Thien Nguyen Huu[1,2*], Jung Eun Seol[1], Hyoung Kyu Kim[1], Jin Han[1]

[1]College of Medicine, Inje University, Republic of Korea, [2]Deparment of Psychiatry, Military Hospital 175, Vietnam

MOP2-A-8 Machine learning discovery of lipid-derived extracellular vesicles' role in endothelial dysfunction and atherosclerosis

Sahnaz Vivinda Putri[1*], Rifaldy Fajar[2], Andi Nursanti Andi Ureng[3], Prihantini[4], Elfiany Syafruddin[5]

[1]Health Management Laboratory, International University Semen Indonesia, Indonesia, [2]Mathematics and Computer Science, Karlstad University, Sweden, [3]Pharmacy, Andini Persada College of Health Sciences, Indonesia, [4]Machine Learning for BioMedicine Laboratory, Bandung Institute of Technology, Indonesia, [5]Computational Science Research Team, Bulukumba Muhammadiyah University, Indonesia

Mini-Oral Presentation 2-B

Sep 28(Sat) 13:30-14:30 | Mini-Oral B (Studio 6, 6F)

MODERATOR : Jang Won Son (The Catholic University of Korea, Republic of Korea)

MOP2-B-1 Evaluation of nomenclature of fatty liver disease in association with hepatocellular carcinoma: a 15.5-Year cohort study in Korea

Tung Hoang[1,2*], Jeonghee Lee[1], Bo Hyun Kim[3], Yuri Cho[3], Jeongseon Kim[1]

[1]Department of Cancer AI & Digital Health, National Cancer Center Graduate School of Cancer Science and Policy, Republic of Korea, [2]Department of Economic, Social, and Administrative Pharmacy, University of Health Sciences, Vietnam National University - Ho Chi Minh City, Vietnam, [3]Department of Internal Medicine, Center for Liver and Pancreatobiliary Cancer, National Cancer Center, Republic of Korea

MOP2-B-2 MAFLD criteria more accurately reflect cardiac function than MASLD criteria in a healthy population

Yun Kyung Cho[1,2*], Myung Jin Kim[1,2], Eun Hee Kim[3], Min Jung Lee[3], Hyo-Jung Nam[3], Woo Je Lee[1,2], Hong-Kyu Kim[3], Chang Hee Jung[1,2]

[1]Department of Internal Medicine, Asan Medical Center, University of Ulsan College of Medicine, Republic of Korea, [2]Asan Diabetes Center, Asan Medical Center, Republic of Korea, [3]Health Screening and Promotion Center, Asan Medical Center, University of Ulsan College of Medicine, Republic of Korea

MOP2-B-3 Analysis of central obesity risk factors and their association with cardiovascular diseases among adults in Indonesia: insights from the Indonesian family life survey

Nadyatul Husna[1*], Hafizh Rizqi[2]

[1]Medical Doctor, Universitas Andalas/dr. Reksodiwiryo Military Hospital Padang, Indonesia, [2]Business Administration, Prince Sattam Bin Abdulaziz University, Saudi Arabia

MOP2-B-4 Association between admission low-density lipoprotein level and ischemia-reperfusion injury in patients with STEMI who treated by primary PCI

Sunderiya Dalanbaatar[1*], Surenjav Chimed[2]

[1]Cardiology, Intermed Hospital, Mongolia, [2]Radiology, Charité - Universitätsmedizin Berlin, Germany

MOP2-B-5 Features of lipid metabolism disorders in individuals with genetic predisposition to arterial hypertension and patients with essential arterial hypertension

Anastasiia Ivankova[*], Valentyna Romanova, Nataliia Kuzminova

Department of Internal Medicine, National Pirogov Memorial Medical University, Vinnytsya, Ukraine

MOP2-B-6 Associations of dietary intake with cardiovascular disease, blood pressure, and lipid profile in the Korean population: an updated systematic review and meta-analysis

Jeongseon Kim[1*], Madhawa Gunathilake[1], Tung Hoang[1,2]

[1]Department of Cancer AI & Digital Health, National Cancer Center Graduate School of Cancer Science and Policy, Republic of Korea, [2]Department of Economic, Social, and Administrative Pharmacy, University of Health Sciences, Vietnam

MOP2-B-7 Utilizing machine learning algorithms to predict rapid plaque progression and coronary events in patients with familial hypercholesterolemia based on genetic polymorphisms

Roland Helmizar[1*], Dian Puspita[2]

[1]Internal Medicine, Faculty of Medicine Baiturrahmah University, Indonesia, [2]Cardiovascular, Faculty of Medicine Baiturrahmah University, Indonesia

Mini-Oral Presentation 2-C

Sep 28(Sat) 13:30-14:30 | Mini-Oral C (Studio 7, 6F)

MODERATOR : Je Sang Kim (Bucheon Sejong Hospital, Republic of Korea)

MOP2-C-1 Exploring Indonesian phytochemicals as novel PPAR-γ activators for type II diabetes mellitus therapy: an In Silico Study

Dykall Naf'an Dzikri*, Patria Bayu Murdi, Okce Krisnawati, Afrinda Graharani Sandra, Veronica Bianca

Family Medicine, Puskesmas Tasikmadu, Indonesia

MOP2-C-2 Genetic analysis of HMGCR variants reveals potential association with New Onset Statin-induced Diabetes Mellitus (NODM)

Putrya Hawa*

Pharmacology, Republic of Indonesia Defense University, Indonesia

MOP2-C-3 Biochemical, cellular and In Silico characterization of the Exon13_15dup of LDLR associated to familial hypercholesterolemia

Andrea Sanchez[1*], Diego Abarzua[1], Catalina Martínez[1], Rodrigo Alonso[3], Andrea Cid[1], Carlos Felipe Burgos[2], Claudia Radojkovic[1]

[1]Pharmacy Faculty, University of Concepción, Chile, [2]Biological Science, University of Concepción, Chile, [3]Center for Advanced Metabolic Medicine and Nutrition, CAMMYN, Chile

MOP2-C-4 Ex-Vivo characterization of D47N mutation of LDLR associated to familial hypercholesterolemia

Catalina Martínez[1*], Carolina Alarcón[1], Claudia Radojkovic[1], Rodrigo Alonso[2], Paula Honorato[1], Paulina Bustos[1], Andrea Sánchez[1]

[1]Pharmacy Faculty, University of Concepción, Chile, [2]Center for Advanced Metabolic Medicine and Nutrition, CAMMYN, Chile

MOP2-C-5 Unveiling the potential mechanisms of alternanthera sessilis red against atherosclerosis: an in-depth exploration through network pharmacology and molecular docking analyses

Omilla Ragavan[1*], Muhammad Nazrul Hakim Abdullah[2], Lai Yen Fong[3], Yoke Keong Yong[1]

[1]Human Anatomy, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia, [2]biomedical Science, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia, [3]Pre-Clinical Sciences, Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, Malaysia

MOP2-C-6 Aberrant activation of miR10b-5p contributes to the pathogenesis of Kawasaki vasculitis

Gwang Hyeon Eom[1*], Sunyoung Park[1], Somy Yoon[2]

[1]Department of Pharmacology, Chonnam National University Medical School, Republic of Korea, [2]College of Pharmacy, Chonnam National University, Republic of Korea

Mini-Oral Presentation 2-D

Sep 28(Sat) 13:30-14:30 | Mini-Oral D (Studio 8, 6F)

MODERATOR : Soo Lim (Seoul National University, Republic of Korea)

MOP2-D-1 Increased splenic metabolic activity was associated with cardiovascular event and all-cause death after surgery among lung cancer patients

Jiyeon Ha[1*], Wookjin Yang[1], Eung-Joon Lee[1], Han-Yeong Jeong[1], Matthew Chung[1], Boyeon Yang[1], Hyemin Jang[1], Keun-Hwa Jung[1], Seung-Hoon Lee[1], Jin Chul Paeng[2], Jeong-Min Kim[1]

[1]Department of Neurology, Seoul National University Hospital, Republic of Korea, [2]Department of Nuclear Medicine, Seoul National University Hospital, Republic of Korea

MOP2-D-2 Incident and risk factors associated with perioperative respiratory complication in obese patients undergoing anesthesia: result from a secondary care hospital in Thailand

Pakawan Kanjanan*, Piyanan Pinidsatira

Department of Anesthesiology, Songkhla Hospital, Thailand

MOP2-D-3 Global trends in clinical trials of NASH treatment

Jung Kim*

College of Medicine, Yonsei University, Republic of Korea

MOP2-D-4 Current status and clinical characteristics of familial hypercholesterolemia patients in Korea: a two-center, real world experience

Kyung An Kim[1,2*], Moon-kyung Jung[1], Dongwoo Kim[3], Joonseok Kim[3], Jong-Chan Youn[1]

[1]Division of Cardiology, Department of Internal Medicine, Seoul St. Mary's Hospital, The Catholic University of Korea, Republic of Korea, [2]Division of Cardiology, Department of Internal Medicine, Incheon St. Mary's Hospital, The Catholic University of Korea, Republic of Korea, [3]College of Medicine, The Catholic University of Korea, Republic of Korea

MOP2-D-5 Changes in metabolic components before and after the COVID-19 pandemic: analysis of general health check-up data

Jung-sun Lim*, Sujeong Han, Bumjo Oh

Family Medicine, SMG-SNU Boramae Medical Center, Republic of Korea

MOP2-D-6 Sex differences in all-causes and cause-specific mortality according to body types among Koreans using the Korean Genome and Epidemiology Study (KoGES)

Jiae Shin[1*], Jaca Maison Lailo[1], Sang-Ah Lee[2]

[1]Interdisciplinary Graduate Program in Medical Bigdata Convergence, Kangwon National University, Republic of Korea, [2]Department of Preventive Medicine, Kangwon National University School of Medicine, Republic of Korea

MOP2-D-7 A novel self nano emulsifying formulation of hydrochlorothiazide enhanced its diuretic and natriuretic efficacy

Pankajkumar Yadav*

Pharmaceutical Sciences, SHUATS, India

Mini-Oral Presentation 2-E

Sep 28(Sat) 13:30-14:30 | Mini-Oral E (Studio 9, 6F)

MODERATOR : Se Eun Park (Sungkyunkwan University, Republic of Korea)

MOP2-E-1 Soluble ST-2 association with intima-media thickness in patients with acute myocardial infarction

Borys Shelest[1*], Yuliia Kovalova[2], Oleksiy Shelest[2], Julia Rodionova[3]

[1]Internal and Occupational Diseases, Kharkiv National Medical University, Ukraine, [2]Department of Internal Medicine No. 2, Clinical Immunology and Allergology Named after Academician L.T. Malaya, Kharkiv National Medical University, Ukraine, [3]Department of Prevention and Treatment of Emergency Conditions, L.T. Malaya Therapy National Institute of the National Academy of Medical Sciences of Ukraine, Ukraine

MOP2-E-2 Comparative assessment of hsCRP and apolipoprotein B as ASCVD risk biomarkers

Saheed Amusat[*]

Chemical Pathology Department, The Directorate of Laboratory Medicine, Beaumont Hospital, Republic of Ireland, Ireland

MOP2-E-3 Spontaneous femoral pseudoaneurysm in a 64-year-old patient with chronic kidney disease: a case report

Monica Claudine D. Reas[1*], Shena Jo A. Capucion-Quebec[3], Frederic Joseph P. Asanza[4], Deaver P. Merin[4], Sherrywin A. Simon-Lim[2]

[1]Eastern Visayas, Philippine College of Physician, Philippines, [2]Eastern Visayas, Philippine Society of Vascular Medicine, Philippines, [3]Eastern Visayas, Philippine Society of Nephrology, Philippines, [4]Eastern Visayas, Philippine Society for Vascular and Endovascular Surgeons, Inc, Philippines

MOP2-E-4 A comparative study to evaluate the role of apolipoprotein B vs low density lipoprotein C in predicting the risk of atherosclerotic cardiovascular disease in obese patients at a tertiary care hospital in India

Aashal Bhavesh Shah[*]

Pharmacology, GMERS Medical College, Valsad, Gujarat, India

MOP2-E-5 The accuracy of coronary artery plaque detection in CT angiography images by using machine learning: a meta-analysis

Withdrawn

Mochamad Afifudin[*], Achmad Alvin Noor Mochtar, Ridhwanah Nadhiratuz Zahrah

Clinical Medicine, Islamic University of Indonesia, Indonesia

MOP2-E-6 Long-term efficacy and clinical outcomes of paclitaxel-eluting balloons vs uncoated balloon for coronary in-stent restenosis

Ulil Albab Habibah[*], Ninda Devita

Internal Medicine, Islamic University of Indonesia, Indonesia

MOP2-E-7 Cardiovascular benefit of Evolocumab in 27,564 patients with and without autoimmune or inflammatory diseases: an analysis of the FOURIER trial

Ana Laura Kunzler[2*], Xinhui Ran[1], Sabina Murphy[1], Huei Wang[3], Narimon Honarpour[3], Marc Steven Sabatine[1], Robert P. Giugliano[1], Andre Zimerman[1]

[1]TIMI Study Group, Brigham and Women's Hospital, Harvard Medical School, United States, [2]Internal Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, United States, [3]AMGEN, United States

Mini-Oral Presentation 2-F

Sep 28(Sat) 13:30-14:30 | Mini-Oral F (Studio 10, 6F)

MODERATOR : Jun Hwa Hong (Eulji University, Republic of Korea)

MOP2-F-1 Malaysian Tualang Honey (MTH) inhibits cell migration and oxidative stress in Vascular Smooth Muscle Cells (VSMC)

Ain Nabila Syahira Binti Shamsol Azman*, Yong Yoke Keong

Human Anatomy, Faculty of Medicine and Health Sciences Universiti Putra Malaysia, Malaysia

MOP2-F-2 Bioinformatics identification of high-efficacy PCSK9 siRNAs for atherosclerosis therapy

Rian Ka Praja[1*], Reny Rosalina[2]

[1]Faculty of Medicine, Universitas Palangka Raya, Indonesia, [2]Faculty of Mathematics and Natural Sciences, Universitas Palangka Raya, Indonesia

MOP2-F-3 Effect of taurine intake over kidneys and intestinal tissues in ob/ob mice

Amara Zulfiqar[1*], Kainat Ahmed[1], Hanjing Lyu[1], Jung-Eun Yim[1,2]

[1]Interdisciplinary Program in Senior Human Ecology, Changwon National University, Republic of Korea, [2]Department of Food and Nutrition, Changwon National University, Republic of Korea

MOP2-F-4 Effect of dietary intervention on food intake among CVD patients in comprehensive cardiac rehabilitation: interim analysis

Jung Eun Lee[1*], Jiyoung Youn[1], Ga Young Lee[1], Sang Hee Shin[2], Chi Sun Suh[2], Sung Nim Han[1], Ick-Mo Chung[3]

[1]Department of Food and Nutrition, Seoul National University, Republic of Korea, [2]Division of Cardiology, Ewha Womans University Mokdong Hospital, Republic of Korea, [3]Division of Cardiology, Department of Internal Medicine, Mokdong Hospital, School of Medicine, Ewha Womans University, Republic of Korea

MOP2-F-5 The protective effects of p-Coumaric acid on high-fructose diet-induced metabolic dysregulation

Hye Jin Yoon[1,2*], Un Ju Jung[1]

[1]Department of Food Nutrition, Pukyong University, Republic of Korea, [2]Natural Product Research Center, KRIBB, Republic of Korea

MOP2-F-6 Brown fat HuR is a cold-induced RNA binding protein that regulates fatty acid oxidation to enhance thermogenesis

Kun-Young Park[1*], Sanghun Lee[3], Yeon Jin Roh[4], Sungwoo Choi[5], Hyemi Shin[1], Dong Wook Choi[4], Su Myung Jung[3], Jae Myoung Suh[2]

[1]Institute of Life Science, Korea Advanced Institute of Science and Technology, Republic of Korea, [2]Graduate School of Medical Science and Engineering, Korea Advanced Institute of Science and Technology, Republic of Korea, [3]Department of Biological Sciences, Sungkyunkwan University, Republic of Korea, [4]Department of Biotechnology, Korea University, Republic of Korea, [5]Department of Nutritional Sciences and Toxicology, University of California, Berkeley, United States

MOP2-F-7 The role of vimentin on microparticle in macrophages

Soonhyeong Oh*, Wonkyoung Cho, Young Mi Park

Basic Science, Ewha Womans University, Republic of Korea

MOP2-F-8 Molecular analysis of use of Anti-FAM19A5 antibodies for treating atherosclerosis

Haerani[1*], Ramlah[2]

[1]Family Medicine, Institute of Health Science Bina Bangsa Majene, Indonesia, [2]Natural Science, West Sulawesi University, Indonesia

Mini-Oral Presentation 2-G

Sep 28(Sat) 13:30-14:30 | Mini-Oral G (Studio 1, 6F)

MODERATOR : Nam Hoon Kim (Korea University, Republic of Korea)

MOP2-G-1 Rapid detection of beta-blocker in human urine using LC-MS/MS: an antiatherosclerotic agents

Awanish Kumar Upadhyay*, Tarun Handa, Kamna Sharma, Puranlal Sahu

Drug Analysis by LC-MS/MS, National Dope Testing Laboratory, New Delhi, India

MOP2-G-2 Non-linear association between admission glucose level and incomplete recovery of coronary blood flow in patients with STEMI treated by primary PCI

Surenjav Chimed[1*], Batmyagmar Khuyag[2]

[1]Radiology, Charité - Universitätsmedizin Berlin, Germany, [2]Cardiology, Intermed Hospital, Mongolia

MOP2-G-3 Autonomic rehabilitation enhances cardioplasticity in patients with post COVID-19 cardiopulmonary dysfunctions

Priyanka Rishi*, Dr. Zaki Anwer

Physiotherapy, Lovely Professional University, India

MOP2-G-4 The role of acetyltransferase PCAF in cardiac remodeling

Yongwoon Lim*, Hyun Kook

Pharmacology, Chonnam National University, Republic of Korea

Withdrawn

MOP2-G-5 Selectively targeting the Gasdermin-D pore attenuates cardiac inflammation and fibrosis after ischemia reperfusion injury

Judy Choi[1,4*], Daniel Donner[2], Helen Kiriazis[2], Aascha Brown[2], Mehnaz Pervin[1], Parvin Yavari[1], James Vince[5,6], Arpeeta Sharma[3], Judy B. de Haan[1,3,4]

[1]Cardiovascular Inflammation and Redox Biology Laboratory, Baker Heart and Diabetes Institute, Australia, [2]Preclinical Cardiology Microsurgery and Imaging Platform, Baker Heart and Diabetes Institute, Australia, [3]Department of Diabetes, Monash University, Australia, [4]Department of Immunology, Monash University, Australia, [5]Department of Medical Biology, The University of Melbourne, Australia, [6], The Walter and Eliza Hall Institute of Medical Research, Australia

MOP2-G-6 Ex vivo three-dimensional visualization of mouse sinoatrial node

Hoang Le[1*], Nguyen Tran[1], Trang Luong[1], Pilhan Kim[2], Jaetaek Kim[1]

[1]Division of Endocrinology and Metabolism, Department of Internal Medicine, College of Medicine, Chung-Ang University, Republic of Korea, [2], Graduate School of Medical Science and Engineering, KAIST, Daejeon, Republic of Korea

MOP2-G-7 Empagliflozin alleviates cardiac lipid accumulation and fibrosis in diabetic mice

Trong Kha Pham[1,2*], To Hoai T. Nguyen[1], Hyeong Rok Yun[1], Vu Thi Thu[2], Luu Thi Thu Phuong[2], Hyoung Kyu Kim[1], Jin Han[1]

[1]Cardiovascular and Metabolic Disease Center, Inje University, Republic of Korea, [2]VNU University of Science, Vietnam National University, Hanoi, Vietnam

MOP2-G-8 Genetic analysis of methods for detection of atherosclerosis and atherosclerosis diagnostic kits using polypeptide markers and their antibodies for diagnosis of atherosclerosis

Ramlah[1*], Haerani[2]

[1]Educational of Biology, Universitas Sulawesi Barat, Indonesia, [2]Public Health, STIKes Bina Bangsa Majene, Indonesia

Mini-Oral Presentation 2-H

Sep 28(Sat) 13:30-14:30 | Mini-Oral H (Studio 2, 6F)

MODERATOR : Jae-Hoon Choi (Hanyang University, Republic of Korea)

MOP2-H-1 Genome-wide identification and characterization of Senna tora miRNAs and its cross kingdom regulation in atherosclerosis

Saumya K. Patel[1*], Rohan A. Pandey[1], Rakesh M. Rawal[2]

[1]Department of Bioinformatics, Gujarat University, India, [2]Department of Life sciences, Gujarat University, India

MOP2-H-2 Probiotic properties and anti-diabetic effects of lactiplantibacillus plantarum LRCC5314 postbiotics in vivo

Ahyoung Lim[1*], Seokmin Yoon[1], Woongkwon Kwak[2], Yohan Nam[2], Hoontae Kwon[1], Jungki Kwak[1], Wonyong Kim[2]

[1]Microbial&Fermentation Team, LOTTE R&D Center, Republic of Korea, [2]Department of Microbiology, College of Medicine, Chung-Ang University, Republic of Korea

MOP2-H-3 M2 macrophage exosomes improve cardiac function in mice with heart failure by suppressing cardiometabolic inflammation and type 1 interferon response

Martin Ng*, Alex S Gao, Tuan A Phu, Ngan K Vu, Robert L Raffai

Surgery, UCSF, NCIRE, United States

MOP2-H-4 Involvement of endocan in vascular dysfunction in angiotensin II-induced hypertensive mice

Eun Yi Oh*, Seonhee Byeon, Soo-Kyoung Choi, Young-Ho Lee

Physiology, Yonsei University College of Medicine, Republic of Korea

MOP2-H-5 Protective effect of human milk oligosaccharide on lipopolysaccharide-induced inflammation by inhibiting STAT1 signaling pathway

Yujin Jin[1*], Lila Kim[2], Kyung-Sun Heo[1]

[1]College of Pharmacy, Chungnam National University, Republic of Korea, [2]Company, GeneChem Inc., Republic of Korea

MOP2-H-6 BH4 prevents diabetic cardiomyopathy by activating CaMKK2 signaling pathway

Nguyen Thi To Hoai[1*], Hyoung Kyu Kim[1], Jae Boum Youm[1], Nam Mi Park[1], Pham Trong Kha[1,2], Yun Hyeong Rok[1], Vu Thi Thu[2], Pham Thi Bich[2], Luu Thi Thu Phuong[2], Jin Han[1]

[1]Department of Physiology, BK21 Plus Project Team, College of Medicine, Smart Marine Therapeutics Center, Cardiovascular and Metabolic Disease Center, Inje University, Busan, Republic of Korea, [2]University of Science, Vietnam National University, Hanoi, Vietnam

MOP2-H-7 Protective effects of β-lapachone on isoproterenol-induced cardiac hypertrophy

Mario Albino Sozinho Indarua*, Jin Han, Trong Kha Pham, Hyoung Kyu Kim

Physiology Department, Inje University, Republic of Korea

MOP2-H-8 Epidemiologic data of cardiovascular disease caused by high LDL cholesterol in low sociodemographic index vs high sociodemographic index: a population-based study

Zavia Putri Salsabila*

Basic Science, Indonesia Islamic University, Indonesia

Mini-Oral Presentation 2-I

Sep 28(Sat) 13:30-14:30 | Mini-Oral I (Studio 3, 6F)

MODERATOR : Jin Joo Park (Seoul National University, Republic of Korea)

MOP2-I-1 Diabetes distress and psychosocial issues towards Quality of Life (QoL) of outpatients diabetes care

Rosinta Hotmaida Pebrianti Purba[1*], Lintong Hottua Simbolon[1], Ester Marnita Purba[2]

[1]Socioeconomic Research, The Pranala Institute, Indonesia, [2]Hospitality and Care, Tindal NT Darwin, Australia

MOP2-I-2 Serum LDL cholesterol lipids serve as predictor of steroid resistance in patients with focal segmental glomerulosclerosis

Fahad Zadjali[*]

Biochemistry, Oman College of Health Sciences, Oman

MOP2-I-3 Gender specific association of PNPLA3 variants with fatty liver disease trait heritability

Mustafa Al Hinai[1*], Fahad Zadjali[2]

[1]Family and Community Medicine, Sultan Qaboos University Hospital, Oman, [2]Deanship, Oman College of Health Sciences, Oman

MOP2-I-4 The prevalence of dyslipidemia and diabetes mellitus in Thai kidney transplant patients

Suthida Boonsom[*]

School of Pharmaceutical Sciences, University of Phayao, Thailand

MOP2-I-5 Association between cardiometabolic risk factors and COVID-19 severity in patients of tertiary rural hospital

Withdrawn

Percival Dilla[*]

Internal Medicine, Region II Trauma and Medical Center, Philippines

MOP2-I-6 Associations of changes in metabolic syndrome status and risk factor count with incident cardiovascular events among cancer survivors

Jaeyong Lee[*], Hyeok-Hee Lee, Hyeon Chang Kim, Hokyou Lee

Department of Preventive Medicine, Yonsei University College of Medicine, Republic of Korea

MOP2-I-7 Impact of different quantity and source of dietary protein intake on cardiovascular diseases risk factors in Singapore older adults: a randomized controlled trial

Yueying Yao[1*], Ian Mak[1], Clarinda Sutanto[1], Khoo Chin Meng[2], Roger Sy Foo[3], Jung Eun Kim[1]

[1]Department of Food Science and Technology, National University of Singapore, Singapore, [2]Division of Endocrinology, University Medicine Cluster, National University Hospital, Singapore, [3]NUS Yong Loo Lin School of Medicine, National University of Singapore, Singapore

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Key Lectures

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Plenary Lecture 1

Sep 27(Fri) 11:05-11:45 | Room 1,2,3 (3F)

CHAIRPERSON : Jaetaek Kim (Chung-Ang University, Republic of Korea)

11:05-11:45 **Inflammation and atherosclerosis: from theory to practice**

Paul M Ridker (Harvard Medical School, USA)

CURRICULUM VITAE

Paul M Ridker

Eugene Braunwald Professor of Medicine,
Director, Center for Cardiovascular Disease Prevention,
Brigham and Women's Hospital, Boston, Massachusetts, USA

Education and Training

MD Harvard Medical School, Boston, MA (1986), MPH Harvard School of Public Health, Boston, MA,
Internship, Residency, Cardiovascular Disease Fellowship, Brigham and Women's Hospital, Boston,

Employment and Position

Brigham and Women's Hospital, Harvard Medical School
Director, Center for Cardiovascular Disease Prevention

Important Publications

1. Ridker PM, Lei L, Louie M et al. Inflammation and cholesterol as predictors of cardiovascular events among 13970 contemporary high-risk patients with statin intolerance. Circulation 2024;149:28-354.
2. Ridker PM, Bhatt DL, Pradhan AD, et al. Inflammation and cholesterol as predictors of cardiovascular events among patients receiving statin therapy: a collaborative analysis of three randomized trials. Lancet 2023;401:1293-1301.
3. Ridker PM, Rane M. Interleukin-6 signaling and anti-interleukin-6 therapeutics in cardiovascular disease. Circ Res 2021;128:1728-1746.
4. Ridker PM, MacFadyen JG, Everett BM, Libby P, Thuren T, Glynn RJ for the CANTOS Trial Group. Relationship of C-reactive protein reduction to cardiovascular event reduction following treatment with canakinumab: a secondary analysis from the CANTOS randomised controlled trial. Lancet. 2018; 391:319-328.
5. Ridker PM, Everett BM, Thuren T, et al. Antiinflammatory Therapy with Canakinumab for Atherosclerotic Disease. N Engl J Med. 2017;377:1119-1131.

Awards and Honors

Distinguished Scientist Award, American Heart Association; Elected member National Academy of Medicine (USA); multiple honorary degrees

Research Interest

Inflammation and atherosclerosis, clinical trials, prevention and treatment of atherosclerotic disease.

Inflammation and atherosclerosis: from theory to practice

Paul M Ridker

Eugene Braunwald Professor of Medicine, Harvard Medical School,
Director, Center for Cardiovascular Disease Prevention, Brigham and Women's Hospital, Boston, Massachusetts, USA

Atherosclerosis is a disease driven by lipid accumulation (measured by LDL cholesterol) and chronic low-grade systemic inflammation (measured by high sensitivity C-reactive protein or hsCRP). Yet, clinicians often focus attention solely on "residual cholesterol risk" without paying adequate attention to "residual inflammatory risk" even though the latter group of patients are more prevalent then the former. The JUPITER trial demonstrated that individuals with low levels of LDLC but elevated hsCRP benefit greatly from statin therapy in primary prevention. In statin treated secondary prevention patients, data from multiple randomized trials now demonstrate that targeting inflammation is at least as effective as further targeting of LDL cholesterol. Further, the availability of low dose colchicine 0.5 mg daily, as demonstrated in the COLCOT and LoDoCo2 trials, now allows clinicians to move beyond lipid strategies alone to reduce major adverse cardiovascular event rates in their patients. Thus, to effectively practice today, clinicians need to measure hsCRP as well as LDL cholesterol to differentiate patients with "residual inflammatory risk" from those with "residual cholesterol risk". Among individuals with evidence of low-grade systemic inflammation detected by hsCRP >2 mg/L, targeting the canonical NLPR3 to IL-1 to IL-6 pathway of innate immunity was proven in the CANTOS trial of IL-1b inhibition to reduce vascular event rates without reducing cholesterol or blood pressure. Moving forward, efforts on a global basis are now focused on inhibition of the central signaling cytokine IL-6 and novel agents such as ziltivekimab, a monoclonal antibody that targets the IL-6 ligand, are under investigation in patients with atherosclerosis and chronic kidney disease (ZEUS trial), heart failure with preserved ejection fraction (HERMES trial), and in acute coronary ischemia (ARTEMIS trial). In the future, it can be anticipated that all atherosclerosis patients will receive aggressive lipid lowering and inflammation inhibiting therapy, in addition to behavioral and lifestyle interventions.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Plenary Lecture 2

Sep 28(Sat) 10:40–11:20 | Room 1,2,3 (3F)

CHAIRPERSON : Jin Han (Inje University, Republic of Korea)

10:40–11:20 **Lipid metabolism in thermogenic adipose tissues**

Joerg Heeren (University of Hamburg, Germany)

CURRICULUM VITAE

Joerg Heeren

Professor, University Medical Center Hamburg-Eppendorf, Germany

Education and Training

1995	University of Hamburg, Germany, Diploma, Biochemistry
1998	University of Hamburg, Germany, Ph.D., Biochemistry
2005	University of Hamburg, Germany, Venia legendi, Biochemistry
2005	University of Hamburg, Germany, Habilitation, Biochemistry

Employment and Position

1998-2001	UKE, Hamburg, Germany, Postdoc
2001-2005	UKE, Hamburg, Germany, Junior Scientists, group leader
2005-2015	UKE, Hamburg, Germany, Senior Scientists, group leader
Since-2015	UKE, Hamburg, Germany, Full Professor for Immunometabolism

Important Publications

1. Niemann B, Haufs-Brusberg S, Puetz L, Feickert M, Jaeckstein MY, Hoffmann A, Zurkovic J, Heine M, Trautmann EM, Müller CE, Tönjes A, Schlein C, Jafari A, Eltzschig HK, Gnad T, Blüher M, Krahmer N, Kovacs P, Heeren J, Pfeifer A. Apoptotic brown adipocytes enhance energy expenditure via extracellular inosine. Nature. 2022 Jul 5. doi: 10.1038/s41586-022-05041-0. IP: 49.96.
2. Fischer AW, Jaeckstein MY, Gottschling K, Heine M, Sass F, Mangels N, Schlein C, Worthmann A, Bruns OT, Yuan Y, Zhu H, Chen O, Ittrich H, Nilsson SK, Stefanicka P, Ukropec J, Balaz M, Dong H, Sun W, Reimer R, Scheja L, Heeren J. Lysosomal lipoprotein processing in endothelial cells stimulates adipose tissue thermogenic adaptation. Cell Metab. 2021;33(3):547-564.e7. doi: 10.1016/j.cmet.2020.12.001. IP: 31.37.
3. Heine M, Fischer AW, Schlein C, Jung C, Straub LG, Gottschling K, Mangels N, Yuan Y, Nilsson SK, Liebscher G, Chen O, Schreiber R, Zechner R, Scheja L, Heeren J. Lipolysis Triggers a Systemic Insulin Response Essential for Efficient Energy Replenishment of Activated Brown Adipose Tissue in Mice. Cell Metab. 2018;28(4):644-655.e4. doi: 10.1016/j.cmet.2018.06.020. IP: 31.37.
4. Worthmann A, John C, Rühlemann MC, Baguhl M, Heinsen FA, Schaltenberg N, Heine M, Schlein C, Evangelakos I, Mineo C, Fischer M, Dandri M, Kremoser C, Scheja L, Franke A, Shaul PW, Heeren J. Cold-induced conversion of cholesterol to bile acids in mice shapes the gut microbiome and promotes adaptive thermogenesis. Nat Med. 2017;23(7):839-849. doi: 10.1038/nm.4357. IP: 53.44.
5. Bartelt A, Bruns OT, Reimer R, Hohenberg H, Ittrich H, Peldschus K, Kaul MG, Tromsdorf UI, Weller H, Waurisch C, Eychmüller A, Gordts PL, Rinninger F, Bruegelmann K, Freund B, Nielsen P, Merkel M, Heeren J. Brown adipose tissue activity controls triglyceride clearance. Nat Med. 2011; 17(2):200-5. doi: 10.1038/nm.2297. IP: 53.44.

Lipid metabolism in thermogenic adipose tissues

Joerg Heeren

University Medical Center Hamburg-Eppendorf, Hamburg, Germany

The remarkable capacity of energy combustion by thermogenic brown adipocytes represents a valuable therapeutic target for treating obesity, dyslipidemia and atherosclerosis. Adaptive thermogenesis is an energy-demanding process mediated by cold-activated beige and brown adipocytes, which requires increased uptake of dietary carbohydrates and lipids for maintaining caloric balance. The presence and activity of brown adipose tissue (BAT) correlate with improved metabolic health, lower body weight and beneficial cardiovascular outcomes in humans. The activity of BAT declines with ageing and is reduced in obese states both in rodents and in humans. Accordingly, activating BAT or preventing the obesity- and ageing-induced decrease in BAT function have been proposed as a strategy to combat cardiometabolic diseases. To investigate the role of systemic energy and lipid metabolism in organ-specific processing of lipids and metabolites related to BAT activity, we have established a variety of advanced methods ranging from high-throughput lipid analysis to nanoparticle-based molecular lipid imaging. This enables us to capture organ-specific metabolism in transgenic animal models, to decipher the molecular mechanisms of glucose and lipid processing in white and brown adipocytes, and to validate the relevance of adaptive thermogenesis for obesity-associated diseases. At the meeting, I will present our latest findings on lipoprotein and lipid uptake and their relevance to BAT function and tissue remodeling in response to cold exposure. In addition, the molecular and cellular mechanisms that initiate inflammatory tissue degeneration during BAT involution and their relevance to systemic energy metabolism will be presented.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Keynote Lecture 1

Sep 27(Fri) 15:50-16:30 | Room 1,2,3 (3F)

CHAIRPERSON : Ki Hoon Han (University of Ulsan, Republic of Korea)

15:50-16:30 **Lipoprotein(a) in cardiovascular disease**

Børge G. Nordestgaard (Copenhagen University, Denmark)

CURRICULUM VITAE

Børge G. Nordestgaard

Professor, University of Copenhagen, Denmark

Education and Training

1985.01	University of Copenhagen, M.D, Medicine
1990.11	University of Copenhagen, DMSc, Internal Medicine/Cardiology

Employment and Position

1986-1988	Cornell University, New York, USA, Post.doc.
1989-1990	St. Thomas' Hospital, London, UK, Research Associate
1991-1999	Copenhagen University Hospital, Denmark, Registrar & Senior Registrar
2000-2024	Copenhagen University Hospital, Denmark, Chief Physician
2005-2024	University of Copenhagen, Clinical Professor

Important Publications

1. Johansen MØ, Afzal S, Vedel-Krogh S, Nielsen SF, Davey Smith G, Nordestgaard BG. From plasma triglycerides to triglyceride metabolism: effects on mortality in the Copenhagen General Population Study. Eur Heart J 2023; 44: 4174-4182.
2. Thomas PE, Vedel-Krogh S, Kamstrup PR, Nordestgaard BG. Lipoprotein(a) is linked to atherothrombosis and aortic valve stenosis independent of C-reactive protein Eur Heart J 2023; 44 :1449-1460.
3. Wadström BN, Pedersen KM, Wulff AB, Nordestgaard BG. Elevated remnant cholesterol, plasma triglycerides, and cardiovascular and non-cardiovascular mortality. Eur Heart J 2023; 44: 1432-1445.
4. Balling M, Afzal S, Davey Smith G, Varbo A, Langsted A, Kamstrup PR, Nordestgaard BG. Elevated LDL-Triglycerides and Atherosclerotic Risk. J Am Coll Cardiol 2023; 81: 136-152.
5. Mortensen MB, Nordestgaard BG. Elevated LDL cholesterol and increased risk of myocardial infarction and atherosclerotic cardiovascular disease in individuals aged 70-100 years: a contemporary primary prevention cohort. Lancet 2020; 396: 1644-1652.

Awards and Honors

- US National Lipid Association (NLA) Honorary Lifetime Membership Award 2021
- Anitschkow Award 2022, European Atherosclerosis Society
- 2023 US Family Heart Pioneer Award

Lipoprotein(a) in cardiovascular disease

Børge G. Nordestgaard

Copenhagen University Hospital, University of Copenhagen, Denmark

This lecture also covers lipoprotein(a) in a historical perspective, genetic evidence of causality, epidemiology, role in familial hypercholesterolaemia and diabetes, physiology and pathophysiology, management including guidelines and screening, diagnosis, measurement, and prevention, and the pipeline of new lipoprotein(a)-lowering drugs.

One in five is at high risk for atherosclerotic cardiovascular disease and aortic valve stenosis due to high concentrations of lipoprotein(a). Lipoprotein(a) concentrations are lowest in East Asians, Europeans, and Southeast Asians, intermediate in South Asians, Arabs, and Latin Americans, and highest in Africans. Women after menopause have slightly higher concentrations than men. Plasma concentrations of lipoprotein(a) are >90% genetically determined, making high lipoprotein(a) the most common inherited condition causing premature morbidity and mortality in both sexes. Individuals considered at cardiovascular risk should have lipoprotein(a) measured once in a lifetime, to inform those with high concentrations to adhere to a healthy lifestyle and if needed receive preventive medication to lower other cardiovascular risk factors. With no approved drugs to lower lipoprotein(a), it is promising that at least five drugs in development lower concentrations by 65-98%, of which two are currently being tested in large cardiovascular endpoint trials.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Keynote Lecture 2

Sep 28(Sat) 11:25–12:05 | Room 1,2,3 (3F)

CHAIRPERSON : Sang-Hyun Kim (Seoul National University, Republic of Korea)

11:25–12:05 **Recent advances in the treatment of dyslipidemia with PCSK9 therapy and a look into potential new options in the next 10 years**

R. Scott Wright (Mayo Clinic, USA)

CURRICULUM VITAE

R. Scott Wright

Professor, Mayo Clinic, USA

Education and Training

1989.05	University of Kentucky, USA, M.D, Medicine
1992.06	Mayo Clinic, Residency, Internal Medicine
1996.06	Mayo Clinic, Fellowship, Cardiology

Employment and Position

1996-Present	Mayo Clinic, Cardiologist and Assistant Professor
2001	Mayo Clinic, Associate Professor
2006	Mayo Clinic, Professor of Medicine
2005	Mayo Clinic, Associate Chair, Division of Cardiology
2017	Mayo Clinic, Senior Chair, IRB and Human Research Protection Program
2018	Mayo Clinic, Associate Editor, Mayo Clinic Proceedings
2018-2021	Mayo Clinic, Member, Officers and Councilors

Important Publications

1. Effects of Inclisiran in Patients with ASCVD: A Pooled Analysis of the ORION-10 and ORION-11 Randomized Trials. Mayo Clinic Proceedings 2024 (in press).
2. Safety and Tolerability of Inclisiran for Treatment of Hypercholesterolemia in 7 clinical trials. JACC 2023;82: 2251-61.
3. Pooled Patient-Level Analysis of Inclisiran Trials in Patients with FH or Atherosclerosis. JACC 2021;77:1182-1193.
4. Two Phase 3 trials of inclisiran in patients with elevated LDL cholesterol. N Engl J Med 2020;382:1507.
5. Convalescent Plasma Antibody Levels and the Risk of Death from Covid-19. N Engl J Med 2021;384:1015-1027.

Awards and Honors

2021	Mayo Clinic Team Science award for the US Convalescent Plasma Program
2023	Amateur Radio Hall of Fame CQ Magazine
2021	Sir Richard Doll Lectureship, Oxford University

Recent advances in the treatment of dyslipidemia with PCSK9 therapy and a look into potential new options in the next 10 years

R. Scott Wright

Mayo Clinic, USA

Management of dyslipidemia now frequently requires multiple therapies targeting multiple pathways. PCSK9 therapies are the most potent LDL lowering therapy now available. There are multiple approaches to lower PCSK 9 including monoclonal antibodies and small interfering RNA treatment. TBe future will also include Lp(a) targeted therapies coupled with LDL lowering. This presentation will review the approved PCSK 9 agents and discuss clinical scenarios that will explore when monoclonal therapies vs si RNA might be preferred.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Special Lecture 1

Sep 27(Fri) 10:20-11:00 | Room 1,2,3 (3F)

CHAIRPERSON : Ick-Mo Chung (Ewha Womans University, Republic of Korea)

10:20-11:00 **Unrecognized role for insulin/IGF-1 signaling in the heart**

Jaetaek Kim (Chung-Ang University, Republic of Korea)

CURRICULUM VITAE

Jaetaek Kim

Professor, Chung-Ang University, Republic of Korea

Education and Training

1992.02	Chung-Ang University, College of Medicine, Seoul, Republic of Korea, M.D., Medicine
2002.02	Chung-Ang University, Graduate School of Medicine, Seoul, Republic of Korea, Ph.D., Endocrinology

Employment and Position

2011-	Division of Endocrinology and Metabolism, Department of Internal Medicine, Chung-Ang University, College of Medicine, Seoul, Republic of Korea, Professor and Chief
2021-	The Society for Heart and Vascular Metabolism, Board of Directors
2023-2024	The Korean Society of Lipid and Atherosclerosis, Chairman

Important Publications

1. Lee WS, Abel ED, Kim J. New Insights into IGF-1 Signaling in the Heart. Physiology (Bethesda). 39:0, 2024
2. Ock S, Choi SW, Choi SH, Kang H, Kim SJ, Lee WS, Kim J. Insulin signaling is critical for sinoatrial node maintenance and function. Exp Mol Med. 55:965-973, 2023
3. Ock S, Ham W, Kang CW, Kang H, Lee WS, Kim J. IGF-1 protects against angiotensin II-induced cardiac fibrosis by targeting αSMA. Cell Death Dis. 12:688, 2021
4. Kim JM, Lee WS, Kim J. Therapeutic strategy for atherosclerosis based on bone-vascular axis hypothesis. Pharmacol Ther. 206:107436, 2020
5. Ock S, Lee WS, Kim HM, Park KS, Kim YK, Kook H, Park WJ, Lee TJ, Abel ED, Kim J. Connexin43 and zonula occludens-1 are targets of Akt in cardiomyocytes that correlate with cardiac contractile dysfunction in Akt deficient hearts. Biochim Biophys Acta Mol Basis Dis. 1864:1183-1191, 2018

Research Interest

Research is focused on understanding basic molecular biological mechanisms underlying cardiovascular disease with emphasis on the role of insulin and IGF-1 receptor signaling

Unrecognized role for insulin/IGF-1 signaling in the heart

Jaetaek Kim

Division of Endocrinology and Metabolism, Department of Internal Medicine,
College of Medicine, Chung-Ang University, Seoul, Republic of Korea

Insulin and insulin-like growth factor-1 (IGF-1) signaling have multiple physiological roles in cellular growth, metabolism, and aging. Myocardial hypertrophy, cell death, senescence, fibrosis, and electrical remodeling are hallmarks of various heart diseases and contribute to the progression of heart failure. This lecture will discuss the critical role of insulin/IGF-1 and their cognate receptors in cardiovascular diseases.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Special Lecture 2

Sep 28(Sat) 14:40–15:20 | Room 1,2,3 (3F)

CHAIRPERSON : Jeongseon Kim (National Cancer Center, Republic of Korea)

14:40–15:20 **Dissecting dietary approaches targeting lipid biomarkers**

Sung Nim Han (Seoul National University, Republic of Korea)

CURRICULUM VITAE

Sung Nim Han

Professor, Seoul National University, Republic of Korea

Education and Training

1987.02	Seoul National University, Korea, B.S., Food and Nutrition
1990.02	Seoul National University, Korea, M.S., Food and Nutrition
1999.05	Tufts University, USA, Ph.D, Human Nutrition

Employment and Position

2007-Present	Seoul National University, Department of Food and Nutrition, Professor
2003-2007	The Gerald J. and Dorothy R. Friedman School of Nutrition Science and Policy at Tufts University, Assistant Professor
2002-2007-	Nutritional Immunology Lab, JM-USDA Human Nutrition Research Center on Aging at Tufts University, Scientist III & II

Important Publications

1. H You, U Shin, DH Kwon, J Hwang, GY Lee, SN Han. The effects of in vitro vitamin D treatment on glycolytic reprograming of bone marrow-derived dendritic cells from Ldlr knock-out mouse. Biochimica et Biophysica Acta Molecular Basis of Disease 1870(7):167436, 2024.
2. M Oh, S Jung, Y-a Kim, GY Lee, SN Han. Dietary vitamin D3 supplementation enhances splenic NK cell activity in healthy and diabetic male mice. Nutrition Research, 127: 144-155, 2024
3. J Hwang, H You, DH Kwon, Y Son, GY Lee, SN Han. Transcriptome analysis of T cells from Ldlr-/- mice and effects of in vitro vitamin D treatment. Journal of Nutritional Biochemistry 124: 109510, 2024
4. GY Lee, K-M Chung, J Lee, J_H Kim, SN Han. Changes in anxiety and depression levels and meat intake following recognition of low genetic risk for high body mass index, triglycerides, and lipoproteins: A randomized controlled trial. PLoS One 18(9): e0291052, 2023
5. J So, K-M Chung, J Seo, B Kim, H Chun, SN Han, I-M Chung. High intake of sweet foods and low life satisfaction can act as risk factors for acute coronary syndrome through synergistic interaction. Frontiers in Nutrition 10:1221916, 2023

Awards and Honors

- JLA 최우수상 (2023)
- 보건복지부장관표창 (2019)
- NRP 최다피인용상 (2019)

Research Interest

- Effects of vitamin D on diabetes: gender-specific difference and modulation of adipose tissue inflammation and skeletal muscle metabolism
- Nutrient regulation of immune and inflammatory responses associated with obesity and metabolic diseases
- Modulation of immunometabolism by vitamin D

Dissecting dietary approaches targeting lipid biomarkers

Sung Nim Han

Seoul National University, Republic of Korea

Circulating levels of lipid biomarkers are used to assess cardiovascular diseases (CVD) risk and to set treatment goals. Although LDL-cholesterol (LDL-C), HDL-cholesterol (HDL-C), and triglycerides (TG) are classic biomarkers for assessing CVD risk, other lipid biomarkers have also been implicated. Elevated LDL-C, low HDL-C, elevated TG, elevated lipoprotein(a) [Lp(a)], and elevated apolipoprotein B (apoB) are risk-enhancing factors for CVD according to the 2019 ACC/AHA Guidelines. However, recent research suggests that elevated HDL-C levels may be linked to increased mortality in certain populations.

Nutrition and dietary recommendations for CVD prevention emphasize the intake of vegetables, fruits, legumes, nuts, whole grains, and fish or lean proteins to reduce atherosclerotic CVD risk factors and the risk of CVD events. Reducing the percentage of energy from saturated fat and replacing it with monounsaturated and polyunsaturated fats, limiting refined carbohydrates, and avoiding *trans* fat are considered beneficial for lowering CVD events.

In this lecture, we will discuss the association of various lipid biomarkers (LDL-C, HDL-C, TG, ApoB, ApoCIII, Lp(a), and HDL subclasses) with CVD risk and the effect of dietary components on these lipid biomarkers.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Main Symposia

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Symposium 1

New Antidyslipidemic Agents on the Horizon

Sep 27(Fri) 08:30-10:00 | Room 1 (3F)

CHAIRPERSON : Sang-Hak Lee (Yonsei University, Republic of Korea)

08:30-08:50	**Cutting-edge LP(a)-lowering therapies: how will they impact our practice?** Yu Mi Kang (Havard Medical School/TIMI Study Group, USA)
08:50-09:10	**Cutting-edge triglyceride-lowering therapies: can we close the gap in hypertriglyceridemia management?** Andre Zimerman (Moinhos de Vento Hospital and College of Health Sciences, Brazil)
09:10-09:30	**Cutting-edge LDL-lowering therapies: where will the next-generation PCSK9 inhibitors stand?** Kyung Woo Park (Seoul National University, Republic of Korea)
09:30-10:00	**Panel Discussion** Nam Hoon Kim (Korea University, Republic of Korea) Jong-Chan Youn (The Catholic University of Korea, Republic of Korea) Dong-Hyuk Cho (Korea University, Republic of Korea)

CURRICULUM VITAE

Yu Mi Kang

Senior Interdisciplinary Fellow, Harvard Medical School, TIMI Study Group, USA

Education and Training

2005.02	University of Toronto, Toronto ON, Canada, B.Sc., Integrative Biology
2010.02	Chonbuk National University Medical School, Jeonju, Republic of Korea, M.D., M.Sc., Medicine
2015.07	Asan Medial Center/University of Ulsan, College of Medicine, Seoul, Republic of Korea, Ph.D., Internal Medicine (Vascular Biology)
2025.05	Harvard University, T.H. Chan School of Public Health, Boston, MA, USA, MPH, Master of Public Health

Employment and Position

2017.03-2019.06	Asan Medical Center, Republic of Korea, Instructor
2019.07-2022.06	Yale University School of Medicine, Department of Internal Medicine, Resident Physician
2022.07-	Harvard Medical School, Division of Endocrinology, Diabetes and Hypertension, Senior Clinical and Research Fellow
2023.07-	Harvard Medical School, TIMI Study Group (Division of Cardiovascular Medicine), Senior Research Fellow

Important Publications

1. Patel SM, Kang, YM et al. Sodium Glucose Co-transporter 2 Inhibitors and Major Adverse Cardiovascular Outcomes: A SMART-C Collaborative Meta-Analysis. Circulation. 2024 Apr 7 Online ahead of print. doi: 10.1161/CIRCULATIONAHA.124.069568
2. Kang YM, Cho YK, Lee J, Lee SE, Lee WJ, Park JY, Kim YJ, Jung CH, Nauck MA. Asian Subpopulations May Exhibit Greater Cardiovascular Benefit From Long-Acting Glucagon-Like Peptide 1 Receptor Agonists: A Meta-Analysis of Cardiovascular Outcome Trials. Diabetes Metab J 2019 Aug;43(4):410-421. doi: 10.4093/dmj.2018.0070. PMID 3060459
3. Kang YM, Cho YK, Lee SE, Park JY, Lee WJ, Kim YJ, Jung CH. Cardiovascular Diseases and Life Expectancy in Adults with Type 2 Diabetes; A Korean National Sample Cohort Study. J Clin Endocrinol Metab jc.2017-00643. DOI: https://doi.org/10.1210/jc.2017-00643. PMID 28911137

Cutting-edge LP(a)-lowering therapies: how will they impact our practice?

Lipoprotein(a), or Lp(a), has emerged as a significant risk factor for cardiovascular disease (CVD). The levels of Lp(a) are primarily determined by genetic factors, with minimal influence from traditional cardiovascular risk factors such as lifestyle patterns, underscoring the urgent necessity for pharmacologic management. Among currently available lipid-lowering agents, statins and fibrates demonostrated minimal efficacy in reducing Lp(a) levels, while niacin and proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors have demonstrated a modest reduction in Lp(a), although they are not currently approved for this specific purpose.

Recent advancements in therapies targeting Lp(a) have shown promising results, with reductions in Lp(a) levels ranging from 60% to 98%. These emerging therapies employ cutting-edge technologies, such as antisense oligonucleotides (ASOs) and small interfering RNAs (siRNAs), to target and degrade LPA mRNA. Additionally, gene editing technologies, including CRISPR/Cas9, are being investigated for their potential to directly modify the LPA gene. These innovative approaches may offer more effective and targeted treatments for patients with elevated Lp(a), presenting a promising solution for individuals at high risk of CVD. Ongoing cardiovascular outcome trials will clarify the efficacy of these new Lp(a)-targeting therapies in reducing CVD incidence and mortality.

CURRICULUM VITAE

Andre Zimerman

Head, Clinical Trials Unit,
Moinhos de Vento Hospital and College of Health Sciences (HMV-Brazil)

Education and Training

2016	Federal University of Rio Grande do Sul, Brazil, M.D, Medicine
2019	Hospital de Clinicas de Porto Alegre, Brazil, Internal Medicine Residency, Internal Medicine
2022	Hospital de Clinicas de Porto Alegre, Brazil, Cardiology Fellowship, Cardiology
2022	Federal University of Rio Grande do Sul, Brazil, Ph.D, Cardiology

Employment and Position

2022-2024	TIMI Study Group, Brigham and Women's Hospital, Postdoctoral Research Fellow
2024-	HMV-Brazil, Head, Clinical Trials Unit // Preventive Cardiologist

Important Publications

1. Bergmark BA, Marston NA, Prohaska TA, Alexander VJ, Zimerman A, Moura FA, Murphy SA, Goodrich EL, Zhang S, Gaudet D, Karwatowska-Prokopczuk E, Tsimikas S, Giugliano RP, Sabatine MS. Olezarsen for Hypertriglyceridemia in Patients at High Cardiovascular Risk. New England Journal of Medicine 2024;NEJMoa2402309.
2. Zimerman A, Wiviott SD, Park JG, Murphy SA, Ran X, Bramson CR, Curto M, Ramos V, Jevne A, Kuder JF, Verma S, Wojakowski W, Terra SG, Sabatine MS, Bergmark BA, Marston NA. Reductions in remnant cholesterol and VLDL cholesterol through inhibition of ANGPTL3 protein synthesis: an analysis from the TRANSLATE-TIMI 70 trial. European Journal of Preventive Cardiology 2024:zwae090. doi:10.1093/eurjpc/zwae090.
3. Zimerman A, Wiviott SD, Park JG, Murphy SA, Ran X, Bramson CR, Curto M, Ramos V, Jevne A, Kuder JF, Verma S, Wojakowski W, Terra SG, Sabatine MS, Bergmark BA, Marston NA. Hepatic fat changes with antisense oligonucleotide therapy targeting ANGPTL3. Journal of Clinical Lipidology 2023 Dec:S1933287423003513.

Cutting-edge triglyceride-lowering therapies: can we close the gap in hypertriglyceridemia management?

Elevated plasma triglycerides, or triglyceride-rich lipoproteins (TRL), are associated with increased cardiovascular risk and pancreatitis. Unfortunately, currently available triglyceride-lowering therapies have a variable effect on triglycerides and atherogenic particle count, with limited cardiovascular benefit on top of statins. Thus, reducing triglycerides and TRLs remains an unmet clinical need. RNA-based technology provides a targeted, potent, and durable effect, leading to a new era in triglyceride-lowering therapeutics.

Angiopoietin-like protein 3 (ANGPTL3) is a potent inhibitor of lipoprotein lipase and endothelial lipase. Loss-of-function variants in ANGPTL3 have been associated with reduced triglycerides, LDL-C, and cardiovascular disease. ANGPTL3 inhibition is a promising approach for patients with hypertriglyceridemia. Novel agents that target ANGPTL3 include the monoclonal antibody evinacumab, the small interfering RNA zodasiran, and the antisense oligonucleotide vupanorsen.

Apolipoprotein C-III (apoC-III) enhances the formation and prevents clearance of TRLs through both LPL-dependent and LPL-independent mechanisms. In genetic studies, loss-of-function variants in apoC-III have been associated with lower triglycerides and improved cardiovascular risk. Novel agents targeting apoC-III include the small interfering RNA plozasiran and the antisense oligonucleotides volanesorsen and olezarsen.

Each of these medications has been shown to markedly decrease triglycerides, yet it remains unclear whether this reduction will be translated into cardiovascular benefit. In the lecture, we will discuss recent evidence regarding ANGPTL3 and apoC-III inhibitors, ongoing clinical trials, and new therapies on the horizon.

The lecture is intended to provide an overview of the latest advancements in triglyceride-lowering therapies and their emerging role in residual risk reduction.

CURRICULUM VITAE

Kyung Woo Park

Seoul National University, Republic of Korea

Present Position

Professor of Medicine
Department of Internal Medicine, Cardiovascular Center
Seoul National University Hospital, Seoul Korea
Associate Editor, Circulation Cardiovascular Intervention, American Heart Association (AHA)
Deputy Editor, Journal of the Asia-Pacific Society of Cardiology (JAPSC)
Board of Directors and Director of International Affairs, Korean Society of Cardiology (KSC)
Board Member, Scientific Advisory Board, Asia Pacific Society of Cardiology (APSC)
Board Member, Asia Pacific Society of Interventional Cardiology (APSIC)
Board of Directors, Korean Society of Lipid and Atherosclerosis
Member, Scientific Committee, ESC (European Society of Cardiology)-Asia
Course Advisory Committee and Scientific Committee Member, ENCORE-Seoul Meeting
Board of Trustees, Dongwon Educational Foundation
Member of Board of Directors, EzCaretech
Medical Advisor, Special Olympics Korea

Past Position

- President, Seoul National University Hospital Healthcare System Gangnam Center, Seoul, Korea (2021-2023)
- Chief Innovation and Quality Officer, Seoul National University Hospital, Seoul, Korea (2019-2021)
- Vice President and Chief of Global Operations and Business Development, Seoul National University Hospital (2019)
- Deputy Chief of Planning, Budget, and Strategy, Seoul National University Hospital (2016-2019)
- Director of Cardiac Catheterization Lab, Cardiovascular Center (2016-2018)
- Summer Associate, McKinsey & Co (New Jersey Office) (2015)
- Executive Director of International Healthcare Center (2012-2014)
- Deputy Director of International Healthcare Center (2010-2012)
- Assistant & Associate Professor of Medicine, Department of Internal Medicine, Cardiovascular Center, Seoul National University Hospital (2008-2012, 2012-2017)
- Medical Officer in the President's Medical Team, Presidential Security Services (2004-2006)
- Director of General Affairs, Board of Directors, Korean Society of Lipid and Atherosclerosis
- Member, General Affairs Committee, Korean Society of Cardiology
- Member, Scientific Committee, Korean Society of Cardiology,
- Member, Scientific Committee, Korean Society of Interventional Cardiology
- Aviation Medical Consultant, Asiana Airlines
- Asan Award in Medicine Review and Awards Committee, The Asan Foundation

Cutting-edge LDL-lowering therapies: where will the next-generation PCSK9 inhibitors stand?

Symposium 2

Recent Advances in Metaflammation and Atherosclerosis Research

Sep 27(Fri) 08:30–10:00 | Room 2 (3F)

CHAIRPERSONS : Jin Han (Inje University, Republic of Korea)
Sung Joon Kim (Seoul National University, Republic of Korea)

08:30–08:50	**Protective roles of BLT2 receptor on the plasma membrane disruption–induced epithelial cell damage** Takehiko Yokomizo (Juntendo University, Japan)
08:50–09:10	**Mechanistic insights into the cardioprotective effects of empagliflozin in myocardial infarction: metabolomic analysis of the emmy trial** Mahmoud Abdellatif (University of Graz, Austria)
09:10–09:30	**TM4SF19–mediated lysosomal activity of macrophages in metaflammation** Yun–Hee Lee (Seoul National University, Republic of Korea)
09:30–10:00	**Panel Discussion** Yong Joo Ahn (POSTECH, Republic of Korea) Juhyun Song (Chonnam National University, Republic of Korea) Joo–Hui Han (Woosuk University, Republic of Korea)

CURRICULUM VITAE

Takehiko Yokomizo

Professor, Juntendo University, Japan

Education and Training

1988.03	The University of Tokyo, Japan, M.D, Medicine
1995.03	The University of Tokyo, Japan, Ph.D, Biochemistry

Employment and Position

1995-1998	The University of Tokyo, Japan, Postdoctoral Fellow
1998-2000	The University of Tokyo, Japan, Research Associate
2000-2006	The University of Tokyo, Japan, Associate Professor
2006-2012	Kyushu University, Japan, Professor
2012-Present	Juntendo University, Japan, Professor

Important Publications

1. Jo-Watanabe A., T. Inaba, T. Osada, R. Hashimoto, T. Nishizawa, T. Okuno, S. Ihara, K. Touhara, N. Hattori, M. Oh-Hora, O. Nureki, T. Yokomizo. Bicarbonate signalling via G protein-coupled receptor regulates ischaemia-reperfusion injury. Nat Commun 15, 1530 (2024)
2. Ri K., H.C. Lee-Okada, T. Yokomizo. Omega-6 highly unsaturated fatty acids in Leydig cells facilitate male sex hormone production. Commun Biol 5, 1001 (2022)
3. Sasaki F., T. Koga, M. Ohba, K. Saeki, T. Okuno, K. Ishikawa, T. Nakama, S. Nakao, S. Yoshida, T. Ishibashi, H. Ahmadieh, M.R. Kanavi, A. Hafezi-Moghadam, J.M. Penninger, K.H. Sonoda, T. Yokomizo. Leukotriene B4 promotes neovascularization and macrophage recruitment in murine wet-type AMD models. JCI Insight 3, 96902 (2018)

Protective roles of BLT2 receptor on the plasma membrane disruption-induced epithelial cell damage

The plasma membrane serves as a natural barrier to prevent external invasion. Bacterial pore-forming toxins (PFTs) such as pneumolysin (PLY), streptolysin O (SLO), and α-hemolysin (α-HL) bind to the outer leaflet of the plasma membrane and form pores leading to cell lysis. For self-healing, cells possess some self-repair systems that sense and fix cell membrane damage. Leukotriene B_4 (LTB_4) receptor type 2 (BLT2), a member of the class A GPCR family, is a high-affinity receptor for a bioactive lipid 12(*S*)-hydroxyheptadeca-5*Z*,8*E*,10*E*-trienoic acid (12-HHT). We previously reported that 12-HHT/BLT2 signaling maintains skin and intestinal barrier function and accelerates skin wound healing[1,2]. In addition we found that BLT2 plays protective roles in PLY-dependent acute lung injury by suppressing cysteinyl leukotrienes receptor 1-induced vascular leakage[3]. Here, we report that BLT2 overexpression protects epithelia from cell death caused by PFTs. In contrast, primary cultured keratinocytes form BLT2-deficient mice and BLT2 overexpressing cells treated with BLT2 antagonist were more sensitive to PFTs than their control cells. BLT2-dependent protection of PFTs-induced cell damage was accompanied by a rapid membrane repair which was triggered by an influx of extracellular Ca^{2+} through the pores. Finally, we found that BLT2 promotes the elimination of PFTs-punched membrane by releasing extracellular vesicles (EVs) containing damaged membrane. 12-HHT/BLT2 axis stimulates the activation of Rac1 and reorganization of cytoskeleton, both of which lead to maintain membrane integrity and cell survival. Taken together, 12-HHT/BLT2 signaling plays a critical role in the self-repair systems against cell damage induced by PFTs.

References: 1. Liu, M. et al., J Exp Med, 211: 1063-1078 (2014). 2. Yokomizo, T. et al. J Clin Invest, 128: 2691-701 (2018) Review. 3. Shigematsu, M. et al. Sci Rep, 6: 34560 (2016).

CURRICULUM VITAE

Mahmoud Abdellatif

Assistant Professor & Group Leader, Ass-Prof. Dr., Medical University of Graz, Austria

Education and Training

2015	University of Porto, Portugal, M.Sc., Cardiovascular Pathophysiology
2019	Medical University of Graz, Austria, Ph.D., Molecular Medicine/Cardiology
2023	University of Oxford, UK, M.Sc., Clinical Trials

Employment and Position

2013-2015	University of Porto, Research Fellow
2015-2019	Medical University of Graz, Doctoral Candidate
2020-2023	Centre de Recherche des Cordeliers, Sorbonne Université, Postdoc (Marie-Curie) Fellow
2023-	Medical University of Graz, Assistant (Tenure-Track) Professor

Important Publications

1. Abdellatif M✉ et al., Hallmarks of Cardiovascular Aging. Nature Reviews Cardiology. 2023; May 16. DOI: 10.1038/s41569-023-00881-3. [IF=49.421]
2. Abdellatif M✉ et al., Fine-tuning cardiac IGF1 receptor signaling to promote health and longevity. Circulation. 2022; May 26: 101161CIRCULATIONAHA122059863. [IF=39.918]
3. Abdellatif M et al., Nicotinamide for the treatment of heart failure with preserved ejection fraction. Science Translational Medicine. 2021. DOI: 10.1126/scitranslmed.abd7064. [IF=19.319]
4. Abdellatif M et al., NAD+ metabolism in cardiac health, aging and disease. Circulation. 2021 Nov 30;144(22): 1795-1817. DOI: 10.1161/CIRCULATIONAHA.121.056589. [IF=39.918]
5. Eisenberg T*, Abdellatif M* et al., Cardioprotection and lifespan extension by the natural polyamine spermidine. Nature Medicine. 2017; 22(12):1428-1438. DOI: 10.1038/nm.4222 [IF=87.241]

*equally contributing first authors; ✉corresponding author

Mechanistic insights into the cardioprotective effects of empagliflozin in myocardial infarction: metabolomic analysis of the emmy trial

Background: Sodium-glucose cotransporter 2 (SGLT2) inhibitors, particularly empagliflozin (Empa), have demonstrated significant efficacy in improving outcomes for patients with heart failure and those at risk of heart failure, such as individuals who have experienced a myocardial infarction. Despite these promising clinical results, the precise mechanisms through which Empa exerts its beneficial effects remain poorly understood, largely due to a lack of relevant human mechanistic studies.

Objective and Methods: This study aimed to elucidate the metabolic changes induced by Empa compared to a placebo in plasma samples from participants of the EMMY trial (EMpagliflozin in patients with acute MYocardial infarction). We randomly selected 228 participants, dividing them equally into two groups (1:1 ratio; Empa vs. placebo). To achieve a comprehensive understanding of these metabolic alterations, we conducted extensive metabolome profiling 26 weeks post-treatment. Our approach combined targeted and untargeted metabolomics techniques, allowing us to analyze a total of 221 metabolites.

Results and Conclusion: Our findings bolster the hypothesis that Empa may enhance myocardial bioenergetics through the ketone body-TCA (tricarboxylic acid) cycle axis in humans. However, we have also identified other previously overlooked mechanisms that could contribute to the protection against ischemia-reperfusion injury through SGLT2 inhibition. These novel insights suggest that the cardiac benefits of SGLT2 inhibitors may be more complex than previously thought, warranting a reexamination of the underlying mechanisms. As such, our study provides a foundation for future research to further explore and validate these potential pathways, ultimately contributing to a deeper understanding of how Empa and other SGLT2i can be optimized for cardiovascular protection.

CURRICULUM VITAE

Yun-Hee Lee

Professor, Seoul National University, Republic of Korea

Education and Training

2001.02	Seoul National University, Korea, B.S., Pharmacy
2003.02	Seoul National University, Korea, M.S., Pharmacy
2012.05	Wayne State University, US, Ph.D, Pathology

Employment and Position

2003-2012	Ministry of Food and Drug Safety, Tenured Researcher
2012-2014	Wayne State University School of Medicine, Post-doc
2015-2018	Yonsei University College of Pharmacy, Assistant/Associate Professor
2018-Present	Seoul National University College of Pharmacy, Professor

Important Publications

1. TM4SF19-mediated control of lysosomal activity in macrophages contributes to obesity-induced inflammation and metabolic dysfunction. Nature Communications. 2024 Mar 30;15(1):2779.
2. TMEM86A regulates plasmalogen homeostasis and protein kinase A-dependent energy metabolism. Nature Communications 13, 4084 (2022).
3. STK3/STK4 signalling in adipocytes regulates mitophagy and energy expenditure. Nature Metabolism (2021) 2021;3:428-441.
4. Deconstructing adipogenesis induced by ß3-adrenergic receptor activation with single cell expression profiling Cell Metabolism, 28, 300-309.e304 (2018).
5. Identification of an adipogenic niche for adipose tissue remodeling and restoration. Cell Metabolism 18(3): 355-367 (2013).

Awards and Honors

1. Next generation Scientist—Physiology/Medicine, S-Oil/KAST (2023)
2. Commendation of the Minister of Food and Drug Safety, Republic of Korea (2022)
3. Commendation of the Ministry of Science, Technology and Information, Republic of Korea (2017)

Research Interest

Adipose Tissue Biology, Immunometabolism, Mitochondrial Metabolism, Anti-obesity therapeutics.

TM4SF19-mediated lysosomal activity of macrophages in metaflammation

Adipose tissue (AT) adapts to overnutrition through a complex process where specialized immune cells play a crucial role in removing and replacing dysfunctional and stressed adipocytes with new fat cells. Among the immune cells recruited to AT, lipid-associated macrophages (LAMs) have emerged as key players in obesity and diseases involving lipid stress and inflammation, such as non-alcoholic fatty liver disease, atherosclerosis, and Alzheimer's disease. In this study, we identify that LAMs selectively express transmembrane 4 L six family member 19 (TM4SF19), a lysosomal protein that represses acidification through its interaction with vacuolar-ATPase. Our findings show that the inactivation of TM4SF19 elevates lysosomal acidification and accelerates the clearance of dying and dead adipocytes both in vitro and in vivo. Additionally, the deletion of TM4SF19 reduces LAM accumulation and increases the proportion of restorative macrophages in the adipose tissue of male mice fed a high-fat diet. Importantly, male mice lacking TM4SF19 adapt to high-fat feeding through adipocyte hyperplasia, rather than hypertrophy. This adaptation significantly improves local and systemic insulin sensitivity and energy expenditure. Our research highlights the pivotal role of TM4SF19 in regulating lysosomal acidification and macrophage function. This mechanism offers a potential avenue to combat obesity-related metabolic dysfunction by promoting a therapeutic remodeling of adipose tissue.

Symposium 3 (K)

Nutrition Management and Related Systems Using AI

Sep 27(Fri) 08:30-10:00 | Room 3 (3F)

CHAIRPERSONS : Hyojee Joung (Seoul National University, Republic of Korea)
Eun Mi Kim (Kangbuk Samsung Hospital, Republic of Korea)

08:30-08:50	**Advancing precision nutrition: addressing nutritional challenges for Koreans** Hyunjung Lim (Kyung Hee University, Republic of Korea)
08:50-09:10	**Personalized artificial intelligence nutritional management platform** Saningun Lee (Dr.diary, Republic of Korea)
09:10-09:30	**Development of AI-based care system of precision nutrition for health** Jiyoung Kim (NUSEUM-LAB, Republic of Korea)
09:30-10:00	**Panel Discussion** Shin Ok Park (Noom Korea, Republic of Korea) Jean Kyung Paik (Eulji University, Republic of Korea) Youngmin Han (Yonsei University, Republic of Korea)

CURRICULUM VITAE

Hyunjung Lim

Professor, Kyung Hee University, Republic of Korea

Education and Training

2002	Kyung Hee University, Korea, BS, Food and Nutrition
2004	Kyung Hee University, Korea, MS, Clinical Nutrition
2009	Kyung Hee University, Korea, PhD, Medical Nutrition
2010-2013	Johns Hopkins University, MD, USA, Post-doc, Human Nutrition, epidemiology

Employment and Position

2005-2010	Dept. of Medical Nutrition, Kyung Hee University, Assistant Professor
2015-	Research Institute of Medical Nutrition, Director
2017-2021	Dept. of Medical Nutrition, Kyung Hee University, Associate Professor
2022-	Dept. of Medical Nutrition, Kyung Hee University, Professor

Important Publications

1. Sun X, Yon DK, Nguyen TT, Tanisawa K, Son K, Zhang L, Shu J, Yang Y, Branca F, Wahlqvist ML, Lim H. Influence of dietary and other lifestyle factors on non-communicable diseases in the Western Pacific region and policy implications. The Lancet Regional Health - Western Pacific 2024;43: 100842.
2. Park S, Lee H, Cho W, Woo HG, Lim H, Kim S, Rhee SY, Yon DK. Efficacy of information and communication technology interventions for the management of diabetes mellitus: An umbrella review and evidence map. Obesity Reviews 2024; 25 (5): e13714.
3. Bae JH, Lim H, Lim S. The Potential Cardiometabolic Effects of Long-Chain Omega-3 Polyunsaturated Fatty Acids: Recent Updates and Controversies. Advances in Nutrition 2023; 14: 612-628.
4. Park S, Kim HJ, Kim S, Rhee SY, Woo HG, Lim H, Cho W, Yon DK. National trends in physical activity among adults in South Korea before and during the COVID-19 pandemic, 2009-2021. JAMA Network Open 2023; 6(6), e2316930-e2316930.
5. Kim BH, Kang M, Kim DY, Son K, Lim H*. High Compliance with the Lifestyle-Modification Program "Change 10 Habits" Is Effective for Obesity Management. Journal of Obesity & Metabolic Syndrome 2024.

Advancing precision nutrition: addressing nutritional challenges for Koreans

Precision Nutrition represents an innovative approach that offers personalized nutritional management based on an individual's genetic, physiological, and environmental characteristics. This approach plays a pivotal role in integrating clinical nutrition and nutritional informatics. This lecture explores how the principles of precision nutrition can be effectively applied to clinical nutrition, with a focus on the unique dietary habits and genetic background of Koreans. The lecture will introduce the foundational concepts and recent advancements in precision nutrition, examine the evolution of Korean dietary patterns and modern eating habits, and address nutritional challenges associated with major chronic diseases such as obesity, diabetes, and hypertension.

Specifically, the lecture will develop customized nutritional strategies that reflect the clinical characteristics and lifestyle factors of Koreans and explain how these strategies can be effectively implemented in clinical practice. Through practical examples in clinical nutrition, the discussion will detail how precision nutrition can be utilized for personalized dietary counseling and therapeutic interventions, aiming at the prevention and management of chronic diseases and the enhancement of individual health. Additionally, the lecture will explore the potential advancements in nutritional informatics, including big data analytics and artificial intelligence, which enhance the precision of nutritional approaches by enabling the design of tailored dietary plans and real-time health monitoring. Future research directions will be discussed, highlighting how data-driven precision nutrition can contribute to the advancement of clinical nutrition and its potential impact on Korean health management. This lecture aims to assist practitioners in applying an integrated approach to precision nutrition, clinical nutrition, and nutritional informatics to achieve more effective personalized nutrition management and treatment in clinical settings.

CURRICULUM VITAE

Saningun Lee

CRO (Chief Research Officer), Dr.Diary, Republic of Korea

Education and Training

2007.02	Kyung Hee University, Korea, B.S, Food and Nutrition
2009.02	Kyung Hee University, Korea, M.D, Medical Nutrition
2019.08	Kyung Hee University, Korea, Ph.D, Medical Nutrition

Employment and Position

2015-2019	Noom Korea, Head Coach, Supervisor
2019-2020	Gachon University, Principal Researcher
2020-2024	Dr.Diary, CRO(Chief Research Officer)

Important Publications

1. Lee, S. I., Lee, H. S., & Choue, R. (2009). Study on nutritional knowledge, use of nutritional supplements and nutrient intakes in Korean elite bodybuilders. Korean Journal of Exercise Nutrition, 13(2), 101-107.
2. Kim H, Lee S, Choue R. Metabolic responses to high protein diet in Korean elite bodybuilders with high-intensity resistance exercise. J Int Soc Sports Nutr. 2011 Jul 4;8:10.
3. Lee S, Lim H. Development of an Evidence-based Nutritional Intervention Protocol for Adolescent Athletes. J Exerc Nutrition Biochem. 2019 Sep 30;23(3):29-38.

Awards and Honors

- 1st Place, -65kg Category, 21st Seoul Mayor's Cup Bodybuilding Competition, 2010
- 2nd Place, 2023 SPORTS-UP Demoday IR Pitching, Korea Sports Promotion Foundation
- Information Committee Member, The Korean Society of Clinical Nutrition

Personalized artificial intelligence nutritional management platform

Background: The advent of AI has revolutionized personalized nutritional management. Utilizing logistic regression algorithms and advanced analytical techniques, AI can process vast datasets to discern dietary patterns and health indicators, enabling tailored dietary plans and real-time feedback. Dr. Diary's 'Gluet' embodies this technological integration in a healthcare setting.

Objective: This presentation elucidates the development and implementation of 'Gluet,' an AI-driven nutritional management platform. It highlights the methodology of analyzing continuous glucose monitoring (CGM) data in conjunction with dietary and lifestyle inputs to deliver personalized dietary recommendations aimed at optimizing blood glucose levels and enhancing metabolic health

Methods: Gluet synthesizes data from health indicators, 24-hour blood glucose levels, meals, physical activities, and lifestyle information linked to CGM and wearable devices. Food Lens tracks daily food intake and dietary habits without manual entry. Advanced machine learning algorithms monitor individual glycemic responses, delivering real-time feedback and personalized guidance through a mobile application supported by human coaches.

Results: Pilot studies demonstrated that participants using Gluet experienced significant improvements in metabolic markers, including reduced average blood glucose levels, weight loss, decreased postprandial glycemic excursions, and increased time-in-range (TIR). These findings validate the platform's efficacy in mitigating glycemic variability and supporting weight management through AI-guided interventions.

Conclusion: Gluet leverages AI and CGM data to provide dietary recommendations tailored to individual metabolic responses, with the potential to enhance metabolic disease management. By detecting nutrient imbalances, tracking caloric intake, and analyzing dietary habits, AI offers personalized health predictions aimed at improving health outcomes and quality of life.

Future Directions: Dr. Diary app users will make informed decisions regarding diet, exercise, and lifestyle, fostering improved health outcomes and quality of life. AI-driven predictive nutrition supports informed living by forecasting health outcomes and providing data-driven insights for proactive intervention, establishing personalized nutrition as a cornerstone of preventive healthcare. Analyzing genetic predispositions, metabolic profiles, and environmental factors to generate optimized recommendations promises to revolutionize nutritional and health management. The prospect of one-to-one health coaching is imminent.

CURRICULUM VITAE

Jiyoung Kim

Founder & CEO, NUSEUM, Republic of Korea

Education and Training

2000.02	Korea University, Korea, B.S., Food Technology (Life Science)
2004.08	University of Georgia, USA, Ph.D, Toxicology (Physiology & Pharmacology)

Employment and Position

2004-2006	School of Pharmacy, University of Wisconsin-Madison, Post-Doctoral Research Associate
2006-2007	College of Pharmacy, Seoul National University, Post-Doctoral Fellow
2007-2009	Seoul National University, Brain Korea (BK) 21 Assistant Professor
2014-2018	Seoul National University, Research Assistant Professor
2018-2023	Seoul National University, Research Professor
2023-	NUSEUM, Founder & CEO

Important Publications

1. Autism Spectrum Disorder and Eating Problems: The Imbalance of Gut Microbiota and the Gut-Brain Axis Hypothesis. J Kim. Journal of the Korean Academy of Child and Adolescent Psychiatry 35 (1), 51. 2024.
2. Ca2+-Permeable TRPV1 Receptor Mediates Neuroprotective Effects in a Mouse Model of Alzheimer's Disease via BDNF/CREB Signaling Pathway. J Kim, S Seo, JHY Park, KW Lee, J Kim, JC Kim. Molecules and Cells 46 (5), 319.
3. 김경철, 김지영, 김해영. 개인맞춤 영양의 시대가 온다. 클라우드나인. 2022 Sep.
4. 김지영. 개인맞춤영양 AI diet 식품산업. 식품산업과 영양. 2021 Dec; 26 (1): 1-8.
5. Kim J. Pre-Clinical Neuroprotective Evidences and Plausible Mechanisms of Sulforaphane in Alzheimer's Disease. International Journal of Molecular Sciences. 2021 Jan;22(6): 2929.

Awards and Honors

2023	Korea Innovation Center Washington DC Defy Conference Idea & Innovation 대상
2022	서울대학교 창업지원단 창업클럽 최우수상
2013, 2015	BRIC 한국을 빛내는 사람들

Development of AI-based care system of precision nutrition for health

This presentation explores the development of AI-based systems, such as ChatGPT, that are revolutionizing personalized nutrition by creating dietary plans tailored to individual health needs. Most individuals require management of multiple health conditions simultaneously, not just a single disease, and NUSEUM is actively developing solutions to address this complexity. Despite significant advancements in precision nutrition, the field still faces challenges such as accessibility, high analysis costs, and concerns over data privacy and management. NUSEUM addresses these challenges by simplifying user surveys, integrating with e-commerce, and pursuing hyper-personalization strategies to enhance service quality and effectiveness. The presentation also references a 2023 study published in *Nutrition*, which evaluated the reliability of AI-generated diets. The study found that while AI generally provides balanced diets, there are risks, such as inaccuracies in calorie counts and the inclusion of potentially harmful ingredients for certain individuals. NUSEUN's efforts focus on refining these AI-driven nutrition tools to ensure they are safe, effective, and capable of managing multiple health conditions, thereby driving innovation in personalized healthcare.

Symposium 4

New Therapeutic Strategies for Metabolic Diseases

Sep 27(Fri) 13:00-14:30 | Room 1 (3F)

CHAIRPERSONS : YongSeek Park (Kyung Hee University, Republic of Korea)
Chanbae Park (Ajou University, Republic of Korea)

13:00-13:20	**Cardiac-specific SERCA overexpression improves cardiac and systemic glucose metabolism during diabetes** Véronique Anne Lacombe (Oklahoma State University, USA)
13:20-13:40	**ADAMTS4 elicits myeloid-derived immune cell recruitment and liver fibrogenesis in metabolic dysfunction-associated steatotic liver disease** Won Kim (Seoul National University, Republic of Korea)
13:40-14:00	**Gene and cell therapies for metabolic disease** Il Minn (University of Texas Southwestern Medical Center, USA)
14:00-14:30	**Panel Discussion** Jeonghan Kim (The Catholic University of Korea, Republic of Korea) Hyeongseok Kim (Chungnam National University, Republic of Korea) Chang-Myung Oh (GIST, Republic of Korea)

CURRICULUM VITAE

Véronique Anne Lacombe

Professor, Oklahoma State University, USA

Education and Training

1995	National Veterinary School of Alfort, France, D.V.M., Veterinary Medicine
2000	Ohio State University, Columbus, USA, Diplomate, American College of Veterinary Internal Medicine, Equine Internal Medicine
2003	Ohio State University, Columbus, USA, Ph.D., Comparative Exercise Physiology

Employment and Position

2003-2005	Ohio State University, Columbus, USA, Post Doctoral Research Fellow
2005-2007	Ohio State University, Columbus, USA, Senior Research Associate
2007-2012	Ohio State University, Columbus, USA, Research Assistant Professor
2012-2020	Oklahoma State University, USA, Associate Professor
2012-Present	Oklahoma State University, USA, Director of the Comparative Metabolism Research Laboratory
2020-Present	Oklahoma State University, USA, Professor
2023-Present	Oklahoma State University, USA, Vice-Chair of Graduate Council

Selected Publications

1. Rochowski MT, Jayathilake K, Balcerak JM, Selvan MT, Gunasekara S, Miller C, Rudd JM, Lacombe VA. Impact of Delta SARS-CoV-2 Infection on Glucose Metabolism: Insights on Host Metabolism and Virus Crosstalk in a Feline Model. Viruses. 16(2):295, 2024.
2. Maria Z, Campolo AR, Scherlag BJ, Ritchey JW, Lacombe VA. Insulin Treatment Reduces Susceptibility to Atrial Fibrillation in Type 1 Diabetic Mice. Front Cardiovasc Med, 12:7:134, 2020.

Cardiac-specific SERCA overexpression improves cardiac and systemic glucose metabolism during diabetes

Rationale: Diabetes, a worldwide epidemic, results from a defect in insulin production or action, with dysfunctional glucose transport into insulin-sensitive tissues (i.e., striated muscles and adipose tissues). Diabetes has been identified as a major risk factor for cardiovascular diseases such as diabetic cardiomyopathy and heart failure. We previously demonstrated that impaired sarcoplasmic reticulum calcium handling underlies diabetic cardiomyopathy. Although the heart is a major organ to utilize glucose, the regulation of glucose transport in the heart remains not well elucidated, especially regarding insulin-independent pathways.

Objective: Since the sarcoplasmic reticulum calcium ATPase (SERCA) pump tightly regulates cytosolic [Ca^{2+}], we investigated whether the SERCA pump is a major regulator of glucose transport.

Methods: Transgenic (TG) mice with cardiac-specific SERCA overexpression and wild-type (WT) mice were made diabetic. Cardiac metabolism was evaluated in isolated working hearts. The trafficking of glucose transporters (GLUT) to the cell surface, the rate-limiting step in glucose uptake, was assessed using a photolabeling biotinylation assay. Nitric oxide was measured using Electron Paramagnetic Resonance.

Results: Cardiac efficiency, glucose oxidation, and cardiac GLUT trafficking were decreased in WT diabetic, which were restored in TG diabetic mice ($p<0.05$). Although the total O-GlcNAcylation levels were unchanged, glucosamine-fructose-6-phosphate aminotransferase, O-GlcNAc transferase, and O-GlcNAcase were upregulated in the TG heart. Nitric oxide of iNOS origin was only increased in WT diabetic heart ($p<0.001$). Surprisingly, cardiac-specific SERCA overexpression partially rescued hyperglycemia during diabetes by improving glucose transport in peripheral insulin-sensitive tissues. Using quantitative mass spectrometry and ELISA, we identified protein disulfide isomerase (PDI) as upregulated in the heart and serum of healthy and diabetic transgenic mice. PDI administration rescued hyperglycemia and GLUT4 trafficking in striated muscle and reduced cardiac iNOS activity in treated WT diabetic mice.

Conclusion: The cardiac SERCA pump could regulate glucose metabolism through PDI and iNOS modulation and be a novel therapeutic target for diabetes.

CURRICULUM VITAE

Won Kim

Associate Professor, Seoul National University, Republic of Korea

Education and Training

1997.02	Seoul National University, Korea, M.D, Medicine
2007.02	Seoul National University, Korea, Ph.D, Internal Medicine

Employment and Position

2008-2024	Seoul National University College of Medicine, Professor
2018-2019	Korean Liver Cancer Association, Director of Research Committee
2022-2023	Korean Association for the Study of the Liver (KASL), Director of Research Committee
2024-	Korean Association for the Study of the Liver (KASL), Director of Publication Committee

Important Publications

1. Outcomes of Various Classes of Oral Antidiabetic Drugs on Nonalcoholic Fatty Liver Disease. JAMA Intern Med. 2024
2. Metabolic dysfunction-associated steatotic liver disease increases the risk of incident cardiovascular disease: a nationwide cohort study. EClinicalMedicine. 2023
3. Steatotic liver disease predicts cardiovascular disease and advanced liver fibrosis: A community-dwelling cohort study with 20-year follow-up. Metabolism. 2024
4. Tropifexor for nonalcoholic steatohepatitis: an adaptive, randomized, placebo-controlled phase 2a/b trial. Nat Med. 2023
5. A PNPLA3 Polymorphism Confers Lower Susceptibility to Incident Diabetes Mellitus in Subjects With Nonalcoholic Fatty Liver Disease. Clin. Gastroenterol. Hepatol. 2022

Awards and Honors

2017	KASL-GSK Academic Paper Award
2021	함춘의학상 (서울의대 총동창회)
2023	범석의학상
2024	KASL Leading Research Achievement Award

Research Interest

Integrated multi-omics analysis of MASLD and new drug discovery

ADAMTS4 elicits myeloid-derived immune cell recruitment and liver fibrogenesis in metabolic dysfunction-associated steatotic liver disease

A disintegrin and metalloproteinase with thrombospondin motifs 4 (ADAMTS4) is known to play a role in arthritis and lung fibroblast activation. However, its specific functions in liver homeostasis remain largely unexplored. Our findings revealed elevated hepatic ADAMTS4 mRNA expression in human patients with fibrotic steatohepatitis. Genetic deletion of ADAMTS4 provided protection against liver fibrogenesis by suppressing the recruitment of myeloid-derived infiltrating macrophages in liver fibrosis models. We demonstrated that ADAMTS4-mediated versican cleavage produced versikine, promoting the migration and differentiation of macrophages into the M1 phenotype. Moreover, we found that tumor necrosis factor-α increased both mRNA expression and protein secretion of ADAMTS4. Additionally, ADAMTS4 directly induced collagen accumulation through the activation of signal transducer and activator of transcription 3 (STAT3) in HSCs. Finally, through response-eQTL analysis of metabolic dysfunction-associated steatotic liver disease patients, we identified a single-nucleotide polymorphism that increased ADAMTS4 expression in a subset of patients carrying a specific genotype. Our study identifies ADAMTS4 as a crucial regulatory factor in the recruitment of myeloid-derived infiltrating macrophages and collagen production during liver fibrogenesis.

CURRICULUM VITAE

Il Minn

Associate Professor, University of Texas Southwestern Medical Center, USA

Education and Training

2012.08	Johns Hopkins University, USA, PostDoc, Biomedical Science
2008.08	The Pennsylvania State University, USA, Ph.D., Biochemistry, Microbiology, and Molecular Biology
1998.02	KAIST, Korea, M.S., Biotechnology
1996.02	Hanyang University, Korea, B.S., Biochemistry

Employment and Position

2012-2014	Johns Hopkins University, Research Associate
2014-2017	Johns Hopkins University, Instructor
2017-2024	Johns Hopkins University, Assistant Professor
2024-	University of Texas Southwestern Medical Center, Associate Professor

Important Publications

1. Ahn HH, Carrington C, Hu Y, Liu HW, Ng C, Nam H, Park A, Stace C, West W, Mao HQ, Pomper MG, Ullman CG, Minn I. Nanoparticle-mediated tumor cell expression of mIL-12 via systemic gene delivery treats syngeneic models of murine lung cancers. Sci Rep. 2021 May 6;11(1):9733. doi: 10.1038/s41598-021-89124-4. PubMed PMID: 33958660; PubMed Central PMCID: PMC8102550.
2. Hu Y, He Z, Hao Y, Gong L, Pang M, Howard GP, Ahn HH, Brummet M, Chen K, Liu HW, Ke X, Zhu J, Anderson CF, Cui H, Ullman CG, Carrington CA, Pomper MG, Seo JH, Mittal R, Minn I*, Mao HQ*. Kinetic Control in Assembly of Plasmid DNA/Polycation Complex Nanoparticles. ACS Nano. 2019 Sep 10;. doi: 10.1021/acsnano.9b03334. [Epub ahead of print] PubMed PMID: 31503450. *Co-corresponding authors.
3. Minn I, Rowe SP, Pomper MG. Enhancing CAR T-cell therapy through cellular imaging and radiotherapy. Lancet Oncol. 2019 Aug;20(8):e443-e451. doi: 10.1016/S1470-2045(19)30461-9. Epub 2019 Jul 29. Review., PMID: 31364596.
4. I Minn, David J. Huss, Hye-Hyun Ahn, Tamara Chinn, Andrew Park, Jon Jones, Mary Brummet, Steven P. Rowe, Polina Sysa-Shah, Yong Du, Hyam I. Levitsky, Martin G. Pomper, Imaging CAR-T Cell Therapy with PSMA-targeted Positron Emission Tomography, Sci Adv. 2019 Jul 3;5(7):5096. PMID: 31281894. PMCID: PMC6609218, DOI: 10.1126/sciadv.aaw5096.
5. Minn I, Wang H, Mease RC, Byun Y, Yang X, Wang J, Leach SD, Pomper MG. A red-shifted fluorescent substrate for aldehyde dehydrogenase. Nat Commun. 2014 Apr 23;5:3662.

Gene and cell therapies for metabolic disease

Gene and cell therapies are emerging as promising approaches for treating various metabolic disorders. Leveraging the clinical knowledge and experience gained from the development of COVID-19 vaccines and cell-based therapies for other indications, the path to applying gene and cell therapies for metabolic diseases has been significantly shortened. This presentation will introduce novel strategies to address metabolic disorders using gene- and cell-based therapies. Particular attention will be given to the toxicity concerns associated with these approaches, with an emphasis on cardiovascular complications. Additionally, advancements in molecular and clinical imaging techniques for the management of metabolic disease treatment will be discussed.

Symposium 5

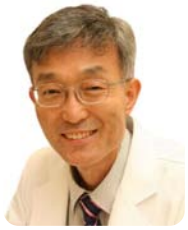
Comprehensive Cardiac Rehabilitation for Secondary Prevention of Atherosclerotic CVD

Sep 27(Fri) 13:00–14:30 | Room 2 (3F)

CHAIRPERSONS : Ick-Mo Chung (Ewha Womans University, Republic of Korea)
Chul Kim (Inje University, Republic of Korea)

13:00–13:15	**How can we recover atherosclerotic cardiovascular disease?** Ick-Mo Chung (Ewha Womans University, Republic of Korea)
13:15–13:35	**Cardiac rehabilitation: A high value service in need of disruptive innovation** Randal J. Thomas (Mayo Clinic, USA)
13:35–13:55	**Nutritional strategies for the prevention and management of cardiometabolic conditions** Qi Sun (Harvard Medical School, USA)
13:55–14:10	**Exercise strategies for optimal cardiovascular recovery: key considerations for cardiovascular disease and type 2 diabetes** Kyuwan Lee (Ewha Womans University, Republic of Korea)
14:10–14:30	**Panel Discussion** Hyun-Jae Kang (Seoul National University, Republic of Korea) Jong-Chan Youn (The Catholic University of Korea, Republic of Korea) Jungeun Lee (Seoul National University, Republic of Korea) Jong-Young Lee (Sungkyunkwan University, Republic of Korea)

CURRICULUM VITAE



Ick-Mo Chung

Professor, School of Medicine Ewha Womans University, Mokdong Hospital, Republic of Korea

Education and Training

1985.02	College of Medicine, Yonsei University, Korea, M.D, Medicine
1999.08	College of Medicine, Yonsei University, Korea, Ph.D, Cardiology

Employment and Position

1985-1989	Severance Hospital, Yonsei University, Intern & Resident
1992-1994	Severance Hospital, Yonsei University, Clinical Fellow
1994-1995	Massachusetts General Hospital, Harvard University, Boston, MA, USA, Research Fellow
1995-1997	Pathology, University of Washington, Seattle, WA, USA, Research Fellow
1997-2024	School of Medicine, Ewha Womans University, Dongdaemun hospital / Mokdong Hospital, Assistant Professor - Professor

Important Publications

1. (SCIE, IF 6.576, co-corresponding author)) Jisun So, Kyong-Mee Chung, Jihyeon Seo, Byungmi Kim, Hyejin Chun, Sung Nim Han*, Ick-Mo Chung* High intake of sweet foods and low life satisfaction can act as risk factors for acute coronary syndrome through synergistic interaction. Frontiers in Nutrition 07 Aug. 2023 volume 10
2. (SCI, IF: 4.9, corresponding & co-first author) Ick-Mo Chung*, Young-Myeong Kim, Mi-Hyun Yoo, Mi-Kyung Shin, Chun-Ki Kim, Suk-Hyo Suh. Immobilization stress induces endothelial dysfunction by oxidative stress via the activation of the angiotensin II/its type I receptor pathway. Atherosclerosis 2010;213(1):109-114
3. (SCI, IF: 6.175, corresponding & first author) Ick-Mo Chung*, Junwoo Kim, Youngmi K Pak, Yangsoo Jang, Woo-Ick Yang, Innoc Han, Seung-Jung Park, Seong-Wook Park, Jooryung Huh, Thomas N Wight, Hikaru Ueno. Blockade of TGF-β by catheter-based local intravascular gene delivery does not alter the in-stent neointimal response, but enhances inflammation in pig coronary arteries. International Journal of Cardiology 2010;145(3):468-475

How can we recover atherosclerotic cardiovascular disease?

According to the widely accepted hypothesis, atherosclerosis has been known to develop through fibro-proliferative and inflammatory response to injury on the vascular endothelium and tissues. Intensive researches carried out over recent several decades to understand the pathogenesis of atherosclerosis have led us to better understand the molecular mechanisms of atherosclerosis. Although several large scale clinical trials based on the molecular mechanisms of atherosclerosis have some positive results in improving outcomes, these kinds of approaches per se could not reach satisfactory level of recovery.

On the other hand, identifying and controlling the injury on the vasculature seems to be more efficient in recovery of atherosclerosis than modifying tissue response. Identifying injury is crucial not only for understanding the causative mechanism but also for the recovery of atherosclerosis. Injury mechanisms on the vasculature have been the target of research and include the concept of risk factors of atherosclerosis. Lifestyle factors including smoking, diet/nutrition, physical activity, psychosocial risk factors are closely associated with well-known risk factors and significantly contribute to development of atherosclerosis. Mortality of coronary artery disease has been reduced by ~ 50% in recent two decades (1980-2000) attributed to both 1) advance in therapeutics and 2) efficient control of risk factors with almost equal contribution.

Comprehensive cardiac rehabilitation (CR) dealing with diverse core factors regarding to risks of atherosclerosis is known to reduce event free survival by 32% in patients with CVDs. Nonetheless, participation rate to CR is 30-40% in Europe and USA, and 1.5% in Korea.

In this regard, more efforts are needed to develop and practice patient centered comprehensive CR in patients with atherosclerosis for the recovery and improved outcomes.

CURRICULUM VITAE

Randal J. Thomas

Professor, Mayo Clinic Alix School of Medicine, USA

Education and Training

1986.05	George Washingont University Medical School, M.D, Medicine
1990.06	Georgia Baptist Medical Center, Resident, Internal Medicine
1992.06	Stanford University Medical Center, Fellow, Preventive Cardiology

Employment and Position

1992-1996	Northwestern University Medical Center, Assistant Professor
1996-1999	Greenville Hospital System, Associate Professor
1999-Present	Mayo Clinic, Professor

Important Publications

1. Goel K, Lennon RJ, Tilbury RT, Squires RW, Thomas RJ. Impact of cardiac rehabilitation on mortality and cardiovascular events after percutaneous coronary intervention in the community. Circulation. 2011 May 31;123 (21):2344-52 Epub 2011 May 16 PMID: 21576654 DOI:10.1161/CIRCULATIONAHA.110.983536
2. Pack QR, Squires RW, Lopez-Jimenez F, Lichtman SW, Rodriguez-Escudero JP, Zysek VN, Thomas RJ. The current and potential capacity for cardiac rehabilitation utilization in the United States. J Cardiopulm Rehabil Prev. 2014 Sep-Oct; 34: (5)318-26. PMID: 25098437 DOI:0.1097/HCR.0000000000000076
3. Thomas RJ, Balady G, Banka G, Beckie TM, Chiu J, Gokak S, Ho PM, Keteyian SJ, King M, Lui K, Pack Q, Sanderson BK, Wang TY. 2018 ACC/AHA Clinical Performance and Quality Measures for Cardiac Rehabilitation: A Report of the American College of Cardiology/American Heart Association Task Force on Performance Measures. Circ Cardiovasc Qual Outcomes. 2018 Apr; 11 (4):e000037 PMID: 29599285 DOI:10.1161/HCQ.0000000000000037
4. Thomas RJ, Beatty AL, Beckie TM, Brewer LC, Brown TM, Forman DE, Franklin BA, Keteyian SJ, Kitzman DW, Regensteiner JG, Sanderson BK, Whooley MA. Home-Based Cardiac Rehabilitation: A SCIENTIFIC STATEMENT FROM THE AMERICAN ASSOCIATION OF CARDIOVASCULAR AND PULMONARY REHABILITATION, THE AMERICAN HEART ASSOCIATION, AND THE AMERICAN COLLEGE OF CARDIOLOGY. J Cardiopulm Rehabil Prev. 2019 Jul; 39 (4):208-225 PMID: 31082934 PMCID: 7530797 DOI:10.1097/HCR.0000000000000447
5. Thomas RJ. Cardiac Rehabilitation - Challenges, Advances, and the Road Ahead. N Engl J Med. 2024 Feb 29; 390 (9):830-841 PMID: 38416431 DOI: 10.1056/NEJMra2302291

Cardiac rehabilitation: A high value service in need of disruptive innovation

Cardiac rehabilitation is a high value service that provides systematic delivery of effective secondary cardiovascular disease (CVD) prevention therapies to patients with CVD. Unfortunately, only a minority of eligible patients participate in cardiac rehabilitation programs due to a number of various barriers to participation. While several known strategies can help improve participation in cardiac rehabilitation, there is still a large need to identify and implement additional innovative and disruptive strategies that will help move past the current barriers and find new ways to provide these life-saving services to all eligible patients.

Home-based cardiac rehabilitation is one such strategy that is in the process of being studied and implemented. Several steps are essential in implementing home-based cardiac rehabilitation, including the identification of effective technology resources, matching options with patient needs, exploring financial reimbursement options, and continually improving and innovating home-based care options. The experience of home-based cardiac rehabilitation at the Mayo Clinic will be reviewed, as well as current trends in innovation in cardiac rehabilitation.

CURRICULUM VITAE

Qi Sun

Associate Professor, Harvard T.H. Chan School of Public Health, USA

Education and Training

1997.07	Beijing Medical University, Beijing, China, M.D., Maternal and Child Health
2007.07	Harvard T.H. Chan School of Public Health, Boston, MA, USA, ScD, Nutrition and Epidemiology
2007.06-2012.08	Harvard T.H. Chan School of Public Health, Boston, MA, USA, Research Fellow, Nutritional and Molecular Epidemiology of Type 2 Diabetes

Employment and Position

2010.06-2012.03	Harvard Medical School, Boston, MA, Instructor in Medicine
2012.04-2017.11	Harvard Medical School, Boston, MA, Assistant Professor of Medicine
2017.12-	Harvard Medical School, Boston, MA, Associate Professor of Medicine
2013.02-2018.05	Harvard T.H. Chan School of Public Health, Boston, MA, Assistant Professor
2018.06-	Harvard T.H. Chan School of Public Health, Boston, MA, Associate Professor
2021.04-	Joslin Diabetes Center, Boston, MA, Adjunct Associate Professor

Important Publications

1. Ma L, Hu Y, Alperet DJ, Liu G, Malik V, Manson JE, Rimm EB, Hu FB, Sun Q. Beverage consumption and mortality among adults with type 2 diabetes: prospective cohort study. Bmj. 2023;381:e073406. doi: 10.1136/bmj-2022-073406.
2. Hu Y, Li J, Wang B, Zhu L, Li Y, Ivey KL, Lee KH, Eliassen AH, Chan A, Huttenhower C, Hu FB, Qi Q, Rimm EB, Sun Q. Interplay between diet, circulating indolepropionate concentrations and cardiometabolic health in US populations. Gut. 2023 Nov 24;72(12):2260-2271. doi: 10.1136/gutjnl-2023-330410.

Nutritional strategies for the prevention and management of cardiometabolic conditions

Abundant evidence has unequivocally shown that cardiometabolic conditions, such as type 2 diabetes (T2D) and cardiovascular disease (CVD), are largely preventable. Diet is among the most important determinants of these diseases and their comorbidities. Many nutritional epidemiological studies and dietary intervention trials have been conducted to examine individual foods or nutrients, as well as dietary patterns, in relation to these chronic conditions. Evidence consistently suggests that higher intake of fruits, vegetables, whole grains, wine, coffee, and yogurt may exert beneficial effects on reducing the risk of developing these conditions, whereas higher intake of red meats, refined carbohydrates, and sugar-sweetened beverages has the opposite effects. Data regarding nutrients rich in these foods are in line with the abovementioned evidence. For example, dietary fiber, polyunsaturated fat, and vegetable proteins, in contrast to refined carbohydrates, saturated fat, and animal proteins, respectively, result in an overall better cardiometabolic health. The effects of healthful dietary patterns that emphasize high intake of the beneficial foods/nutrients have been evaluated in multiple observational studies and clinical trials. In particular, the Mediterranean diet, DASH diet, and healthy plant-based diets demonstrate clear benefits on reducing cardiometabolic risk. In the era of precision nutrition, increasing efforts have been dedicated to research that elucidates the biological basis underlying individualized responses to the same dietary interventions. Studies start to reveal that the effects of diet on metabolic diseases may be modulated by the human gut microbiota. Sensitive and specific food biomarkers are being identified and evaluated for characterizing human diet with accuracy. The approach of integrating multi-omics data is increasingly used to help elucidate mechanisms linking diet with human health, and also to identify target populations for more precise prevention or intervention. These lines of research represent the frontiers in the field of cardiometabolic disease prevention and treatment. In conclusion, abundant evidence suggests that diet, at the levels of nutrients, foods, and dietary patterns, plays a critical role in the etiology of cardiometabolic diseases. Synchronized, inter- and multi-disciplinary research efforts are warranted to facilitate making individualized dietary recommendations toward the prevention and management of these diseases.

CURRICULUM VITAE

Kyuwan Lee

Professor, Ewha Womans University, Republic of Korea

Education and Training

2015.08	West Virginia University / United States, M.S, Cardiovascular Exercise Physiology
2019.05	University of Southern California (USC) / United States, Ph.D, Clinical Exercise Physiology

Employment and Position

2019-2020	University of Southern California, Clinical Instructor
2020-2023	City of Hope National Medical Center, Assistant Professor
2023-2024	Ewha Womans University, Assistant Professor

Important Publications

1. Kyuwan Lee, Aleksi Iukuridze, Tianhui He, Alysia Bosworth, Lanie Lindenfeld, Jennifer Berano Teh, Meagan Echevarria, Sophia Albanese, Liezl Atencio, Rusha Bhandari, F. Lennie Wong, Andrew S. Artz, Tanya Siddiqi, Matthew Mei, Geoffrey Shouse, Leslie L. Popplewell, Alex F. Herrera, Elizabeth Budde, Stephen J Forman, Saro H. Armenian. Association between skeletal muscle loss and outcomes after chimeric antigen receptor T-cell therapy. Journal of National Comprehensive Cancer Network 2023;21(4):1-12.
2. Kyuwan Lee, Justin Shamunee, Lanie Lindenfeld, Elizabeth Ross, Lindsey Hageman, Mina Sedrak, F. Lennie Wong, Smita Bhatia, Saro Armenian. Feasibility of Implementing a Telehealth Supervised Exercise Intervention on Physical Function in Frail Survivors Treated with Hematopoietic Cell Transplantation. BMC Cancer 2023 23:390.
3. Kyuwan Lee, Lanie Lindenfeld, Meagan Echevarria, JoAnn Hsu, F. Lennie Wong, Hari Narayan, Clayton Lau, LiYing Cai, Sumanta K. Pal, Saro H. Armenian. Prospective Evaluation of Early Cardiotoxicity Induced by Tyrosine Kinase Inhibitors and Immune Checkpoint Inhibitors in Patients with Metastatic Renal Cell Carcinoma. International Journal of Cardiology 2023 June 380;40-46.
4. Kyuwan Lee, Irene Kang, Wendy J. Mack, Joanne Mortimer, Fred Sattler, George Salem, Christina M. Dieli-Conwright. Effect of High Intensity Interval Training on Matrix Metalloproteinases in Women with Breast Cancer Receiving Anthracycline-Based Chemotherapy. Scientific Reports. 2020 Apr 3;10(1):5839.

Exercise strategies for optimal cardiovascular recovery: key considerations for cardiovascular disease and type 2 diabetes

Exercise plays a pivotal role in managing and recovering from cardiovascular diseases (CVD) and type 2 diabetes (T2D). Tailored exercise programs addressing the unique needs of each patient have become essential, significantly enhancing cardiovascular health and diabetes management. Numerous studies demonstrate that moderate-intensity aerobic exercise and resistance training enhance glycemic control, muscle mass, insulin sensitivity, and cardiopulmonary fitness. Recently, high-intensity interval training (HIIT) has gained popularity for its efficiency and potential for superior outcomes compared to conventional exercise strategies. However, patients with CVD and T2D often face challenges such as muscle weakness, fatigue, reduced physical activity, and frailty, which can limit participation in regular exercise programs. Alternatively, low-impact exercise modalities like yoga, tai chi, and Pilates show promise in improving health outcomes in this population. Emerging research suggests that exercise timing can influence glycemic control in T2D patients, though evidence is limited and sometimes controversial. Some studies indicate morning exercise may improve insulin sensitivity and glycemic control throughout the day, while pre-meal exercise can reduce postprandial glucose spikes, and post-meal exercise effectively lowers blood glucose levels. Although these strategies require further investigation, recent findings are promising, showing feasibility and health benefits for frail patients with CVD and T2D. This presentation aims to identify and discuss optimal exercise strategies for cardiovascular recovery in patients with CVD and T2D, focusing on evidence-based research concerning aerobic exercise, resistance training, combination training, and HIIT.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Symposium 6

MASLD, Type 2 Diabetes, and Atherosclerotic Cardiovascular Disease

Sep 27(Fri) 13:00–14:30 | Room 3 (3F)

CHAIRPERSONS : Sung Rae Kim (The Catholic University of Korea, Republic of Korea)
Cheol-Young Park (Sungkyunkwan University, Republic of Korea)

13:00–13:20	**MASLD and type 2 diabetes: are they different disease entities?** Kyung-Soo Kim (CHA University, Republic of Korea)
13:20–13:40	**MASLD and ASCVD: epidemiologic and genetic associations** Martijn Brouwers (Maastricht University, Netherlands)
13:40–14:00	**Does targeting MASLD reduce cardiovascular risk?** Jae Seung Lee (Yonsei University, Republic of Korea)
14:00–14:30	**Panel Discussion** Yong-ho Lee (Yonsei University, Republic of Korea) Jae-Han Jeon (Kyungpook National University, Republic of Korea) Yun Kyung Cho (University of Ulsan, Republic of Korea)

CURRICULUM VITAE

Kyung-Soo Kim

Associate Professor, CHA Bundang Medical Center, CHA University, Republic of Korea

Education and Training

2004.02	CHA University, Korea, M.D, Medicine
2020.08	CHA University, Korea, Ph.D, Internal Medicine

Employment and Position

2012-2014	Division of Endocrinology and Metabolism, Department of Internal Medicine, CHA Bundang Medical Center, CHA University, Fellow
2014-2020	Division of Endocrinology and Metabolism, Department of Internal Medicine, CHA Bundang Medical Center, CHA University, Assistant Professor
2020-	Division of Endocrinology and Metabolism, Department of Internal Medicine, CHA Bundang Medical Center, CHA University, Associate Professor

Important Publications

1. Park J, Jung JH, Park H, Song YS, Kim SK, Cho YW, Han K, Kim KS. Association between exercise habits and incident type 2 diabetes mellitus in patients with thyroid cancer: nationwide population-based study. BMC Med 2024;22:251. (Corresponding author)
2. Kim KS, Hong S, Han K, Park CY. Association of non-alcoholic fatty liver disease with cardiovascular disease and all cause death in patients with type 2 diabetes mellitus: nationwide population based study. BMJ 2024;384:e076388.
3. Kim KS, Hong S, Ahn HY, Park CY. Metabolic dysfunction-associated fatty liver disease and mortality: a population-based cohort study. Diabetes Metab J 2023;47:220-231.
4. Kim KS, Hong S, Han K, Park CY. Fenofibrate add-on to statin treatment is associated with low all-cause death and cardiovascular disease in the general population with high triglyceride levels. Metabolism. 2022;137:155327.
5. Hong S, Kim KS, Han K, Park CY. Acromegaly and cardiovascular outcomes: a cohort study. Eur Heart J 2022;43:1491-9. (Co-first author)

Awards and Honors

2023	Young Investigator Research Grant, Korean Society of Lipid and Atherosclerosis
2022	Hyangseol Young Investigator Award, Korean Endocrine Society
2019	EnM Research Award, Korean Endocrine Society

Research Interest

Diabetes mellitus, Insulin resistance, Fatty liver disease, Lipid metabolism, Endocrine disorder

MASLD and type 2 diabetes: are they different disease entities?

Metabolic dysfunction-associated steatotic liver disease (MASLD) is the most common liver disorder and is associated with various metabolic diseases, including type 2 diabetes mellitus (T2DM). MASLD and T2DM have a strong association with each other due to shared pathogenic mechanisms. T2DM is considered a major contributor to the development of MASLD. MASLD escalates the likelihood of T2DM onset and has a detrimental effect on glucose metabolism among the T2DM population. Extensive evidence has noticed the overlapping of MASLD and T2DM.

In this talk, I will present about MASLD and T2DM whether they are different disease entities.

CURRICULUM VITAE

Martijn Brouwers

Professor in Endocrinology and Metabolic Diseases,
Maastricht University Medical Centre, the Netherlands, Netherlands

Education and Training

2002.10	Maastricht University, the Netherlands, M.D, Medicine
2007.08	Maastricht University, the Netherlands, Ph.D, Internal Medicine

Employment and Position

2012-Current	Maastricht University Medical Centre, Internist-endocrinologist
2019-Current	Maastricht University Medical Centre, Head and Full Professor in Endocrinology and Metabolic Diseases
2023-Current	Maastricht University, Principal Investigator 'Cardiovascular complications of diabetes'

Important Publications

1. Ren Z, Simons PIHG, Wesselius A, Stehouwer CDA, Brouwers MCGJ. Relationship between NAFLD and coronary artery disease: A Mendelian randomization study. Hepatology. 2023 Jan 1;77(1):230-238.
2. Brouwers MCGJ, Simons N, Stehouwer CDA, Isaacs A. Non-alcoholic fatty liver disease and cardiovascular disease: assessing the evidence for causality. Diabetologia. 2020 Feb;63(2):253-260.
3. Brouwers MCGJ, Simons N, Stehouwer CDA, Koek GH, Schaper NC, Isaacs A. Relationship Between Nonalcoholic Fatty Liver Disease Susceptibility Genes and Coronary Artery Disease. Hepatol Commun. 2019 Feb 11;3(4):587-596.
4. Simons N, Isaacs A, Koek GH, Kuč S, Schaper NC, Brouwers MCGJ. PNPLA3, TM6SF2, and MBOAT7 Genotypes and Coronary Artery Disease. Gastroenterology. 2017 Mar;152(4):912-913.
5. Brouwers MC, van Greevenbroek MM, Stehouwer CD, de Graaf J, Stalenhoef AF. The genetics of familial combined hyperlipidaemia. Nat Rev Endocrinol. 2012 Feb 14;8(6):352-62.

Research Interest

Cardiometabolic consequences of metabolic dysfunction-associated steatotic liver disease (MASLD), and the role of fructose herein

MASLD and ASCVD: epidemiologic and genetic associations

Metabolic dysfunction-associated steatotic liver disease (MASLD), formerly known as non-alcoholic fatty livers disease (NAFLD), is a common liver disease, with an estimated prevalence of 25-30% globally. Although patients with MASLD are at risk of end stage liver disease and hepatocellular carcinoma, they mostly die of cardiovascular complications. Large epidemiological studies and meta-analyses have indeed confirmed a relationship between MASLD and cardiovascular disease. There has, however, been an ongoing discussion whether MASLD - or intrahepatic lipid accumulation per se - is an active contributor or, instead, an innocent bystander in the pathogenesis of cardiovascular disease.

Recent Mendelian randomization studies have shed light on this conundrum. The results show that the causal relationship between MASLD/NAFLD and coronary artery disease is pathway dependent, i.e. individuals with an impaired secretion of VLDL particles are prone to MASLD, but protected from coronary artery disease, whereas individuals with genetically-enhanced *de novo* lipogenesis are predisposed to both MASLD and coronary artery disease. Serum lipids appear to play a pivotal role as a mediator between MASLD and cardiovascular disease and, hence, offer therapeutic strategies to reduce cardiovascular risk in patients with MASLD.

CURRICULUM VITAE

Jae Seung Lee

Clinical Assistant Professor, Yonsei University College of Medicine, Republic of Korea

Education and Training

2010.02	Yonsei University, South Korea, M.D, Medicine
2024.02	Yonsei University, South Korea, Ph.D, Medicine

Employment and Position

2010-2011	Severance Hospital, Yonsei University College of Medicine, Intern
2014-2018	Department of Internal Medicine, Severance Hospital, Resident
2018-2020	Institution of Gastroenterology, Yonsei University, Fellow
2020-	Institution of Gastroenterology, Yonsei University, Clinical assistant professor

Important Publications

1. Lee JS, Jung CY, Lee JI, Ahn SH, Kim BS, Kim SU. Comparison of decline in renal function between patients with chronic hepatitis B with or without antiviral therapy. Aliment Pharmacol Ther. 2023 Jul;58(1):99-109.
2. Lee JS, Lee HW, Kim BK, Park JY, Kim DY, Ahn SH, Jang JY, Park SY, Lee HW, Lee CK, Kim SU. Comparison of FibroScan-Aspartate Aminotransferase (FAST) Score and Other Non-invasive Surrogates in Predicting High-Risk Non-alcoholic Steatohepatitis Criteria. Front Med (Lausanne). 2022 Apr 14;9:869190.
3. Lee JS, Lee HW, Lim TS, Min IK, Lee HW, Kim SU, Park JY, Kim DY, Ahn SH, Kim BK. External Validation of the FSAC Model Using On-Therapy Changes in Noninvasive Fibrosis Markers in Patients with Chronic Hepatitis B: A Multicenter Study. Cancers (Basel). 2022 Jan 29;14(3):711.
4. Lee JS, Sinn DH, Park SY, Shin HJ, Lee HW, Kim BK, Park JY, Kim DY, Ahn SH, Oh JH, Lee JI, Kim SU. Liver Stiffness-Based Risk Prediction Model for Hepatocellular Carcinoma in Patients with Nonalcoholic Fatty Liver Disease. Cancers (Basel). 2021 Sep 11;13(18):4567.
5. Baatarkhuu O, Lee JS (Co-primary), Amarsanaa J, Kim DY, Ahn SH, Naranzul N, Enkhtuya D, Choijamts N, Batbayar P, Otgonbayar R, Saruul BU, Gantuul C, Gegeebadrakh B, Tuvshinbayar N, Badamsuren D, Ulzmaa G, Otgonbold J, Han KH. Efficacy and safety of ledipasvir/sofosbuvir in 5,028 Mongolian patients infected with genotype 1 hepatitis C virus: A multicenter study. Clin Mol Hepatol. 2021 Jan;27(1):125-135.

Does targeting MASLD reduce cardiovascular risk?

Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD), formerly known as Non-alcoholic Fatty Liver Disease (NAFLD), is now the most prevalent liver disease globally, with a rising prevalence from 25% in 2016 to an estimated 30% in 2023. MASLD is characterized by liver steatosis and at least one of five cardiometabolic risk factors, reflecting its close association with metabolic syndrome. The term Metabolic Dysfunction-Associated Steatohepatitis (MASH) now replaces NASH for cases involving inflammation and fibrosis. Due to the overlap of risk factors, patients with MASLD are at increased risk of cardiovascular disease (CVD), which remains the leading cause of morbidity and mortality in these patients.

CVD risk factors, such as hypertension, dyslipidemia, obesity, and type 2 diabetes mellitus (T2DM), are intricately linked with MASLD. Thus, CVD risk in MASLD patients should be aggressively managed through regular screening and targeted treatments, including lipid-lowering agents, smoking cessation, hypertension management, glycemic control in diabetic patients, and lifestyle interventions emphasizing diet changes and physical activity. Notably, patients with atherosclerotic cardiovascular disease (ASCVD) require intensive risk factor management, regardless of their MASLD status, to prevent recurrent events.

Lifestyle modifications, particularly diet and exercise, are crucial in managing MASLD and associated CVD risks. Weight loss, even in the absence of obesity, significantly improves both hepatic and cardiometabolic outcomes. Increased physical activity alone can enhance hepatic and CVD status. Studies consistently show that combining dietary changes with exercise reduces liver fat proportionally to intervention intensity. Pharmacological treatments, including GLP-1 analogues, pioglitazone, and lanifibranor, have shown benefits in reducing both CVD risk factors and MASLD, offering promising avenues for comprehensive patient management. Regular screening and aggressive treatment of CVD risk factors, alongside lifestyle modifications and targeted pharmacotherapy, are essential in reducing the burden of morbidity and mortality in MASLD patients.

Symposium 7

Role of Diets for Cardiometabolic Health

Sep 27(Fri) 16:50–18:20 | Room 3 (3F)

CHAIRPERSONS : Min-Jeong Shin (Korea University, Republic of Korea)
Oh Yoen Kim (Dong-A University, Republic of Korea)

16:50–17:10	**Cardiovascular protective effects of a healthy dietary pattern with carotenoids rich food consumption** Jung Eun Kim (National University of Singapore, Singapore)
17:10–17:30	**Insights into dietary polyphenols in disorders of lipid metabolism** Bohkyung Kim (Pusan National University, Republic of Korea)
17:30–17:50	**Plant-based diets and human cardiometabolic health** Qi Sun (Harvard Medical School, USA)
17:50–18:20	**Panel Discussion** Minjoo Kim (Hannam University, Republic of Korea) Kyong Park (Yeungnam University, Republic of Korea) Jeong-Hwa Choi (Keimyung University, Republic of Korea)

CURRICULUM VITAE

Jung Eun Kim

Assistant Professor, PhD, RD, National University of Singapore, Singapore

Education and Training

2017.02	Purdue University, USA, Post-Doctoral Research Associate, Nutritional Science
2012.07	Yale-New Haven Hospital, USA, Dietetic Intern, Dietetics
2011.08	University of Connecticut, USA, Ph.D, Nutritional Science
2008.02	Ewha Womans University, South Korea, M.S, Nutritional Science
2006.02	Ewha Womans University, South Korea, B.S, Nutritional Science

Employment and Position

2017-Present	National University of Singapore, Singapore, Assistant Professor

Important Publications

1. Yao Y, Yang Z, Yin B, Goh HM, Toh DWK, Kim JE. Effects of dietary fat type and emulsification on carotenoid absorption: a randomized crossover trial. Am J Clin Nutr. 2023;117(5):1017-1025.
2. Yao Y, Tan P, Kim JE. Effects of dietary fats on the bioaccessibility and bioavailability of carotenoids: a systematic review and meta-analysis of in vitro studies and randomized controlled trials. Nutr Rev. 2022;80(4):741-761.
3. Xia X, Toh DWK, Ng SL, Zharkova O, Poh KK, Foo RSY, Wang JW, Kim JE. Impact of following a healthy dietary pattern with co-consuming wolfberry on number and function of blood outgrowth endothelial cells from middle-aged and older adults. Food Funct. 2022;13(1):76-90.
4. Toh DWK, Xia X, Sutanto CN, Low JHM, Poh KK, Wang J-W, Foo RS-Y, Kim JE. Enhancing the cardiovascular protective effects of a healthy dietary pattern with wolfberry (Lycium barbarum): A randomized controlled trial. Am J Clin Nutr. 2021;114(1):80-89.

Cardiovascular protective effects of a healthy dietary pattern with carotenoids rich food consumption

Adhering healthy dietary pattern (HDP) with consuming carotenoids-rich food may serve as a potential dietary strategy for cardiovascular disease (CVD) risk management while limited studies examined their combined effects. Therefore, this study aimed to investigate the impact of wolfberry consumption as part of a HDP on vascular health-related outcomes and classical CVD risk factors in middle-aged and older adults in Singapore.

This was a 16-week, parallel design, randomized controlled trial and participants in both the wolfberry group (n=22) and the control group (n=18) received dietary counselling to follow HDP recommendations while only wolfberry group was asked to cook and consume 15 g/d whole dried wolfberry with their main meals. Classical CVD risk factors (lipid-lipoproteins profile and blood pressure), biomarkers of vascular function (flow-mediated dilation, plasma total nitrate/nitrite, endothelin-1 and intercellular adhesion molecule-1), vascular structure (carotid intima-media thickness) and vascular regeneration (count, angiogenic and migration activities of blood outgrowth endothelial cells (BOECs)) were assessed.

All participants showed an improved compliance toward the HDP and this was coupled with a marked rise in total nitrate/nitrite (mean change wolfberry: 3.92±1.73 nmol/mL; control: 5.01±2.55 nmol/L) and reductions in endothelin-1 (wolfberry: -0.19±0.06 pg/mL; control: -0.15±0.08 pg/mL). Moreover, both groups showed increased BOECs' tube formation capacity and migration activity. Compared with the control group which depicted no changes from baseline, the wolfberry group had a significantly higher HDL-cholesterol level (0.08±0.04 mmol/L), as well as lower Framingham predicted long-term CVD risk (-0.8±0.5%) and vascular age (-1.9±1.0 y) post-intervention. No differences were observed in the other vascular health-related outcomes.

In middle-aged and older adults, adherence to a HDP improves vascular function and regeneration ability. Incorporating wolfberry to the HDP diet further improves blood lipid-lipoprotein profile and may lower long-term CVD risk.

CURRICULUM VITAE

Bohkyung Kim

Associate Professor of Molecular Nutrition, Pusan National University, Republic of Korea

Education and Training

2010.10-2015.05	University of Connecticut, USA, Postdoctral Scholar, Molecular Nutrition
2009.02	Pusan National University, Korea, Ph.D, Molecular Nutrition
2002.02	Pusan National University, Korea, M.S., Nutrition
2000.02	Pusan National University, Korea, B.S., Nutrition

Employment and Position

2005-2010	Pusan National University, Associate professor
2018-2022	Pusan National University, Assistant professor

Important Publications

1. Inhibitory Effects of Ginsenoside Compound K on Lipopolysaccharide-Stimulated Inflammatory Responses in Macrophages by Regulating Sirtuin 1 and Histone Deacetylase 4. H. Kang, S. Kim, J-Y. Lee, B. Kim. Nutrients. 2023 15(7): 1625.
2. Bioactive Compounds as Inhibitors of Inflammation, Oxidative Stress and Metabolic Dysfunctions via Regulation of Cellular Redox Balance and Histone Acetylation State. H. Kang and B. Kim. Foods 2023 12(5): 925.
3. DGKB mediates radioresistance by regulating DGAT1-dependent lipotoxicity in glioblastoma. H. Kang, H. Lee, K. Kim, E. Shin, B. Kim, JH Kang, B. Kim, J. S. Lee, J-M Lee, HS. Youn, BH Youn. Cell Rep Med 17: 4(1):100880.
4. The protective effects of Aster yomena (Kitam.) Honda on high-fat diet-induced obese C57BL/6J mice. M. J. Kim, J. H. Kim, S. Lee, B. Kim, H. Y. Kim. Nutr Res Pract. 2022 16(1): 46.
5. The Effects of Anthocyanin-Rich Bilberry Extract on Transintestinal Cholesterol Excretion. J. Hong, M. Kim, B. Kim. Foods 2021 10(11), 2852.

Research Interest

Cardiovascular disease (CVD), metabolic dysfunction-associated steatotic liver disease (MASLD), fibrogenesis, energy phenotye, epigenetics

Insights into dietary polyphenols in disorders of lipid metabolism

The rising rate of obesity is highly associated with the prevalence of cardiovascular disease (CVD) and metabolic dysfunction-associated steatotic liver disease (MASLD). Emerging evidence supports the association between CVD and MASLD. CVD and MASLD share risk factors, including obesity, hypertension, insulin resistance, and dyslipidemia. In MASLD patients, CVD is one the most common cause of mortality and atherogenic dyslipidemia is observed. Dysregulation of lipid metabolism is one of the significant risk factors for CVD and MASLD. Dietary strategies for the prevention of MASLD conditions are strongly considered as no pharmacological treatment is available. Natural products rich in polyphenols are claimed to have protective effects against oxidative stress, inflammation, insulin resistance, dyslipidemia, and fatty liver. However, little is understood about the protective effects and mechanistic insights of berry polyphenols on the dysregulation of lipid metabolism and hepatic fibrogenesis. In the present study, we aimed to investigate the hypocholesterolemic of berry polyphenols by stimulating reverse cholesterol transport (RCT)-mediated biliary cholesterol excretion pathway and non-biliary cholesterol excretion, transintestinal cholesterol excretion (TICE). Berry polyphenols exerted hypocholesterolemic effects by altering RCT-mediated cholesterol excretion and TICE. Furthermore, berry polyphenols improved antioxidant properties and reduced total cholesterol in apolipoprotien E knockout mice. The effects of berry polyphenols on hepatic steatosis and fibrogenesis were investigated in hepatocytes and hepatic stellate cells. Berry polyphenols exerted protective effects in hepatic steatosis by regulating genes involved in lipid metabolism, antioxidant defense system, and inflammation in hepatocytes. In addition, berry polyphenols exerted protective effects against fibrosis by regulating the genes involved in fibrogenesis. These results support the consumption of berry polyphenols may be beneficial for the prevention of CVD and MASLD.

CURRICULUM VITAE

Qi Sun

Associate Professor, Harvard T.H. Chan School of Public Health, USA

Education and Training

1997.07	Beijing Medical University, Beijing, China, M.D., Maternal and Child Health
2007.07	Harvard T.H. Chan School of Public Health, Boston, MA, USA, ScD, Nutrition and Epidemiology
2007.06-2012.08	Harvard T.H. Chan School of Public Health, Boston, MA, USA, Research Fellow, Nutritional and Molecular Epidemiology of Type 2 Diabetes

Employment and Position

2010.06-2012.03	Harvard Medical School, Boston, MA, Instructor in Medicine
2012.04-2017.11	Harvard Medical School, Boston, MA, Assistant Professor of Medicine
2017.12-	Harvard Medical School, Boston, MA, Associate Professor of Medicine
2013.02-2018.05	Harvard T.H. Chan School of Public Health, Boston, MA, Assistant Professor
2018.06-	Harvard T.H. Chan School of Public Health, Boston, MA, Associate Professor
2021.04-	Joslin Diabetes Center, Boston, MA, Adjunct Associate Professor

Important Publications

1. Ma L, Hu Y, Alperet DJ, Liu G, Malik V, Manson JE, Rimm EB, Hu FB, Sun Q. Beverage consumption and mortality among adults with type 2 diabetes: prospective cohort study. Bmj. 2023;381:e073406. doi: 10.1136/bmj-2022-073406.
2. Hu Y, Li J, Wang B, Zhu L, Li Y, Ivey KL, Lee KH, Eliassen AH, Chan A, Huttenhower C, Hu FB, Qi Q, Rimm EB, Sun Q. Interplay between diet, circulating indolepropionate concentrations and cardiometabolic health in US populations. Gut. 2023 Nov 24:72(12):2260-2271. doi: 10.1136/gutjnl-2023-330410.

Plant-based diets and human cardiometabolic health

Accumulating evidence from human observational studies and clinical trials has convincingly demonstrated a link between greater adherence to healthful plant-based diets and reduced risk of developing cardiometabolic conditions, such as cardiovascular disease, obesity, and type 2 diabetes. Cardiometabolic health benefits of consuming key components of the healthful plant-based diets, including fruits, vegetables, nuts, and whole grains, are also consistently illustrated in human studies. Moreover, other healthful dietary patterns, such as the Mediterranean diet and DASH diet, that emphasize the intake of these plant-based foods, reduced risk of developing cardiometabolic diseases in landmark trials. However, it is increasingly apparent that the health benefits of consuming these diets may vary among individuals. Indeed, many factors, such as genetic predisposition, environment, other dietary components or context, existing conditions, and human gut microbiota, may all come into play and determine the individualized dietary responses. In particular, human gut microbiome plays a pivotal role in producing bioactive metabolites from plant-based foods, such as short-chain fatty acids, enterolignans, isoflavone metabolites, etc, that subsequently exert health effects. As such, human gut microbiome is able to mediate but also modulate associations of diet with the production of bioactive microbiota metabolites and cardiometabolic health in humans. One of the hurdles in research along the diet-microbiome-health axis is the partial grasping of exogenous metabolome of dietary origin. This food metabolome, together with endogenous metabolome, will dramatically assist with drawing a complete picture of the complex inter-relationships between plant-based diets, bioactive metabolites, human gut microbiome, and cardiometabolic disease risk, which will lay the foundation for designing precision nutritional strategies for cardiometabolic disease prevention or management.

Symposium 8

Advances in Adipose Tissue Biology

Sep 28(Sat) 08:50-10:20 | Room 2 (3F)

CHAIRPERSONS : Joerg Heeren (University of Hamburg, Germany)
Young Mi Park (Ewha Womans University, Republic of Korea)

08:50-09:10 **Cold-activated HuR fuels brown fat thermogenesis via fatty acid utilization**
Jae Myoung Suh (KAIST, Republic of Korea)

09:10-09:30 **Targets of a novel anti-diabetic drug Imeglimin**
Motoharu Awazawa (National Center for Global Health and Medicine (NCGM), Japan)

09:30-09:50 **Role of obesogenic memory in obesity-related cardiovascular diseases**
Kae Won Cho (Soonchunhyang University, Republic of Korea)

09:50-10:20 **Panel Discussion**
Yun-Hee Lee (Seoul National University, Republic of Korea)
Jae-Han Jeon (Kyungpook National University, Republic of Korea)
Su Myung Jung (Sungkyunkwan University, Republic of Korea)

CURRICULUM VITAE

Jae Myoung Suh

Associate Professor,
Graduate School of Medical Science and Engineering, KAIST, Republic of Korea

Education and Training

1994.02	Yonsei University, Korea, B.S., Biology
1996.02	Yonsei University, Korea, M.S., Biology
2006.12	University of Texas Southwestern Medical Center, Ph.D., Biomedical Sciences

Employment and Position

2007-2008	University of Texas Southwestern Medical Center, Postdoctoral Fellow
2009-2014	Salk Institute for Biological Studies, Research Associate
2014-	KAIST, Associate Professor

Important Publications

1. Choi S, Kang JG, Tran YTH, et al. Hippo-YAP/TAZ signalling coordinates adipose plasticity and energy balance by uncoupling leptin expression from fat mass. Nat Metab. 2024;6(5):847-860.
2. Park A, Kim KE, Park I, et al. Mitochondrial matrix protein LETMD1 maintains thermogenic capacity of brown adipose tissue in male mice. Nat Commun. 2023;14(1):3746.
3. Choi J, Oh TG, Jung HW, et al. Estrogen-Related Receptor γ Maintains Pancreatic Acinar Cell Function and Identity by Regulating Cellular Metabolism. Gastroenterology. 2022;163(1):239-256.
4. Kim KE, Park I, Kim J, et al. Dynamic tracking and identification of tissue-specific secretory proteins in the circulation of live mice. Nat Commun. 2021;12(1):5204.
5. Yeom E, Shin H, Yoo W, et al. Tumour-derived Dilp8/INSL3 induces cancer anorexia by regulating feeding neuropeptides via Lgr3/8 in the brain. Nat Cell Biol. 2021;23(2):172-183.

Research Interest

Metabolism, nuclear receptors, adipose biology, mitochondria, aging

Cold-activated HuR fuels brown fat thermogenesis via fatty acid utilization

Brown adipose tissue (BAT) is critical for adaptive thermogenesis, the regulated production of heat in response to cold stress. the post-transcriptional mechanisms that fine-tune this energy-intensive process remain largely unexplored. To address this gap, we aimed to identify RNA-binding proteins (RBPs) involved in BAT thermogenesis and clarify their physiological roles. Through analysis of publicly available transcriptomic datasets, we identified HuR as an RBP that is upregulated in response to cold exposure and β-adrenergic stimulation. To assess its functional importance, we generated adipocyte-specific HuR knockout mice. These mice displayed a markedly impaired thermogenic response, resulting in significant hypothermia under cold stress. Further analysis showed that HuR-deficient mice also had a reduced capacity to respond to β-adrenergic stimulation, a key driver of BAT thermogenesis. At the cellular level, brown adipocytes lacking HuR exhibited decreased fatty acid oxidation and mitochondrial respiration —both crucial for heat production. Metabolic flux assays confirmed a substantial reduction in fatty acid oxidative capacity in HuR-deficient BAT during cold exposure. Overall, our study reveals a critical role for post-transcriptional regulation, mediated by HuR, in BAT thermogenesis. These findings highlight a previously unrecognized layer of regulation in BAT function and suggest that targeting HuR-related pathways may offer new therapeutic opportunities for metabolic disorders such as obesity and diabetes, where defective thermogenesis and reduced energy expenditure play a central role.

CURRICULUM VITAE

Motoharu Awazawa

Division Chief, Research Institute, National Center for Global Health and Medicine (NCGM), Japan

Education and Training

2000.03	Tokyo University, Japan, M.D, Medicine
2007.03	Tokyo University, Japan, Ph.D, Internal Medicine

Employment and Position

2009-2012	Department of Diabetes and Metabolic Diseases, Tokyo University, Assistant Peofessor
2012-2018	Max-Planck Institute for Metabolism Research, Cologne, Germany, Postdoctoral fellow
2018-	National Center for Global Health and Medicine, Division chief

Important Publications

1. Awazawa M et al, Imeglimin Improves Systemic Metabolism by Targeting Brown Adipose Tissue and Gut Microbiota in Obese Model Mice. Metabolism. 153:155796, 2024.
2. Matsushita M, Awazawa M et al, An antisense transcript transcribed from Irs2 locus contributes to the pathogenesis of hepatic steatosis in insulin resistance. Cell Chem Biol. 29(4): 680-689, 2022.
3. Awazawa M et al, A miRNA screen reveals that increased expression of hepatic Ectodysplasin A during obesity contributes to skeletal muscle insulin resistance. Nat Med. 23 (12) 1466-73, 2017.
4. Awazawa M et al, Deregulation of Pancreas-Specific Oxidoreductin ERO1beta in the Pathogenesis of Diabetes Mellitus. Mol Cell Biol. 34 (7) 1290-1299, 2014.
5. Awazawa M et al, Adiponectin Enhances Insulin Sensitivity by Increasing Hepatic IRS-2 Expression via a Macrophage-Derived IL-6-Dependent Pathway. Cell Metab. 13:401-412, 2011.

Awards and Honors

2021	Lilly Award, Japan Diabetes Society
2019	Young Investigator Award, The Japan Society of Diabetic Complications
2011	Young Investigator Award, Japan Diabetes Society

Research Interest

Metabolic regulation through inter-organ crosstalk

Targets of a novel anti-diabetic drug Imeglimin

Imeglimin is a novel antidiabetic agent which belongs to a new drug class called "Glimins". While imeglimin is currently in use only in selected countries, its regulatory approval is being sought in additional regions based on its potent glucose-lowering effect substantiated by copious preclinical as well as clinical studies. Previous reports have suggested that imeglimin could concurrently enhance insulin secretion in pancreatic β cells and improve insulin sensitivity in the peripheral tissues, while its precise mechanisms of action are yet not fully understood. Here we administered 18 weeks old high-fat-diet fed obese mice with imeglimin and unbiasedly investigated its impacts upon peripheral insulin-target tissues. Our results demonstrated that imeglimin administration could protect mice from high fat diet-induced weight gain with enhanced energy expenditure. The increase in the energy expenditure under imeglimin administration was associated with amelioration of whitening in the brown adipose tissue. Moreover, imeglimin administration led to significant alterations of gut microbiota, where probiotic Akkermansia genus was markedly induced, with the obesity-associated gut pathologies being also ameliorated. Ablation of microbiota by antibiotic treatment partially abrogated the insulin sensitizing effects of imeglimin, while not affecting its actions on body weight gain or on the morphology of brown adipose tissue. Collectively, our data suggest that imeglimin has impacts on BAT functions and gut microbiota as its two independent targets, whereby imeglimin promotes energy expenditure and, at the same time, improves insulin sensitivity through modifying gut microbiota under obesity. Thus, our results characterize imeglimin as a unique and attractive therapeutic agent in diabetes treatment.

CURRICULUM VITAE

Kae Won Cho

Professor, Soonchunhyang University, Republic of Korea

Education and Training

1997.02	Korea University, Korea, BS, Animal Science
2006.08	Purdue University, USA, Ph.D, Adipocyte Biology
2014.02	University of Michigan, USA, Post.Doc, Physiology/Immunology

Employment and Position

2023-Present	Department of Anatomy, Soonchunhyang University, Korea, Professor
2023-Present	Soonchunhyang Institute of Medi-bio Science (SIMS), Soonchunhyang University, Korea, Professor
2023-Present	Korean Society for the Study of Obesity, Vice- President

Important Publications

1. Cho KW, Morris DL, DelProposto JL, Geletka L, Zamarron B, Martinez-Santibanez G, Meyer KA, Singer K, O'Rourke RW, Lumeng CN (2014) An MHC II-Dependent Activation Loop between Adipose tissue Macrophages and CD4+ T cells Controls Obesity-Induced Inflammation. Cell Reports 9, 605-617.
2. Kim Y, Bayona PW, Kim M, Chang J, Hong S, Park Y, Budiman A, Kim YJ, Choi CY, Kim WS, Lee J, Cho KW (2018) Macrophage lamin A/C regulates inflammation and the development of obesity-induced insulin resistance. Front. Immunol. 9, 696.
3. Han HS, Kim SG, Kim YS, Jang SH, Kwon Y, Choi D, Heo D, Moon E, Ahn E, Seong JK, Kweon HS, Hwang GS, Lee DH, Cho KW*, Koo SH* (2022) A novel role of CRTC2 in promoting nonalcoholic fatty liver disease. Mol. Metab. 55, 101402.
4. Moyo KM, Chi J, Chang J, Soedono S, Nguyet D, Song YR, Park SJ, Go GW, Lee DY, Cho KW (2022) 12-OAHSA is a component of olive oil and mitigates obesity-induced inflammation. J Nutr Biochem 110, 109127.
5. Soedonon S, Sharlene S, Vo DHN, Averia M, Rosalie EE, Lee YK, Cho KW (2024) Obese visceral adipose dendritic cells downregulate regulatory T cell development through IL-33. Front. Immunol. 15, 1335651.

Awards and Honors

2023	Best Presentation Award, Korea Society for Biochemistry and Molecular Biology
2014	Distinguished Young Scientist, Korean Association of Immunologists

Research Interest

Diabetes, Atherosclerosis, Obesity, Immunometabolism, Adipose Tissue, Macrophages

Role of obesogenic memory in obesity-related cardiovascular diseases

Obesity is low-grade chronic inflammation state with higher inflammatory immune cell in adipose tissue and associated with the onset of metabolic disorders including type 2 diabetes and cardiovascular diseases. Weight loss intervention ameliorates some of these effects, but the subsequent weight regain are common, which is referred to as “weight cycling” or “yo-yo dieting”. Furthermore, human and rodent data demonstrated that the weight cycling aggravates the inflammation and worsens metabolic health. However, the underlying mechanisms of weight cycling induced metabolic disease are poorly understood. Recent studies suggest that immunological memory in innate immune cells appears to be crucial to provoke pro-inflammatory responses. These findings led us to investigate the effect of obesity history on hematopoietic stem cells (HSC) and their role in atherosclerosis progression. Using diet-switch model and bone marrow transplant experiment, we show that obesity history creates an obesogenic memory in HSC and the obesogenic memory in HSC are critical factor to contribute to the development of atherosclerosis. The molecular mechanisms to drive obesogenic memory in HSC and potential therapeutic strategy to treat weight-cycling induced inflammation will be discussed in this presentation.

Symposium 9

Biomechanical Factors in Atherosclerosis: Mechanisms and Clinical Implications

Sep 28(Sat) 08:50-10:20 | Room 4 (5F)

CHAIRPERSONS : Kyong Soo Park (Konkuk University, Republic of Korea)
Donghoon Choi (Yonsei University, Republic of Korea)

08:50-09:10	**Shear stress on endothelial cell and its molecular cascade to accelerated atherosclerosis** Chang-Hoon Woo (Yeungnam University, Republic of Korea)
09:10-09:30	**HEG1 protects against atherosclerosis by regulating stable flow-induced KLF2/4 expression in endothelial cells** Hanjoong Jo (Emory University, USA)
09:30-09:50	**Perspectives in predicting rapid plaque progression and future coronary events** Kwan Yong Lee (The Catholic University of Korea, Republic of Korea)
09:50-10:20	**Panel Discussion** Yoo-Wook Kwon (Seoul National University, Republic of Korea) Seung-Hwan Lee (The Catholic University of Korea, Republic of Korea) Kyung-Sun Heo (Chungnam National University, Republic of Korea)

CURRICULUM VITAE

Chang-Hoon Woo

Professor, Yeungnam University College of Medicine, Republic of Korea

Education and Training

1996.02	Chonnam National University, Korea, D.V.M., Veterinary medicine
2005.02	Korea University, Korea, Ph.D, Molecular medicine

Employment and Position

2005-2005	Korea University, PostDoc
2005-2010	University of Rochester Medical Center, PostDoc and Research Assistant Professor
2010-	Yeungnam University College of Medicine, Professor

Important Publications

1. Han JH, Nam DH, Kim SH, Hwang AR, Park SY, Lim JH, Woo CH. CHIP Haploinsufficiency Exacerbates Hepatic Steatosis via Enhanced TXNIP Expression and Endoplasmic Reticulum Stress Responses. Antioxidants. 2023 Feb 11;12(2):458.
2. Kim S, Han HJ, Nam DH, Kim GY, Lim JH, Kim JR, Woo CH. PAR-1 is a novel mechano-sensor transducing laminar flow-mediated endothelial signaling. Scientific Reports. 2018 Oct 11;8(1):15172.
3. Nam DH, Han JH, Lee TJ, Shishido T, Lim JH, Kim GY, Woo CH. CHOP deficiency prevents methylglyoxal-induced myocyte apoptosis and cardiac dysfunction. Journal of Molecular and Cellular Cardiology. 2015 Aug;85:168-177.
4. Kim M, Kim S, Lim JH, LeeC, Choi HC, Woo CH. Laminar flow activation of ERK5 protein in vascular endothelium leads to atheroprotective effect via Nrf2 activation. Journal of Biological Chemistry. 2012;287:40722-31.
5. Heo KS, Lee H, Nigro P, Thomas T, Le NT, Chang E, McClain C, Reinhart-King CA, King MR, Berk BC, Fujiwara K, Woo CH[#] and Abe J[#]. PKC mediates disturbed flow-induced endothelial apoptosis via p53 SUMOylation. Journal of Cell Biology. 2011 May 30;193(5):867-84. ([#]Corresponding author)

Awards and Honors

1. Postdoctoral Fellow Travel Award, Experimental Biology, ASBMB, 2007
2. Postdoctoral Fellow Travel Award, Vasculata, NAVBO, 2007
3. New Investigator Travel Award, AHA-BCVS, AHA, 2008
4. Outstanding Research Award, Yeungnam University College of Medicine, 2011
5. Top Articles of 2019 in JLA, Korean Society of Lipid & Atherosclerosis, 2019

Shear stress on endothelial cell and its molecular cascade to accelerated atherosclerosis

Atherosclerosis is readily observed in certain areas where disturbed blood flow (d-flow) is known to occur. A positive correlation between PKCζ activation and d-flow has been reported, but the exact role of d-flow-mediated PKCζ activation in atherosclerosis remains unclear. We test a hypothesis that PKCζ activation by d-flow induces endothelial cell (EC) apoptosis by regulating p53-sumoylation. We found that PKCζ-mediated p53-sumoylation is key regulator in peroxynitrite (ONOO-)-induced EC apoptosis. ONOO- significantly increased PKCζ activation, which subsequently induced p53-sumoylation, p53-Bcl-2 binding, and EC apoptosis. *En face* confocal microscopy revealed increases in non-nuclear p53 expression and apoptosis in aortic EC located in d-flow areas compared with those present in steady laminar flow areas. We propose a novel mechanism for ERK5-sumoylation and p53-sumoylation mediated by PKCζ-PIASy interaction during d-flow-mediated EC apoptosis, which contributes early events of atherosclerosis.

In contrast to d-flow, laminar shear stress governs anti-atherogenic responses in endothelial cells. Recently we found that ERK5-Nrf2 cascade regulates laminar flow-mediated cytoprotective responses both in vitro and in vivo. In addition, we identified the PAR-1 as a novel mechano-sensor for laminar shear stress-mediated endothelial signaling. The related evidence and techniques will be discussed in the presentation.

CURRICULUM VITAE

Hanjoong Jo

Coulter Distinguished Faculty Chair Professor, Emory University & Georgia Tech, USA

Education and Training

1984.02	Korea University, BS, Animal Science
1989.05	Pennsylvania State University, Ph.D., Physiology

Employment and Position

1995-2000	Dept. Pathology and Biomedical Engineering University of Alabama, Birmingham, AL., Assistant Professor
2000-2006	Dept Biomedical Engineering & Cardiology, Emory University and Georgia Tech, Associate Professor
2006-Present	Dept Biomedical Engineering & Cardiology, Emory & GA Tech, Professor

Awards and Honors

- Marshall Distinguished Investigator Award from British Soc. CV Research.
- Fellows of the AAAS, BME Society, AIMBE, AHA, and Am Physiological Society.
- Chairs of 2012 BMES Meeting & 2023 Gordon Conference on CV Biomechanics & Mechanobiology

HEG1 protects against atherosclerosis by regulating stable flow-induced KLF2/4 expression in endothelial cells

Ian A. Tamargo*, Kyung In Baek*, Chenbo Xu, Yerin Kim, Christian Park, Shoutaro Tsuji, Hanjoong Jo

Introduction: Atherosclerosis preferentially occurs in arterial regions of disturbed blood flow, and stable flow (s-flow) protects against atherosclerosis by incompletely understood. Our single-cell RNA-sequencing data using the mouse partial carotid ligation model was reanalyzed, which identified Heart-of-glass 1 (HEG1) as an s-flow-induced gene. Here, we studied the role of HEG1 in endothelial function and atherosclerosis (1).

Methods: HEG1 expression was studied by immunostaining, quantitive polymerase chain reaction, hybridization chain reaction, and Western blot in mouse arteries, HAECs (human aortic endothelial cells), and human coronary arteries. A siRNA (small interfering RNA)-mediated knockdown of HEG1 was used to study its function and signaling mechanisms in HAECs under various flow conditions using a cone-and-plate shear device. We generated endothelial-targeted, tamoxifen-inducible HEG1 knockout ($HEG1^{iECKO}$) mice. To determine the role of HEG1 in atherosclerosis, $HEG1^{i-ECKO}$, and littermate-control mice were injected with an adeno-associated virus-PCSK9 [proprotein convertase subtilisin/kexin type 9] and fed a Western diet to induce hypercholesterolemia either for 2 weeks with partial carotid ligation or 2 months without the surgery.

Results: S-flow induced HEG1 expression at the mRNA and protein levels in vivo and in vitro. S-flow stimulated HEG1 protein translocation to the downstream side of HAECs and release into the media, followed by increased messenger RNA and protein expression. HEG1 knockdown prevented s-flow-induced endothelial responses, including monocyte adhesion, permeability, and migration. Mechanistically, HEG1 knockdown prevented s-flow-induced KLF2/4 (Kruppel-like factor 2/4) expression by regulating its intracellular binding partner KRIT1 (Krev interaction trapped protein 1) and the MEKK3-MEK5-ERK5-MEF2 pathway in HAECs. Compared with littermate controls, $HEG1^{iECKO}$ mice exposed to hypercholesterolemia for 2 weeks and partial carotid ligation developed advanced atherosclerotic plaques, featuring increased necrotic core area, thin-capped fibroatheroma, inflammation, and intraplaque hemorrhage. In a conventional Western diet model for 2 months, $HEG1^{iECKO}$ mice also showed an exacerbated atherosclerosis development in the arterial tree in both sexes and the aortic sinus in males but not in females. Moreover, endothelial HEG1 expression was reduced in human coronary arteries with advanced atherosclerotic plaques.

Conclusions: HEG1 is a novel mediator of atheroprotective endothelial responses to flow and a potential therapeutic target.

References: 1. Tamargo IA, Baek KI, Xu C, Kang DW, Kim Y, Andueza A, Williams D, Demos C, Villa-Roel N, Kumar S, Park C, Choi R, Johnson J, Chang S, Kim P, Tan S, Jeong K, Tsuji S, Jo H. HEG1 Protects Against Atherosclerosis by Regulating Stable Flow-Induced KLF2/4 Expression in Endothelial Cells. Circulation. 2024 Apr 9;149(15):1183-1201.

CURRICULUM VITAE

Kwan Yong Lee

Assistant Professor, The Catholic University of Korea, Republic of Korea

Education and Training

2009.02	The Catholic University of Korea College of Medicine, Korea, M.D, Medicine
2018.02	The Catholic University of Korea College of Medicine, Korea, Ph.D, Internal Medicine

Employment and Position

2009-2010	The Catholic University of Korea, St.Mary's Hospital, Seoul, Korea, Internship
2011-2015	The Catholic University of Korea, Seoul St.Mary's Hospital, Seoul, Korea, Residency of Internal Medicine
2015-2017	The Catholic University of Korea, Seoul St.Mary's Hospital, Division of Cardiology, Korea, Clinical fellow
2017-2021	The Catholic University of Korea, Incheon St.Mary's Hospital, Division of Cardiology, Korea, Clinical Assistant Professor
2021-2023	The Catholic University of Korea, Seoul St.Mary's Hospital, Division of Cardiology, Korea, Clinical Assistant Professor
2023-	The Catholic University of Korea, Seoul St.Mary's Hospital, Division of Cardiology, Korea, Assistant Professor

Perspectives in predicting rapid plaque progression and future coronary events

Despite the latest and most effective preventive treatments, clinical incidents related to coronary atherosclerotic stenosis remain a major cause of death worldwide. When moderate stenotic lesions are underdiagnosed using coronary angiography (CAG) or intravascular imaging tools, fractional flow reserve (FFR) is used to determine whether to pursue percutaneous coronary intervention (PCI) or a medication-based approach (1,2). Although decisions based on FFR are supported by systematic clinical research evidence, unexpected acute coronary syndromes still occur (3,4). In the 1980s, Müller and colleagues introduced the term "vulnerable plaque" to describe plaques that can rupture and cause acute clinical incidents (5). The development and adoption of high-resolution optical coherence tomography (OCT) and near-infrared spectroscopy (NIRS) for quantitative measurement of lipids have revealed various phenotypes of "vulnerable plaques," which are now referred to as "rapidly progressing plaques." Several studies have shown the potential value of intravascular imaging to detect "rapidly progressing plaques" (6). However, limitations remain in terms of their clinical adoption for treatment decisions. The recent PREVENT study has sparked renewed interest in "vulnerable plaque treatment" by demonstrating the effectiveness of proactive treatment of high-risk plaques identified through intravascular imaging, even if the FFR is greater than 0.8 (7).

High-resolution intravascular imaging technologies, such as intravascular ultrasound (IVUS) and OCT, allow for accurate and comprehensive lesion assessment. Several randomized clinical trials and meta-analyses have shown reduced major cardiac adverse events in IVUS- and OCT-guided PCI compared to angiography-guided PCI (8-10). However, the latest intravascular imaging systems do not allow for online physiological lesion assessment. Clinicians frequently encounter cases where imaging and physiological assessments do not align, leading to an important challenge in better assessing residual risk and predicting future cardiac risk. Recent computational modeling approaches based on in vivo imaging have been developed to simulate detailed biomechanical conditions of coronary plaques, providing complementary information beyond morphological characteristics. Intravascular imaging-based computational fluid dynamics (CFD) technology can derive non-invasive FFR results and holds promise (11).

References: 1. Lawton JS, Tamis-Holland JE, Bangalore S, Bates ER, Beckie TM, Bischoff JM, Bittl JA, Cohen MG, DiMaio JM, Don CW, Fremes SE, Gaudino MF, Goldberger ZD, Grant MC, Jaswal JB, Kurlansky PA, Mehran R, Metkus TS, Jr., Nnacheta LC, Rao SV, Sellke FW, Sharma G, Yong CM and Zwischenberger BA. 2021 ACC/AHA/SCAI Guideline for Coronary Artery Revascularization: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines. Circulation. 2022;145:e18-e114. 2. Neumann FJ, Sousa-Uva M, Ahlsson A, Alfonso F, Banning AP, Benedetto U, Byrne RA, Collet JP, Falk V, Head SJ, Jüni P, Kastrati A, Koller A, Kristensen SD, Niebauer J, Richter DJ, Seferovic PM, Sibbing D, Stefanini GG, Windecker S, Yadav R and Zembala MO. 2018 ESC/EACTS Guidelines on myocardial revascularization. Eur Heart J. 2019;40:87-165. 3. Lee SH, Hong D, Dai N, Shin D, Choi KH, Kim SM, Kim HK, Jeon KH, Ha SJ, Lee KY, Park TK, Yang JH, Song YB, Hahn JY, Choi SH, Choe YH, Gwon HC, Ge J and Lee JM. Anatomic and Hemodynamic Plaque Characteristics for Subsequent Coronary Events. Front Cardiovasc Med. 2022;9:871450. 4. Kedhi E, Berta B, Roleder T, Hermanides RS, Fabris E, AJJ IJ, Kauer F, Alfonso F, von Birgelen C, Escaned J, Camaro C, Kennedy MW, Pereira B, Magro M, Nef H, Reith S, Al Nooryani A, Rivero F, Malinowski K, De Luca G, Garcia Garcia H, Granada JF and Wojakowski W. Thin-cap fibroatheroma predicts clinical events in diabetic patients with normal fractional flow reserve: the COMBINE OCT-FFR trial. Eur Heart J. 2021;42:4671-4679. 5. Muller JE, Tofler GH and Stone PH. Circadian variation and triggers of onset of acute cardiovascular disease. Circulation. 1989;79:733-43. 6. Araki M, Yonetsu T, Kurihara O, Nakajima A, Lee H, Soeda T, Minami Y, McNulty I, Uemura S, Kakuta T and Jang IK. Predictors of Rapid Plaque Progression: An Optical Coherence Tomography Study. JACC Cardiovasc Imaging. 2021;14:1628-1638. 7. Ahn JM, Kang DY, Lee PH, Ahn YK, Kim WJ, Nam CW, Jeong JO, Chae IH, Shiomi H, Kao PHL, Hahn JY, Her SH, Lee BK, Ahn TH, Chang K, Chae JK, Smyth D, Stone GW, Park DW, Park SJ; PREVENT Investigators. Preventive PCI or medical therapy alone for vulnerable atherosclerotic coronary plaque: Rationale and design of the randomized, controlled PREVENT trial. Am Heart J. 2023 Oct;264:83-96. doi: 10.1016/j.ahj.2023.05.017. Epub 2023 Jun 2. PMID: 37271356. 8. Bavishi C, Sardar P, Chatterjee S, et al. Intravascular ultrasound-guided vs angiography-guided drug eluting stent implantation in complex coronary le sions: Meta-analysis of randomized trials. Am Heart J 2017;185:26-34. 9. Groenland FTW, Neleman T, Kakar H, et al. Intra vascular ultrasound-guided versus coronary angi ography-guided percutaneous coronary intervention in patients with acute myocardial infarction: A systematic review and meta-analysis. Int J Cardiol 2022;353:35-42. 10. Kuku KO, Ekanem E, Azizi V, et al. Optical coher ence tomography-guided percutaneous coronary intervention compared with other imaging guidance: a meta-analysis. Int J Cardiovasc Imag ing 2018;34(4):503-13. 11. Lee KY, Lee JM, AH Yoon et al. Perspectives in Predicting Rapid Plaque Progression and Future Coronary Events Using Comprehensive Plaque and Hemodynamic Assessment. J Cardiovasc Interv. 2023 Apr;2(2):77-87.

Symposium 10

The Roles of Innate Immune Cells in Cardiovascular Disease

Sep 28(Sat) 15:40–17:10 | Room 3 (3F)

CHAIRPERSONS : Goo Taeg Oh (Ewha Womans University, Republic of Korea)
Jae-Hoon Choi (Hanyang University, Republic of Korea)

15:40–16:00	**Refined cardiovascular risk prediction with immune-cell biomarkers** Andreas Zirlik (Medical University of Graz, Austria)
16:00–16:20	**Control of airway inflammation by lipid metabolism in dendritic cells** Yeonseok Chung (Seoul National University, Republic of Korea)
16:20–16:40	**Macrophage metabolism in foam cell formation** Andrew Murphy (Baker Heart and Diabetes Institute, Australia)
16:40–17:00	**Extracellular vesicles as mediators of innate immunity in atherothrombosis** Christoph J. Binder (Medical University of Vienna, Austria)

CURRICULUM VITAE

Andreas Zirlik

Head of University Heart Center Graz; Univ.-Prof. Dr. med,
University Heart Center Graz, Department of Cardiology, Medical University of Graz, Austria

Education and Training

1993-1999	Medical Studies (MD), University of Leipzig, Germany
1997-2001	Dissertation in Medicine (Dr.med.), Grade: "summa cum laude", University of Leipzig, Germany
2000-2003	Residency in Internal Medicine, Department of Cardiology and Angiology (Prof. Dr. C. Bode), University of Freiburg, Germany
2003-2005	Postdoctoral Research Fellowship, Cardiovascular Medicine (Prof. Dr. Peter Libby), Brigham and Women's Hospital, Harvard Medical School, Boston, USA
2005-2008	Fellowship in Internal Medicine and Cardiology, Department of Cardiology and Angiology (Prof. Dr. C. Bode), University of Freiburg, Germany
2008	Board Certification in Internal Medicine (WBO 2003)
2009	Habilitation (Priv.-Doz.), Topic: "Modulation of inflammatory signalling pathways as therapeutic target in atherosclerosis"; Venia legendi for Internal Medicine / Cardiology
2012	Board Certification in Internal Medicine and Cardiology (WBO 2006)

Employment and Position

2009-2012	Assistant Professor of Medicine / Cardiology (Priv.-Doz.), University of Freiburg, Germany
2010-2018	Attending Physician (Oberarzt), Dept. of Cardiology and Angiology (Prof. Dr. C Bode), University Hospital Freiburg, Freiburg, Germany
2012-2018	Associate Professor of Internal Medicine / Cardiology (APL), University of Freiburg, Freiburg, Germany
2013-2018	Deputy Medical Director of the Department of Cardiology and Angiology I, University Heart Center Freiburg, Freiburg, Germany
Since 2018	Full Professor of Internal Medicine / Cardiology (§98) and Head of the Department of Cardiology, Medical University Graz, Graz, Austria
Since 2020	Director of the University Heart Center Graz, Graz, Austria

Refined cardiovascular risk prediction with immune-cell biomarkers

Traditional cardiovascular risk prediction lacks precision on an individual patient level and leaves a substantial unexplained residual risk unaccounted for. During the last three decades, the pivotal role of our immune system for initiation, propagation, and complication of cardiovascular disease such as atherosclerosis and its sequelae has been uncovered.

Recent advances in technology such as single cell RNA sequencing have enabled us to fathom the diversity and plasticity of immune cells and clusters thereof in atherosclerotic plaques and other tissues. In the light of these data, we investigated whether immunologic signatures in plaque may serve as cellular biomarkers. Indeed, specific immunologic patterns derived from single cell RNA sequencing data of a propensity score matched sub group of the LURIC trial were enriched in patients with coronary artery disease and showed upregulation of pro-inflammatory pathways. Employing cutting-edge algorithms such as multiomic factor analysis we could further demonstrate that such signatures robustly predict total mortality with sensitivity and specificity superior to soluble biomarkers. These date suggest that immunologic signatures derived from single cell RNA sequencing and other high dimensional profiling technologies present a promising novel tool for personal risk prediction.

CURRICULUM VITAE

Yeonseok Chung

Professor, Seoul National University, Republic of Korea

Education and Training

1997.02	Seoul National University, Korea, B.Sc, Pharmacy
2005.08	Seoul National University, Korea, Ph.D, Immunology

Employment and Position

2005-2009	MD Anderson Cancer Center, Postdoc fellow/Instructor
2010-2013	Univ. of Texas Medical School at Houston, Assistant Professor
2014-	Seoul National University, Assitant/Associate/Full professor

Important Publications

1. A personalized cancer vaccine that induces synergistic innate and adaptive immune responses. Kuen DS, Hong J, Lee S, Koh CH, Kwak M, Kim B-S, Jung M, Kim Y-J, Cho B-S, Kim B-S, Chung Y. Advanced Materials. 2023. 35: e2303080
2. Liver X Receptor Controls Follicular Helper T Cell Differentiation via Repression of TCF-1. Kim J., Lee H., Lee J.-E., G., Chung H., Kim D., Park M.J., Gye Y.S., Shin K.-S., Kang C.-Y., Kwok S.-K., and Chung Y. Proc Natl Acad Sci U S A. 2023. 120:e2213793120
3. Defining the role of transforming growth factor β1 in Foxp3+ T regulatory cells. Choi G, Kim BS, Chang JH, Chung Y. Immunity. 2021. 54:393
4. Atherogenic dyslipidemia promotes autoimmune follicular helper T cell responses via IL-27. Ryu H, Lim H, Choi G, Park YJ, Cho M, Na H, Ahn CW, Kim YC, Kim WU, Lee SH, Chung Y. Nat Immunol. 2018. 9:583
5. Proatherogenic conditions promote autoimmune T helper 17 cell responses in vivo. Lim H, Kim YU, Sun H, Lee JH, Reynolds JM, Hanabuchi S, Wu H, Teng B, and Chung Y. Immunity. 2014: 40:153-65

Awards and Honors

- 2014 Herbert Tabor Young Investigator Award, International Cytokine & Interferon Society, Cytokines 2014, Melbourne, Australia
- 2018 1st KAI-Genexine Excellence Award, Korean Association of Immunologists, Korea
- 2019 Top 100 National Research and Development Achievements, 2019, Ministry of Science & ICT of Korea

Control of airway inflammation by lipid metabolism in dendritic cells

Obesity or dyslipidemia oftens links to increased incidence of neutrophilic asthma in humans. Neutrophilic asthma stands out as a distinctive phenotype within the spectrum of asthma, marked by heightened neutrophilic inflammation in the airways. The steroid resistance observed in most cases of neutrophilic asthma translates into limited responsiveness to conventional treatment, thus placing a heightened burden on public health. It has been suggested that type 17 responses contribute significantly to neutrophilic asthma by inducing neutrophil infiltration into airway. In the present study, we aimed to investigate the cellular and molecular mechanisms by which dyslipidemia promotes neutrophilic asthma by employing multiple genetic and chemical perturbation systems in vivo and in vitro. Our findings showed that lipid accumulation in dendritic cells (DCs), but not in T cells, promotes allergen-induced neutrophilic asthma in vivo, associated with increased Th17 cells in the lung. Mechanistic investigations uncovered that intracellular cholesterol in DCs repressed PPARγ and activated XBP1s to trigger Th17 cell responses while suppressing Th2 cell responses. Moreover, administration of an LXR agonist or a PPARγ agonist ameliorated neutrophilic asthma and Th17 cells in vivo. These findings unveil intracellular cholesterol in DCs as a novel negative regulator of type 17 immunity during neutrophilic asthma, offering new perspectives for therapeutic interventions.

CURRICULUM VITAE

Andrew Murphy

Professor, Baker Heart and Diabetes Institute, Australia

Education and Training

2003	Queensland University of Technology, Australia, BSc, Biotechnology
2008	Monash University, Australia, Ph.D, Cell Biology

Employment and Position

2009-2013	Columbia University, Postdoctoral Fellow
2013-Current	Baker Heart and Diabetes Institute, Laboratory Head
2019-Current	Baker Heart and Diabetes Institute, Program Head

Important Publications

1. PK Morgan, G Pernes, K Huynh, C Giles, S Paul, AAT Smith, NA Mellett, A Liang, T van Buuren-Milne, C Bertuzzo Veiga, TJC Collins, Y Xu, MKS Lee, TM De Silva, PJ Meikle, GI Lancaster and AJ Murphy. A lipid atlas of human and mouse immune cells provides insights into ferroptosis susceptibility. Nat Cell Biology. 2024.
2. G Sreejit, A Abdel-Latif, B Athmanathan, A Dhyani, SK Noothi, GA Quaife-Ryan, A Al-Sharea, G Pernes, D Dragoljevic, H Lal, Kate Schroder, BY Hanaoka, C Raman, MB Grant, JE Hudson, SS Smyth, ER Porrello, AJ Murphy*, PR Nagareddy*. Neutrophil-Derived S100A8/A9 Amplify Granulopoiesis After Myocardial Infarction. Circulation. 2020:141:1080-1094. *Joint senior authors.
3. D Dragoljevic, MJ Kraakman, PR Nagareddy, D Ngo, W Shihata, HL Kammoun, A Whillas, MKS Lee, A Al-Sharea, G Pernes, MC Flynn, GI Lancaster, MA Febbraio, J Chin-Dusting, BY Hanaoka, IP Wicks, AJ Murphy. Defective cholesterol metabolism in haematopoietic stem cells promotes monocyte-driven atherosclerosis in rheumatoid arthritis. European Heart Journal. 2018:14;39(23):2158-2167.
4. Nagareddy PR, Kraakman M, Masters SL, Stirzaker RA, Gorman DJ, Grant RW, Dragoljevic D, Hong ES, Abdel-Latif A, Smyth SS, Choi SH, Korner J, Bornfeldt KE, Fisher EA, Dixit VD, Tall AR, Goldberg IJ and Murphy AJ. Adipose tissue macrophages promote myelopoiesis and monocytosis in obesity. Cell Metab. 2014:19:821-35
5. Murphy AJ, Bijl N, Yvan-Charvet L, Welch CB, Bhagwat N, Reheman A, Wang Y, Shaw JA, Levine RL, Ni H, Tall AR and Wang N. Cholesterol efflux in megakaryocyte progenitors suppresses platelet production and thrombocytosis. Nature Medicine. 2013;19:586-94.

Macrophage metabolism in foam cell formation

In patients with atherosclerosis, intermediate and non-classical monocytes are significantly elevated, predicting cardiovascular events. It remains unknown how specific monocyte subsets contribute to foam cell formation to promote atherosclerosis. We show that human M2 macrophages, but not M1, regardless of monocyte origin, are able to scavenge oxidized LDL (oxLDL). However, non-classical monocyte-derived M2 macrophages loaded with oxLDL failed to efflux cholesterol via ABCA1. This was due to elevated mitochondrial reactive oxygen species and altered cellular metabolism, a metabolic phenotype also observed in lipid^{hi}CD206^{+} plaque macrophages of *Apoe*$^{-/-}$ mice. Reducing the accumulation of mitochondrial ROS with MitoQ restored mitochondrial function and cholesterol efflux capacity in human M2 macrophages from non-classical monocytes and in *Apoe*$^{-/-}$ mice reversed the metabolic defects in M2 macrophages, resulting in smaller, less macrophage rich atherosclerotic plaques. These studies provide insight into the contribution of macrophage populations to atherosclerosis. Improving mitochondrial function in plaque macrophages may assist in the development of better strategies to promote the regression of atherosclerosis, lowering cardiovascular events.

CURRICULUM VITAE

Christoph J. Binder

Professor of Atherosclerosis Research,
Department of Laboratory Medicine, Medical University of Vienna, Austria

Education and Training

1997.09	University of Vienna, Austria, M.D, Medicine
2002.09	University of California, USA, Ph.D., Molecular Pathology
2005	Medical University of Vienna, Habilitation, Vascular Biology
2012.11	Austrian Chamber of Physicians, Board Examination, Laboratory Medicine
2013.09	Medical University of Vienna, Certified Specialist in Laboratory Medicine

Employment and Position

Since 2022	Dept. of Laboratory Medicine, Medical University of Vienna, Austria, Deputy Head
Since 2020	Medical University of Vienna, Austria, Coordinator of the PhD Program Vascular Biology
2010–2020	Medical University of Vienna, Austria, Course Coordinator of Medical Propaedeutic Lectures for the PhD Programs
Since 2017	Austrian Atherosclerosis Society, PI of the Familial Hypercholesterolemia Registry
Since 2011	Medical University of Vienna, Austria, Member of the Ethics Committee
Since 2009	Medical University of Vienna, Austria, Professor of Atherosclerosis Research
2006–2021	Center for Molecular Medicine (CeMM), Austrian Academy of Sciences, Vienna, Austria, Principal Investigator
2005–2012	Department of Medicine, University of California, San Diego, CA, Adjunct Assistant Professor of Medicine
2005–2009	Department of Laboratory Medicine, Medical University of Vienna, Austria, Assistant Professor in Laboratory Medicine (Clinical Pathology)
2002–2005	Department of Medicine, University of California, San Diego, CA, Postdoctoral Fellow

Important Publications

1. Kiss, M. G., Papac-Milicevic, N., Porsch, F., Tsiantoulas, D., Hendrikx, T., Takaoka, M., Dinh, H. Q., Narzt, M. S., Goderle, L., Ozsvar-Kozma, M., Schuster, M., Fortelny, N., Hladik, A., Knapp, S., Gruber, F., Pickering, M. C., Bock, C., Swirski, F. K., Ley, K., Zernecke, A., Cochain, C., Kemper, C., Mallat, Z., and Binder, CJ. Cell-autonomous regulation of complement C3 by factor H limits macrophage efferocytosis and exacerbates atherosclerosis. Immunity 2023. doi: 10.1016/j.immuni.2023.06.026.
2. Tsiantoulas D, Eslami M, Obermayer G, Clement M, Smeets D, Mayer FJ, Kiss MG, Enders L, Weisser J, Goderle L, Lambert J, Frommlet F, Mueller A, Hendrikx T, Ozsvar-Kozma M, Porsch F, Willen L, Afonyushkin T, Murphy JE, Fogelstrand P, Donze O, Pasterkamp G, Hoke M, Kubicek S, Jorgensen HF, Danchin N, Simon T, Scharnagl H, Marz W, Boren J, Hess H, Mallat Z, Schneider P and Binder CJ. APRIL limits atherosclerosis by binding to heparan sulfate proteoglycans. Nature. 2021;597:92–96. doi: 10.1038/s41586-021-03818-3.

Extracellular vesicles as mediators of innate immunity in atherothrombosis

Extracellular vesicles (EVs) are lipid bilayer-delimited vesicles released by cells as mediators of para- and endocrine signalling in health and disease. In atherosclerotic cardiovascular disease, increased levels of circulating EVs reflect the ongoing inflammatory processes and contribute to all stages of atherogenesis. These functional effects of EVs in atherosclerosis depend on their cellular origin and the specific pathophysiological context. We have previously identified a subset of EVs that is characterized by the presence of so-called oxidation-specific epitopes (OSE), which are lipid peroxidation-derived structures that constitute a class of danger-associated molecular patterns (DAMPs) present on dying cells, extracellular vesicles, and oxidized lipoproteins. OSEs are critical mediators of sterile inflammation in atherosclerosis and trigger multiple responses in several vascular cells. Notably, natural IgM, which constitute a conserved part of humoral immunity with important functions in host homeostasis, have the capacity modulate the pro-inflammatory and pro-coagulatory effects of OSE and OSE+ EV. Low levels of OSE-specific IgM have been shown to be independent predictors of cardiovascular events in several epidemiological studies. The generation and functional role of OSE+ EVs as well as the protective effects and mechanisms of OSE-specific IgM in atherosclerotic cardiovascular disease will be discussed.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Joint Symposia

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

VAS-KSoLA Joint Symposium

Dyslipidemia Guidelines: Similarity and Difference between Asian Countries

Sep 26(Thu) 13:00-14:30 | Room 4 (5F)

CHAIRPERSONS : Tien Hoang Anh (Hue University of Medicine and Pharmacy, Vietnam)
Eun-Jung Rhee (Sungkyunkwan University, Republic of Korea)

13:00-13:20	**Highlights of the Vietnam Atherosclerosis Society guideline on lipid disorders** Tien Hoang Anh (Hue University of Medicine and Pharmacy, Vietnam)
13:20-13:40	**The target LDL-C levels in Korean dyslipidemia guidelines** Hack-Lyoung Kim (Seoul National University, Republic of Korea)
13:40-14:00	**Cardiovascular disease risk prediction in the Korean population** Hokyou Lee (Yonsei University, Republic of Korea)
14:00-14:30	**Panel Discussion** Kim Ngoc Thanh (Hanoi Medical University, Vietnam) Yun Kyung Cho (University of Ulsan, Republic of Korea) Jun Hwan Cho (Chung-Ang University, Republic of Korea)

CURRICULUM VITAE

Tien Hoang Anh

Associate Professor, Vice President of Cardiovascular Center of Hue University of Medicine and Pharmacy Hospital, Hue University of Medicine and Pharmacy, Vietnam

Education and Training

2002	Hue University of Medicine and Pharmacy, Vietnam, M.D, General Medicine
2011	Hue University of Medicine and Pharmacy, Vietnam, Ph.D, Cardiology
2024	Hue University of Medicine and Pharmacy, Vietnam, Assoc. Prof

Employment and Position

2023-Now	Vietnam Atherosclerosis Society, Vice President
2022-Now	Vietnam Heart Failure, Vice President
2019-Now	Hue University of Medicine and Pharmacy, Vietnam, Head of Cardiology Department

Important Publications

1. Prognosis value of heart rate variability measured by Camera HRV application in patients after acute myocardial infarction. Indian Heart Journal 2024 DOI: https://doi.org/10.1016/j.ihj.2024.07.008. 2024
2. Study of the obstructive sleep apnea syndrome in cerebral infarction patients. Front. Neurol.,14, https://doi.org/10.3389/fneur.2023.1132014. 2023
3. Highlights of the 2022 Vietnamese Society of Hypertension guidelines for the diagnosis and treatment of arterial hypertension. Journal of Clinical Hypertension 24(9):1121-1138, DOI: 10.1111/jch.14580. 2022
4. Adherence to dual antiplatelet therapy after coronary stenting: A study conducted at two Vietnamese hospitals. J Cardiovasc Thorac Res 2021 Vol. 13 Issue 4 Pages 330-335, DOI: 10.34172/jcvtr.2021.52, https://jcvtr.tbzmed.ac.ir/Articl/jcvtr-30239. 2021
5. Blood pressure screening results from May Measurement Month 2019 in Vietnam. European Heart Journal Supplements (2021) 23 (Supplement B), B154-B157 The Heart of the Matter, doi:10.1093/eurheartj/suab035. 2021

Highlights of the Vietnam Atherosclerosis Society guideline on lipid disorders

The Vietnam Atherosclerosis Society (VAS) has recently updated its guidelines on lipid disorders, reflecting the latest advancements in the understanding and management of dyslipidemia, a critical factor in the prevention of atherosclerotic cardiovascular disease (ASCVD). My lecture will focus on the key highlights of these guidelines, providing an overview of the most important updates and recommendations for clinicians.

The VAS guideline emphasizes the importance of a comprehensive risk assessment for all patients, incorporating traditional risk factors such as age, hypertension, diabetes, and smoking, along with newer biomarkers and imaging techniques. It also introduces more stringent targets for low-density lipoprotein cholesterol (LDL-C), especially in high-risk populations, aligning with the latest international consensus on the aggressive management of lipid levels to reduce cardiovascular events.

One of the significant updates in the guideline is the inclusion of new therapeutic options, such as PCSK9 inhibitors and bempedoic acid, which have shown efficacy in lowering LDL-C levels in patients who are either intolerant to statins or require additional lipid-lowering therapy. The guideline also addresses the role of non-HDL cholesterol and apolipoprotein B as additional targets for therapy, reflecting the growing recognition of these markers in cardiovascular risk stratification.

Furthermore, the VAS guideline provides clear recommendations on lifestyle modifications, emphasizing the role of diet, exercise, and weight management as foundational strategies in the management of dyslipidemia. It also highlights the importance of patient education and shared decision-making in achieving optimal outcomes.

In summary, this lecture will offer a comprehensive overview of the latest VAS guidelines on lipid disorders, focusing on the practical application of these recommendations in clinical practice to improve patient outcomes in Vietnam.

CURRICULUM VITAE

Hack-Lyoung Kim

Seoul National University, Republic of Korea

Education

Mar. 1997-Feb. 2003	College of Medicine, Chonnam National University, Gwangju, Korea
Sep. 2008-Feb. 2011	MBA, Sunkyunkwan University, Seoul, Korea
Mar. 2011-Aug. 2013	Postgraduate School, Seoul National University (Ph.D. in Medical Science, Research title: therapeutic effects of udenafil on pressure overload cardiac hypertrophy)

Training and Brief Chronology of Employment

Mar. 2003-Feb. 2004	Internship, Seoul National University Hospital, Seoul, Korea
Mar. 2004-Feb. 2008	Residency in Internal Medicine, Seoul National University Hospital, Seoul, Korea
Apr. 2008-Apr. 2009	Military Medical Officer, Captain, JSA (Joint Security Area), Korea
May 2009-Apr. 2011	Military Medical Officer, Captain, Division of Cardiology, Department of Internal Medicine, Armed Forces Seoul Hospital, Seoul, Korea
May 2011-Feb. 2012	Clinical Fellow in Cardiology, Seoul National University Hospital, Seoul, Korea
Mar. 2012-Oct. 2012	Clinical Fellow in Cardiology, Seoul Metropolitan Government Seoul National University Boramae Medical Center, Seoul, Korea
Sep. 2012-Feb. 2018	Assistant professor of Seoul National University College of Medicine, Seoul Metropolitan Government - Seoul National University Boramae Hospital
Mar. 2018-Present	Associate professor of Seoul National University College of Medicine, Seoul Metropolitan Government - Seoul National University Boramae Hospital

Board Certification

2003	Korea Board of Medical Doctor: 80460
2008	Korea Board of Internal Medicine: 10960
2013	Korea Board of Division of Cardiology: 2-13-890

The target LDL-C levels in Korean dyslipidemia guidelines

2018 ACC/AHA and 2019 ESC/EAS dyslipidemia treatment guidelines proposed a more powerful LDL-C lowering therapy, especially in patients with high CV risk based on the results from IMPROVE-IT, FOURIER, and ODYSSEY OUTCOMES. However, considering that few Asians were included in these studies, the benefits and side effects of strong lipid-lowering therapy are uncertain, and the CVD risk in Korean can be overestimated, a direct application of these guidelines to Koreans may be difficult. Nevertheless, based on evidence proven in several RCTs, it is desirable to implement strong lipid-lowering therapy in patients with CVD or equivalent risk factors. The revised guidelines reflect this and lower the LDL-C target from <70 mg/dL to <55 mg/dL in patients with CAD with strong evidence. In diabetes, domestic health insurance data were also combined, and LDL-C targets were subdivided according to patient's risk. In addition, lowering LDL-C target even further has been suggested as an option to consider for some high-risk diabetics. The LDL-C target values in patients with significant carotid artery stenosis and AAA were also lower compared to previous guidelines. Based on the results of a recent RCT, REDUCE-IT, the class of recommendation for using omega-3 fatty acids for CVD prevention in high-risk patients has been raised. However, Koreans need further Korean studies for the appropriate dose of lipid-lowering drugs, LDL-C targets, CV risk factors, and target goals for hypertriglyceridemia.

CURRICULUM VITAE

Hokyou Lee

Associate Professor of Preventive Medicine, Yonsei University, Republic of Korea

Education and Training

2008.05	University of California, Berkeley, CA, USA, BS, Chemistry
2013.02	Yonsei University College of Medicine, Seoul, Korea, MD, Medicine
2022.02	Yonsei University, Seoul, Korea, PhD, Preventive Medicine

Employment and Position

2013-2014	Yonsei University Severance Hospital, Intern
2014-2018	Yonsei University Severance Hospital, Resident, Internal Medicine
2018-2022	Yonsei University College of Medicine, Fellow, Preventive Medicine
2022-2024	Yonsei University College of Medicine, Assistant Professor, Preventive Medicine
2024-Present	Yonsei University College of Medicine, Associate Professor, Preventive Medicine

Important Publications

1. Lee HH, Lee HA, Kim EJ, Kim HY, Kim HC, Ahn SH, Lee H, Kim SU. Metabolic dysfunction-associated steatotic liver disease and risk of cardiovascular disease. Gut 2024;73(3):533-540.
2. Lee HH, Lee H, Bhatt DL, Kang D, Youn JC, Shin DW, Cho J, Kim HC. Changes in physical activity and incident cardiovascular events in cancer survivors. Eur Heart J 2023;44(47):4997-5000.
3. Kaneko H, Yano Y, Lee H, Lee HH, Okada A, Suzuki Y, Itoh H, Matsuoka S, Fujiu K, Michihata N, Jo T, Takeda N, Morita H, Nishiyama A, Node K, Kim HC, Yasunaga H. Blood Pressure Classification Using the 2017 ACC/AHA Guideline and Heart Failure in Patients With Cancer. J Clin Oncol 2023;41(5):980-990.
4. Lee HH, Lee H, Townsend RR, Kim DW, Park S, Kim HC. Cardiovascular Implications of the 2021 KDIGO Blood Pressure Guideline for Adults With Chronic Kidney Disease. J Am Coll Cardiol 2022;79(17):1675-1686.
5. Lee H, Yano Y, Cho SMJ, Park JH, Park S, Lloyd-Jones DM, Kim HC. Cardiovascular Risk of Isolated Systolic or Diastolic Hypertension in Young Adults. Circulation 2020;141(22):1778-1786.

Awards and Honors

- Wunsch Medical Award for Young Medical Scientist (2023, Korean Academy of Medical Science)
- Daewoong Scientific Award (2022, Daewoong Foundation)
- LG Future Physician Scientist Award (2022, LG Chemical)

Cardiovascular disease risk prediction in the Korean population

The current international guidelines on the primary prevention of cardiovascular disease (CVD) recommend individualized assessment of risk scores as thresholds for preventive therapies. Well-known models for the estimation of a 10-year cardiovascular risk include the ACC/AHA Pooled Cohort Equations (PCE) and PREVENT in the US guidelines and SCORE2/SCORE2-OP in European guidelines. However, applying cardiovascular risk prediction models developed in the US or Europe to other populations may lead to inaccurate risk estimation. In fact, previous studies have reported that these models generally overestimated the risk in the Korean population. Several individual studies have been conducted to derive *de novo* cardiovascular risk prediction models using Korean data, but none have been externally validated, limiting their generalizability. Recently, a new cardiovascular risk prediction model has been developed from a pooled cohort of the Korean Genome and Epidemiology Study (KoGES) consortium and externally validated using the Korean National Health Insurance database revealing excellent discrimination and calibration performances. On the other hand, the SCORE2 Asia-Pacific project recalibrated the original SCORE2 models to fit data from various Asia-Pacific countries, including South Korea. All of these models may be future options for cardiovascular risk assessment in Korean patients. However, to establish primary prevention guidelines based on cardiovascular risk prediction models in Korea, as done in the US and Europe, further research is needed to determine appropriate risk thresholds for the Korean population.

ASPC-KSoLA Joint Symposium

Comprehensive Cardiovascular Prevention: CAC and Beyond

Sep 26(Thu) 16:20-17:50 | Room 1 (3F)

CHAIRPERSONS : Sungha Park (Yonsei University, Republic of Korea)
Eun-Jung Rhee (Sungkyunkwan University, Republic of Korea)

16:20-16:40	**Role of CAC in prevention of ASCVD** Khurram Nasir (Houston Methodist DeBakey Heart & Vascular Center, USA)
16:40-17:00	**Clinical implication and limitations of CAC testing** Jang Hoon Lee (Kyungpook National University, Republic of Korea)
17:00-17:20	**Role of imaging in CV prevention – beyond CAC** Sang-Eun Lee (Ewha Womans University, Republic of Korea)
17:20-17:50	**Panel Discussion** Min Jung Lee (University of Ulsan, Republic of Korea) SungWan Chun (Soonchunhyang University, Republic of Korea) Jun Hwan Cho (Chung-Ang University, Republic of Korea)

CURRICULUM VITAE

Khurram Nasir

William A. Zoghbi Centennial Chair in Cardiovascular Health, Professor of Medicine,
Weill Cornell Medical College, Division Chief, Cardiovascular Prevention and Wellness & Vice Chair Population Health, DeBakey Heart & Vascular Center, Houston Methodist, Houston, TX, USA

Education and Training

1999.05	Allama Iqbal Medical College, Lahore, Pakistan, MD (MBBS), Medicine
2001.06	Johns Hopkins University School of Public Health, Baltimore, MD, M.P.H., Public Health
2005.04	Johns Hopkins University, School of Medicine, Baltimore, MD, Postdoctoral Fellow, Cardiology
2006.04	University of Pittsburgh Medical Center, Pittsburgh, PA, Clinical Resident, Internal Medicine
2006.06	Johns Hopkins University School of Medicine, Baltimore, MD, Postdoctoral Fellow, Cardiology
2008.06	Massachusetts General Hospital, Boston, MA, Postdoctoral Fellow, Radiology
2008.10	Beth Israel Deaconess Hospital, Boston, MA, Clinical Resident, Radiology
2010.06	Boston University Medical Center, Boston, MA, Clinical Resident, Internal Medicine
2012.06	Yale-New Haven Medical Center, New Haven, CT, Clinical Fellowship, Department of Cardiology
2017.11	London School of Economics and Political Science, London, UK, M.Sc., Health Economics and Policy Management

Employment and Position

2019-Present	DeBakey Heart & Vascular Center, Houston Methodist, Houston, TX, Chief Cardiovascular Prevention and Wellness
2019-Present	DeBakey Heart & Vascular Center, Houston Methodist, Houston, TX, Director Preventive Cardiology Clinic
2020-Present	Houston Methodist Academic Institute, Professor of Cardiology
2020-Present	Houston Methodist, Houston, TX, Director, Center for CV Computational & Precision Medicine (C3-PH)
2021-Present	Weill Cornell Medicine, Professor of Medicine
2021-Present	London School of Economics, Visiting Professor
2021-2022	Center for Outcomes Research, Houston Methodist Hospital, Houston, TX, Division Chair, Health Equity & Disparities Research
2023-Present	Department of Cardiology, Houston Methodist, Vice Chair Population Health
2023-Present	Houston Methodist Research Institute, Co-Director Center for Health Data Science and Analytics (HDSA)
2023-Present	DeBakey Heart & Vascular Center, Houston Methodist, Houston, TX, Vice Chair of Population Health

Role of CAC in prevention of ASCVD

Current cardiovascular risk assessment, predominantly relying on traditional risk factor-based scoring systems, often inadequately predict individual risk for major adverse cardiovascular events (MACE), especially in asymptomatic individuals. This presentation explores the utility of coronary artery calcium (CAC) scoring, a method that quantifies calcified plaque in the coronary arteries, as a superior predictor of cardiovascular risk. Using a non-contrast cardiac CT, CAC scoring provides a direct assessment of subclinical atherosclerosis, unlike conventional risk factors that infer risk. CAC scores are categorized into four risk levels, with higher scores indicating greater plaque burden and, consequently, higher risk of cardiovascular events. We discuss the integration of CAC into clinical practice, supported by evidence demonstrating its ability to refine risk predictions and guide preventive therapeutic decisions, such as the initiation or intensification of statin therapy. The predictive power of CAC scoring significantly surpasses that of traditional risk assessments, advocating for its broader use in primary prevention settings to enhance cardiovascular risk stratification and prevent the initial occurrence of cardiovascular diseases. The paradigm in prevention has also changed - the disease is atherosclerosis, not events. This new understanding informs how we assess and mitigate atherosclerotic risk.

CURRICULUM VITAE

Jang Hoon Lee

Professor, Kyungpook National University Hospital, Republic of Korea

Education and Training

1999.02	Kyungpook National University, Korea, M.D, Medicine
2005.02	Kyungpook National University, Korea, Ph.D, Master of Science
2007.03	Korean Ministry of Health & Welfare, Korea, Korean Board of Internal Medicine, Internal Medicine

Employment and Position

2007-2011	Kyungpook National University Hospital, Fellowship
2011-2015	Kyungpook National University Hospital, Assistant Professor
2015-2020	Kyungpook National University Hospital, Associate Professor
2020-	Kyungpook National University Hospital, Professor
2020-	Daegu-Gyeongbuk Regional Cardiocerebrovascular Center, Chief of Cardiovascualr Center

Important Publications

1. Intravascular modality-guided versus angiography-guided percutaneous coronary intervention in acute myocardial infarction. Kim N, Lee JH, Jang SY, Bae MH, Yang DH, Park HS, Cho Y, Jeong MH, Park JS, Kim HS, Hur SH, Seong IW, Cho MC, Kim CJ, Chae SC; Korea Acute Myocardial Infarction Registry - National Institute of Health Investigators. Catheter Cardiovasc Interv. 2020 Mar 1;95(4):696-703. doi: 10.1002/ccd.28359. Epub 2019 May 27.
2. Usefulness of Calculation of Cardiovascular Risk Factors to Predict Outcomes in Patients With Acute Myocardial Infarction. Kim CY, Lee JH, Jang SY, Bae MH, Yang DH, Park HS, Cho Y, Jeong MH, Park JS, Kim HS, Hur SH, Seong IW, Cho MC, Kim CJ, Chae SC; Korea Acute Myocardial Infarction Registry - National Institute of Health Investigators. Am J Cardiol. 2019 Sep 15;124(6):857-863. doi: 10.1016/j.amjcard.2019.06.010. Epub 2019 Jun 25.
3. Coronary Endothelial Dysfunction and the Index of Microcirculatory Resistance as a Marker of Subsequent Development of Cardiac Allograft Vasculopathy. Lee JH, Okada K, Khush K, Kobayashi Y, Sinha S, Luikart H, Valantine H, Yeung AC, Honda Y, Fearon WF. Circulation. 2017 Mar 14;135(11):1093-1095. doi: 10.1161/CIRCULATIONAHA.116.025268. No abstract available.

Clinical implication and limitations of CAC testing

Recently, coronary artery calcium (CAC) level tests have been widely performed in health checkups. In general, the 10-year ASCVD risk score has been used to predict the risk of cardiovascular disease in asymptomatic people, but there was a problem of underestimating the risk in women and the young and overestimating the risk in men, diabetes, and elderly patients. In a study, the CAC estimation test showed that there was a difference in the occurrence of clinical events depending on the CAC estimation, making it possible to evaluate the risk. In particular, it has the advantage of being able to reclassify a patient's risk when added to the existing risk assessment scale.

However, if the CAC level test is performed on all health check-ups without clear standards on which subjects it should be performed on, it may increase unnecessary radiation exposure and increase medical costs. In some studies, it is possible to reclassify the risk of patients, but the low probability of clinical events is raising questions about clinical usefulness. Unintended and incidental findings are frequently discovered after CAC CT scans, which may increase unnecessary medical use. If the CAC level is 0, the possibility of developing coronary artery disease in the future is low, but since arteriosclerotic plaques without calcium still exist, the patient's risk may be underestimated. Conversely, it may promote excessive anxiety and overuse unnecessary tests in asymptomatic people with high CAC levels. There is also a lack of research on whether statin treatment is necessary when the CAC aberration exceeds a certain point. There are limitations in evaluating the response to treatment through changes in CAC levels after statin treatment. Above all, there is no randomized study comparing treatment and follow-up based on CAC level testing, so more research is needed for clinical use.

CURRICULUM VITAE

Sang-Eun Lee

Clinical Assistant Professor, Ewha Womans University, Republic of Korea

Education and Training

2009.02	Yonsei University, Korea, M.D, Medicine
2017.02	Yonsei University, Korea, Ph.D, Internal Medicine

Employment and Position

2011-2015	Severance Hospital, Seoul, Korea, Residency
2015-2018	Severance Hospital, Seoul, Korea, Fellow, Cardiology
2017-2018	Cedars Sinai Biomedical Imaging Research Institute, Los Angeles, USA, Visiting Scholar
2019-	Ewha Womans University Seoul Hospital, Clinical Assistant Professor

Important Publications

1. Lee, Sang-Eun, et al. "Effects of statins on coronary atherosclerotic plaques: the PARADIGM study." JACC: Cardiovascular Imaging 11.10 (2018): 1475-1484.

Awards and Honors

2019.03	Winner, The 2019 Young Author Achievement Award, American College of Cardiology, JACC: Cardiovascular Imaging, "Effects of Statins on Coronary Atherosclerotic Plaques: The PARADIGM Study"

Research Interest

Cardiac Imaging

Role of imaging in CV prevention - beyond CAC

Cardiovascular disease (CVD) remains a leading cause of mortality globally, necessitating the development of accurate and early prediction tools. The coronary artery calcium (CAC) score, derived from computed tomography (CT) imaging, has long been a key predictor of coronary artery disease (CAD) risk. While CAC scoring is a robust indicator, it primarily focuses on atherosclerotic plaque burden in coronary arteries and may not fully capture the complexity of cardiovascular risk in a diverse population. Recent advances in cardiovascular risk prediction have expanded beyond the CAC score to incorporate a wider range of biomarkers, imaging techniques, and machine learning models.

Advanced imaging modalities, including magnetic resonance imaging (MRI) for myocardial fibrosis and CT angiography for plaque characteristics, offer complementary data to CAC scores by evaluating vascular health more comprehensively. Machine learning models trained on large datasets now allow the integration of these diverse parameters to refine risk stratification.

The combination of CAC scores with non-calcified plaque assessment, endothelial function testing, and advanced imaging enhances the ability to predict adverse cardiovascular events. Personalized risk assessment strategies leveraging multi-parametric approaches can lead to more tailored therapeutic interventions, potentially improving patient outcomes.

This review explores the limitations of CAC scoring and highlights emerging techniques in cardiovascular risk prediction that aim to go beyond traditional measures, offering a more holistic and personalized approach to managing CVD risk. These advancements may significantly enhance the accuracy of CVD prediction and contribute to precision medicine in cardiology.

EAVA-KSoLA Joint Symposium

Premature Atherosclerosis: What's Going On?

Sep 26(Thu) 16:20-17:50 | Room 2 (3F)

CHAIRPERSONS : Ashraf Reda (Menofia University, Egypt)
Soon Jun Hong (Korea University, Republic of Korea)

16:20-16:40	**Premature atherosclerosis, Egyptian data** Ashraf Reda (Menofia University, Egypt)
16:40-17:00	**Premature atherosclerosis, archived case scenarios** EL Sayed Farag (Zagazig University, Egypt)
17:00-17:20	**Metabolic risk factors and ASCVD in young Korean adults** Su-Yeon Choi (Seoul National University, Republic of Korea)
17:20-17:50	**Panel Discussion** Hoyoun Won (Chung-Ang University, Republic of Korea) Jung-Hee Lee (Yonsei University, Republic of Korea) Jun Hwa Hong (Eulji University, Republic of Korea)

CURRICULUM VITAE

Ashraf Reda

Professor, Menoufia University, Egypt

Education and Training

1984	El Azhar University, Master degree, Cardiology
1991	Menoufia University, MD degree, Cardiology

Employment and Position

1991-2002	Menoufia University, As professor
2002-2015	Menoufiya University, Professor and head of Cardiology department
2015	EAVA Society, President

Important Publications

1. Overview of the current status of familial hypercholesterolaemia care in over 60 countries-The EAS Familial Hypercholesterolaemia Studies Collaboration (FHSC). AJ Vallejo-Vaz, M De Marco, CAT Stevens, A Akram, T Freiberger, ... Atherosclerosis 277, 234-255. 192. 2018
2. Global perspective of familial hypercholesterolaemia: a cross-sectional study from the EAS Familial Hypercholesterolaemia Studies Collaboration (FHSC) AJ Vallejo-Vaz, CAT Stevens, ARM Lyons, KI Dharmayat, T Freiberger, ... The Lancet 398 (10312), 1713-1725. 177. 2021
3. Reducing the clinical and public health burden of familial hypercholesterolemia: a global call to action. KA Wilemon, J Patel, C Aguilar-Salinas, CD Ahmed, M Alkhnifsawi, ... JAMA cardiology 5 (2), 217-229. 192. 2018
4. Overview of the current status of familial hypercholesterolaemia care in over 60 countries-The EAS Familial Hypercholesterolaemia Studies Collaboration (FHSC). 177. 2021. AJ Vallejo-Vaz, M De Marco, CAT Stevens, A Akram, T Freiberger, ...

Awards and Honors

Founding president of EAVA Society

Research Interest

Risk factors for ASCVD
Heart failure
Acute coronary syndromes

Premature atherosclerosis, Egyptian data

The prevalence of Premature ASCVD, is increasing world wide, and may be more in developed countries. Possible causes include increased prevalence of major CV risk factors as diabetes, hypertension, dyslipidaemia, and smoking. Although genetic background plays a vital role in premature atherosclerosis yet the interaction between this hereditary factor and risk factors as well as unhealthy lifestyle, has increased the magnitude of the problem. The Egyptian Cardiorisk project was a cross sectional observational study, examined Egyptian patients with ACS, to study the risk factors profile, age and gender differences, as well as the treatment strategies of those patients with ACS. Nearly half of our Egyptian patients admitted with ACS, had, by definition, premature ASCVD. Smoking, hypertension, obesity and diabetes, were among the most prevalent risk factors among this patients subgroup.

CURRICULUM VITAE

EL Sayed Farag

Professor, Zagazig University, Egypt

Education and Training

2006.11 University, Zagaxig, M.D, Cardiology
2006.11 University, Zagazig, Ph.D, Cardiology

Employment and Position

2015-2024 EAVA, General Secretary
2019-2024 EAVA, CardioGo CME Director

Important Publications

1. Egyptian Association of Vascular Biology and Atherosclerosis (EAVA) consensus on the usage of proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors. https://tehj.springeropen.com/articles/10.1186/s43044-020-00058-0
2. Development of Primary Percutaneous Coronary Intervention as a National Reperfusion Strategy for Patients with ST-Elevation Myocardial Infarction and Assessment of Its Use in Egypt. https://www.scienceopen.com/hosted-document?doi=10.15212/CVIA.2019.0571
3. Prevalence of atherosclerosis risk factors in Egyptian patients with acute coronary syndrome: final data of the nationwide cross-sectional 'CardioRisk' project. https://pubmed.ncbi.nlm.nih.gov/33623654/
4. Egyptian association for vascular biology and atherosclerosis (EAVA) consensus on the use of inclisiran in clinical practice. https://www.atherosclerosis-journal.com/article/S0021-9150(22)00762-6/fulltext
5. Egyptian atherosclerosis and vascular biology association consensus on the use of sodium glucose cotransporter-2 inhibitors in heart failure with reduced ejection fraction. https://www.atherosclerosis-journal.com/article/S0021-9150(22)01243-6/fulltext

Awards and Honors

Best Case presentation JCA Cardioalex 2006
Best Abstract presentation during TCTAP 2019
Innovation Appreciation CardioAlex 2023

Research Interest

Lipidology and Atherosclerosis

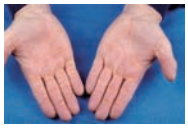
Premature atherosclerosis, archived case scenarios

A 34 -years- old woman with a remote history of MI becomes pregnant. She is on statin + PCSK9 i for homozygous FH. You will advice this patient :

A. To use bile acid sequestrant
B. To be referred for LDL-apharesis
C. To stop PCSK9i
D. All of the above

A 38 years old man with T2DM, remote MI and PAD is having the following fasting lipogram:

TC 465 mg/dl	apoA1: 102 mg/dl (normal range: 75-160)
TG 512 mg/dl	apoB: 77 mg/dl (normal <100)
HDL -C 38 mg/dl	LDL-C=125 mg/dl



A. Familial hyperchylomicronemia (Type I)
B. Familial hypercholesterolemia (Type IIa)
C. Familial dysbetalipoproteinemia (Type III)
D. Familial hypertriglycredemia (Type IV)

CURRICULUM VITAE

Su-Yeon Choi

Professor, Seoul National University Hospital Gangnam Center, Republic of Korea

Education and Training

1996.02	Seoul National University College of Medicine, Korea, M.D, Medicine
2006.02	Seoul National University College of Medicine, Korea, Ph.D, Internal Medicine

Employment and Position

1996-1997	Department of Internal Medicine/Cardiology, Seoul National University Hospital, Intern
1997-2001	Department of Internal Medicine/Cardiology, Seoul National University Hospital, Residency
2003-	Internal Medicine/Cardiology, Seoul National University College of Medicine, Healthcare System Gangnam Center, Instructor (2003-2006), Assistant Clinical Professor (2006-2012), Associate Clinical Professor (2012-2017), Clinical Professor (2017-)

Important Publications

1. Association between Cumulative Metabolic Risk Exposure and Cardiovascular Disease: A Nationwide Cohort of Over 3.6 Million Young Adults. H Lee, TM Rhee, HE Park, K Han, SY Choi (corresponding author), European Journal of Preventive Cardiology, in press.
2. Impact of clonal haematopoiesis on atherosclerotic cardiovascular disease according to low-density lipoprotein cholesterol levels in general population. Heesun Lee, Han Song, Su-Yeon Choi (corresponding author), Youngil Koh, Gangpyo Ryu, Hyo Eun Park, Ji Won Yoon, Min Joo Kim, Soie Chung, Jung Ho Bae, Seung Ho Choi, Bon-Kwon Koo, European Journal of Preventive Cardiology, in press.
3. The association of smoking status and clustering of obesity and depression on the risk of early-onset cardiovascular disease in young adults: a nationwide cohort study. CY Kim, CM Lee, SW Lee, JE Yoo, H Lee, HE Park, K Han, SY Choi (corresponding author) Korean Circ J 2023;53:17-30.

Metabolic risk factors and ASCVD in young Korean adults

The burden of early-onset cardiovascular disease (CVD) is essential for public health, negatively impacting the physical, social, and financial aspects.

We evaluated the impact of smoking, and the clustering effect of behavioral risk factors in young adults on the risk of CVD in large, nationwide population in Korea. The cumulative event rates for CVD were significantly higher in current smokers than in non-current smokers. Even after quitting smoking, the risk of CVD was still high compared to non-smokers. Early age of smoking initiation, and smoking intensity were associated with an increased risk of CVD incidence. Clustering 2 or more risk factors, including smoking, obesity, and depression, increased CVD risk additively. Therefore, we suggest both lifestyle modification and aggressive education on not trying to start smoking and the need to quit smoking early in young adults (Korean Circ J. 2023;53:17-30).

We investigated the association between metabolic syndrome (MetS) and coronary artery calcium (CAC) progression in statin-naïve young adults (20-45 YO). MetS was associated with an approximately 1.8-fold increased risk of CAC progression. The metabolic burden was associated with a risk of CAC progression in a dose-dependent manner. However, a reduction in at least two metabolic burdens was associated with a halved risk of CAC progression in young adults having MetS. Improvement in metabolic imbalance may have a preventive effect on CAC progression (Atherosclerosis 2022;360:27-33).

In Korea nationwide population-based cohort of young adults (<40 years), CVD risk was proportionally associated with cumulative metabolic risk exposure, with 2-fold increase in the MetS-persistent group and followed by the MetS-recovered and MetS-developed groups with similar risks. Because CVD risk increased in an exposure-dependent manner among young adults, efforts to optimize cardiometabolic profiles even after the establishment of MetS might help prevent CVD from young adulthood (Eur J Prev Cardiol, in press).

As in these studies, the lifetime accumulation of cardiovascular risk factors is getting important and therefore early identification and management of risk factors are emphasized in young adults.

Latin America-KSoLA Joint Symposium

Genetics and Environment Related to ASCVD

Sep 27(Fri) 08:30-10:00 | Room 4 (5F)

CHAIRPERSONS : Rodrigo Alonso (Center for Advanced Metabolic Medicine and Nutrition, Chile)
In-Kyung Jeong (Kyung Hee University, Republic of Korea)

08:30-08:45	**Atherosclerotic risk factors and CVD after cancer: growing unmet needs** Hokyou Lee (Yonsei University, Republic of Korea)
08:45-09:00	**Familial hypercholesterolemia in Latam region; how have we progressed in the last decade?** Rodrigo Alonso (Center for Advanced Metabolic Medicine and Nutrition, Chile)
09:00-09:15	**Lipoprotein(a): past, present, and future insights** Pablo Corral (Fasta University, Argentina)
09:15-09:30	**Dietary intervention and CVD: which is the best diet in Latin America?** Alvaro Avezum (Sao Paulo University, Brazil)
09:30-10:00	**Discussion**

CURRICULUM VITAE

Hokyou Lee

Associate Professor of Preventive Medicine, Yonsei University, Republic of Korea

Education and Training

2008.05	University of California, Berkeley, CA, USA, BS, Chemistry
2013.02	Yonsei University College of Medicine, Seoul, Korea, MD, Medicine
2022.02	Yonsei University, Seoul, Korea, PhD, Preventive Medicine

Employment and Position

2013-2014	Yonsei University Severance Hospital, Intern
2014-2018	Yonsei University Severance Hospital, Resident, Internal Medicine
2018-2022	Yonsei University College of Medicine, Fellow, Preventive Medicine
2022-2024	Yonsei University College of Medicine, Assistant Professor, Preventive Medicine
2024-Present	Yonsei University College of Medicine, Associate Professor, Preventive Medicine

Important Publications

1. Lee HH, Lee HA, Kim EJ, Kim HY, Kim HC, Ahn SH, Lee H, Kim SU. Metabolic dysfunction-associated steatotic liver disease and risk of cardiovascular disease. Gut 2024;73(3):533-540.
2. Lee HH, Lee H, Bhatt DL, Kang D, Youn JC, Shin DW, Cho J, Kim HC. Changes in physical activity and incident cardiovascular events in cancer survivors. Eur Heart J 2023;44(47):4997-5000.
3. Kaneko H, Yano Y, Lee H, Lee HH, Okada A, Suzuki Y, Itoh H, Matsuoka S, Fujiu K, Michihata N, Jo T, Takeda N, Morita H, Nishiyama A, Node K, Kim HC, Yasunaga H. Blood Pressure Classification Using the 2017 ACC/AHA Guideline and Heart Failure in Patients With Cancer. J Clin Oncol 2023;41(5):980-990.
4. Lee HH, Lee H, Townsend RR, Kim DW, Park S, Kim HC. Cardiovascular Implications of the 2021 KDIGO Blood Pressure Guideline for Adults With Chronic Kidney Disease. J Am Coll Cardiol 2022;79(17):1675-1686.
5. Lee H, Yano Y, Cho SMJ, Park JH, Park S, Lloyd-Jones DM, Kim HC. Cardiovascular Risk of Isolated Systolic or Diastolic Hypertension in Young Adults. Circulation 2020;141(22):1778-1786.

Awards and Honors

- Wunsch Medical Award for Young Medical Scientist (2023, Korean Academy of Medical Science)
- Daewoong Scientific Award (2022, Daewoong Foundation)
- LG Future Physician Scientist Award (2022, LG Chemical)

Atherosclerotic risk factors and CVD after cancer: growing unmet needs

Cardiovascular disease and cancer are the leading causes of death globally. With recent advances in cancer diagnosis and treatment, the population of cancer survivors is growing rapidly. As a result, generating evidence for the prevention of atherosclerotic diseases and cardiovascular complications after cancer is becoming as important as it is in the general population. While randomized controlled trials and well-designed prospective cohort studies are the gold standard for high-quality evidence, some research questions are difficult to address using these methods. Real-world evidence is increasingly filling such unmet needs and knowledge gaps. In South Korea, the National Health Insurance Service (NHIS) is the sole provider of universal health insurance. The National Health Information Data provided by the NHIS contains de-identified information on sociodemographics, health insurance reimbursement claims, and the vital status of the entire South Korean population. The database also incorporates the results of routine biennial health examinations provided by the NHIS to all South Korean adults. This lecture will introduce epidemiological studies using the Korean NHIS data on atherosclerotic risk factors and cardiovascular disease occurring after cancer. Collaborative efforts leveraging real-world data from multiple countries could open new opportunities in epidemiological research, addressing important clinical questions and unmet needs.

CURRICULUM VITAE

Rodrigo Alonso

Physician, Co-Director, Center for Advanced Metabolic Medicine and Nutrition, Santiago de Chile

Education and Training

1987.12	Universidad de Valparaiso, Chile, M.D, Medicine
1992.12	Universidad de Valparíso, Chile, Specialist, Internal Medicine
1995	Universidad Autónoma Madrid, Spain, PhD, Medicine
1994	Universidad Autónoma Madrid, Master Clinical Nutrition, Clinical Nutrition
2022	Chilean Autonomous National Corporation for the Certification of medical specialties, Specialist, Clinical Nutrition

Employment and Position

1998-2014	Lipid Clinic, Internal Medicine Department, Fundación Jimenez Díaz, Madrid, Staff
1998-2014	Spanish Familal Hypercholesterolemia Foundation, Staff
2014-2020	Department of Nutrition, Clínica Las Condes, Santiago de Chile, Staff,Head of the Department
2020-	Center for Advanced Metabolic Medicine and Nutrition, Santiago, Staff, Co-Director

Important Publications

1. Alonso R, Arroyo-Olivares R, Díaz-Díaz JL, et al. Improved lipid-lowering treatment and reduction in cardiovascular disease burden in homozygous familial hypercholesterolemia: The SAFEHEART follow-up study. Atherosclerosis 2024 Mar 16:16:117516. Doi: 10.1016/j.atherosclerosis.2024.117516.
2. Alonso R, Arroyo-Olivares R, Muñiz-Grijalvo O, et al. Persistence with long-term PCSK9 inhibitors treatment and its effectiveness in familial hypercholesterolemia: Data from the SAFEHEART study. Eur J Prev Cardiol 2023;30:320-328.
3. Ray K, Ference B, Severin T, Blom D, Nichols S, Shiba M, Almahmeed W, Alonso R, et al. World Heart Federation Cholesterol Roadmap 2022.Global Heart 2022;17(1). DOI:Https://doi.org/10.5334/gh.1154.
4. Pérez de Isla L, Watts GF, Alonso R, et al. Lipoprotein(a), LDL-Cholesterol, and hypertension : predictors of the need of aortic valve replacement in familial hypercholesterolemia. Eur Heart J 2021;42:2201-2211.
5. Alves AC, Alonso R, Diaz-Diaz JL, et al. Phenotypical, Clinical, and Molecular Aspects of Adults and Children With Homozygous Familial Hypercholesterolemia in Iberoamerica. Arterioscler Thromb Vasc Biol 2020; 40:2508-2515.

Familial hypercholesterolemia in Latam region; how have we progressed in the last decade?

Familial hypercholesterolemia (FH) is the most common monogenic disorder associated with the development of premature atherosclerotic cardiovascular disease (ASCVD). With almost 600,000,000 inhabitants, it is expected that there are at least 1,2 to 2,4 millions of heterozygous FH patients, and 600-1,800 homozygous FH subjects in the whole region. Less than 1% of patients have been diagnosed, and therefore most of them are not treated or are undertreated. The Ibero-American FH (IBAFH) network was constituted in 2013 with the participation of physicians and biomedical researchers in FH from Argentina, Brazil, Chile, Colombia, Mexico and Uruguay from the region, and Portugal and Spain, due to the historical links of these countries from the Iberian peninsula with latam region. The main objectives of this network is to promote knowledge, education, and awareness about FH for physicians, policy makers, patients, and general population. And also improving FH diagnosis and treatment through the implementation of specific programs according to the differences in health systems in the region. With the exception of Uruguay, no other country in the region has a national screening program for FH. There are some local and regional initiatives like HiperCol Brazil; the FH registry of the Colombian Society of Cardiology, the Da Vinci study inn Argentina, and in Chile with a local registry and the implementation of genetic testing at University level. Some collaborative studies have been performed to know the genetic and clinical aspects of HeFh and HoFH in the region showing an heterogeneous genetic background and phenotype. Access to medicines is the great pending task. Most countries have statins; however, ezetimibe and PCSK9i are available in the private system, but not in the public system. Awareness to health care providers and policy-makers is increasing and it is urgent to have FH nationwide programs to reduce cardiovascular burden in this population.

CURRICULUM VITAE

Pablo Corral

Full Professor, Pharmacology Department, FASTA University, School of Medicine, Argentina

Education and Training

1998.11	El Salvador University, School of Medicine, M.D, Medicine
2005.08	Internal Medicine Consultant Specialist, M.D, Internal Medicine

Employment and Position

2001-	ICM, Staff
2015-	FASTA University, Pharmacology Professor
2020-	IIC, Researcher

Important Publications

1. Familial hypercholesterolaemia in children and adolescents from 48 countries: a cross-sectional study. European Atherosclerosis Society Familial Hypercholesterolaemia Studies Collaboration.Lancet. 2024 Jan 6;403(10421):55-66. doi: 10.1016/S0140-6736(23)01842-1. Epub 2023 Dec 12.PMID: 38101429
2. Effect of Colchicine vs Usual Care Alone on Intubation and 28-Day Mortality in Patients Hospitalized With COVID-19: A Randomized Clinical Trial. Diaz R, Orlandini A, Castellana N, Caccavo A, Corral P, Corral G, Chacón C, Lamelas P, Botto F, Díaz ML, Domínguez JM, Pascual A, Rovito C, Galatte A, Scarafia F, Sued O, Gutierrez O, Jolly SS, Miró JM, Eikelboom J, Loeb M, Maggioni AP, Bhatt DL, Yusuf S; ECLA PHRI COLCOVID Trial Investigators.JAMA Netw Open. 2021 Dec 1;4(12):e2141328. doi: 10.1001/jamanetworkopen.2021.41328.PMID: 34964849
3. Global perspective of familial hypercholesterolaemia: a cross-sectional study from the EAS Familial Hypercholesterolaemia Studies Collaboration (FHSC). EAS Familial Hypercholesterolaemia Studies Collaboration (FHSC). Lancet. 2021 Nov 6;398(10312):1713-1725. doi: 10.1016/S0140-6736(21)01122-3. Epub 2021 Sep 7.PMID: 34506743
4. Unusual genetic variants associated with hypercholesterolemia in Argentina. Corral P, Geller AS, Polisecki EY, Lopez GI, Bañares VG, Cacciagiu L, Berg G, Hegele RA, Schaefer EJ, Schreier LE.Atherosclerosis. 2018 Oct;277:256-261. doi: 10.1016/j.atherosclerosis.2018.06.009.PMID: 30270055

Lipoprotein(a): past, present, and future insights

Lipoprotein(a), or Lp(a), is a unique lipoprotein in human plasma, linked to various cardiovascular diseases. Its structure closely resembles that of low-density lipoprotein (LDL), but with an additional protein called apolipoprotein(a). This distinction is crucial as it influences both the metabolism and pathogenicity of Lp(a).

Historically, research on Lp(a) began in the mid-20th century, but it was not until the advances in genetic and epidemiological methodologies that its significance in cardiovascular risk was appreciated. Early studies highlighted its role in lipid metabolism and its strong genetic determination, leading to a better understanding of its pathophysiological mechanisms. These insights established Lp(a) as an independent predictor of cardiovascular events, particularly in individuals with already elevated risk.

In the present context, the focus on Lp(a) has shifted towards understanding its precise role in atherosclerosis and thrombosis. Current research pinpoints the pro-inflammatory and pro-atherogenic properties of Lp(a), and its ability to interfere with the fibrinolytic system, thereby enhancing clot stability. Such characteristics have made it a target for novel therapeutic interventions aimed at reducing cardiovascular risk where traditional lipid-lowering therapies may not suffice.

Looking ahead, the future of Lp(a) research is promising. Recent developments in genetic editing and antisense oligonucleotide technology offer new avenues to specifically reduce Lp(a) levels. Ongoing clinical trials are assessing the efficacy and safety of these innovative approaches. Additionally, the potential of Lp(a) as a marker for personalized medicine is being explored, with the goal of tailoring cardiovascular prevention strategies based on individual Lp(a) concentrations and genetic backgrounds.

In conclusion, Lipoprotein(a) remains a topic of intense research due to its complex role in cardiovascular health. As our understanding deepens, it holds the potential to significantly alter the landscape of cardiovascular disease management and prevention.

CURRICULUM VITAE

Alvaro Avezum

Director of the International Research Center, Cardiology and Epidemiology,
Oswaldo Cruz German Hospital in São Paulo, Brazil

Personal Statement

Álvaro Avezum, cardiologist and epidemiologist, is the Director of the International Research Center at Oswaldo Cruz German Hospital in São Paulo, Brazil; Full Professor at São Paulo University; Senior Research Associate at the Population Health Research Institute, McMaster University; World Heart Federation At Large Member; and President of the Spirituality and Cardiovascular Medicine Department at Brazilian Cardiology Society.
He had obtained his medical degree from the Federal University of Triangulo Maneiro, MG, Brazil, in 1985; completed his residency in Internal Medicine, followed by the completion of 3-year residency in cardiology, at Dante Pazzanese Institute of Cardiology in São Paulo, in 1990; did research fellowship training in cardiology and earned an MSc in Clinical Epidemiology at McMaster University, Hamilton, Canada, from 1993 to 1995; and obtained his PhD in Cardiology from São Paulo University in 2002 and full-professorship at Cardio Pneumology Department, São Paulo University in 2016.
His previous positions at Medical Societies in Brazil include: São Paulo Cardiology Society (Vice-President, Research Director, and Scientific Director) and Brazilian Cardiology Society (President, Cardiovascular Health Promotion- Funcor, President, Evidence-Based Cardiology Committee, President Spirituality and Cardiovascular Medicine Committee), InterAmerican Cardiology Society (Coordinator, Epidemiology Chapter) World Heart Federation (Member of the Cardiovascular Secondary Prevention Committee), and Research Director at Dante Pazzanese Institute of Cardiology.

Positions and Honours

Dr. Avezum has been a steering committee member for 120 studies and author/co-author of 373 peer-reviewed published scientific papers, including key articles in high impact journals. h-Index of 108 (Jul 2024). His main research interests include clinical trials in cardiovascular diseases, evidence-based practice, cardiovascular disease prevention, epidemiological studies, systematic overview, and knowledge translation interventions.
Dr. Avezum coordinates a large nationwide research network including 3000 research sites across Brazil since 1990, conducting relevant and pivotal RCTs and observational studies. Over the past 16 years, Dr. Avezum has conducted the PURE Study alongside the Population Health Research Institute (Hamilton, Canada), which is the world's largest prospective cohort study - providing new scientific knowledge that has changed clinical practice in cardiovascular prevention and health promotion worldwide.

Contributions to Knowledge Creation, Knowledge Sharing, and/or Knowledge Translation

His contributions to science also include the introduction to, and cardiologist training on, evidence-based medicine; capacity building and clinical trials; the coordination of epidemiological studies; clinical practice evaluation; and promotion of cardiovascular health in Brazil. He has been a reviewer of AHJ, AJC, EHJ, IJC, Circulation, JACC and Lancet.
Recently, during the COVID-19 pandemics, Dr. Avezum was one of the founders of the Coalition COVID-19 Brazil, including 100 new research sites conducting 10 randomized clinical trials in both settings hospitalized and outpatients with COVID-19. Seven out of 10 trials already published. He is the leading investigator of two of those trials (COPE and CARE studies).

Other Relevant Information

Dr. Avezum was identified as one of the world's most influential scientific minds in clinical medicine in 2014 and 2015 by Thompson Reuters, and from 2019 to 2023 by Clarivate Analytics.

Dietary intervention and CVD: which is the best diet in Latin America?

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

OSLA-KSoLA Joint Symposium

Addressing Unmet Needs among High-Risk Patients with Atherosclerotic Cardiovascular Disease with Novel Lipid-Lowering Therapies

Sep 27(Fri) 13:00-14:30 | Room 4 (5F)

CHAIRPERSONS : Khamis Al Hashmi (Sultan Qaboos University, Oman)
Seonghoon Choi (Hallym University, Republic of Korea)

13:00-13:20	**Addressing residual risk in diabetes in the Gulf region** Khalid Al Rasadi (Sultan Qaboos University, Oman)
13:20-13:40	**Addressing unmet needs in familial hypercholesterolemia in Oman** Khalid Al Waili (Sultan Qaboos University, Oman)
13:40-14:00	**Anti-inflammatory therapeutics for atherosclerosis: beyond LDL-C lowering** Nam Hoon Kim (Korea University, Republic of Korea)
14:00-14:30	**Panel Discussion** Kyuho Kim (The Catholic University of Korea, Republic of Korea) Sang Min Park (Eulji University, Republic of Korea) Minjae Yoon (Seoul National University, Republic of Korea)

CURRICULUM VITAE

Khalid Al Rasadi

Professor, Department of Biochemistry, College of Medicine & Health Sciences, Medical Research Center, Sultan Qaboos University, Muscat, Oman

Education and Training

1995	Sultan Qaboos University, Oman, BSc, Medicine
1998	Sultan Qaboos University, Oman, M.D, Medicine
2006	McGill University, Canada, FRCPC, Biochemistry
2008	National Lipid Association, USA, ABCL, Lipidology

Employment and Position

2019-Date	Sultan Qaboos University, Oman, Director of Medical Research Center
2013-2019	Sultan Qaboos University, Oman, Head of Biochemistry Department
2012-Date	Oman Society for Lipid and Atherosclerosis, President

Important Publications

1. Cuchel M, Raal FJ, Hegele RA, Al-Rasadi K, Arca M, Averna M, Bruckert E, Freiberger T, Gaudet D, Harada-Shiba M, Hudgins LC, Kayikcioglu M, Masana L, Parhofer KG, Roeters van Lennep JE, Santos RD, Stroes ESG, Watts GF, Wiegman A, Stock JK, Tokgözoğlu LS, Catapano AL, Ray KK. 2023 Update on European Atherosclerosis Society Consensus Statement on Homozygous Familial Hypercholesterolaemia: new treatments and clinical guidance. Eur Heart J. 2023 Jul 1;44(25):2277-2291. doi: 10.1093/eurheartj/ehad197. PMID: 37130090; PMCID: PMC10314327.
2. Watts GF, Gidding SS, Hegele RA, Raal FJ, Sturm AC, Jones LK, Sarkies MN, Al-Rasadi K, Blom DJ, Daccord M, de Ferranti SD, Folco E, Libby P, Mata P, Nawawi HM, Ramaswami U, Ray KK, Stefanutti C, Yamashita S, Pang J, Thompson GR, Santos RD. International Atherosclerosis Society guidance for implementing best practice in the care of familial hypercholesterolaemia. Nat Rev Cardiol. 2023 Dec;20(12):845-869. doi: 10.1038/s41569-023-00892-0. Epub 2023 Jun 15. PMID: 37322181.

Addressing residual risk in diabetes in the Gulf region

Diabetes mellitus remains a significant health challenge globally, with the Gulf Cooperation Council (GCC) countries experiencing a particularly high prevalence and burden of the disease. According to recent epidemiological data, the prevalence of diabetes in the GCC countries is among the highest in the world, with an estimated 20-25% of the adult population affected. Furthermore, projections suggest that these numbers are expected to rise in the coming years, fueled by factors such as urbanization, sedentary lifestyles, and dietary changes. Despite advancements in treatment modalities and the implementation of comprehensive management strategies, many individuals with diabetes continue to face residual risks, including complications and suboptimal glycemic control. Studies have shown that a significant proportion of individuals with diabetes in the GCC countries have poorly controlled blood glucose levels, with approximately 50-60% failing to achieve target HbA1c levels as recommended by international guidelines. Moreover, the coexistence of dyslipidemia further compounds the risk of cardiovascular complications in individuals with diabetes. Research indicates that up to 70% of individuals with diabetes in the GCC countries have concomitant dyslipidemia, contributing to an increased risk of coronary artery disease (CAD), stroke, and other vascular events. The prevalence of CAD among individuals with diabetes in the Gulf region is alarming, with studies indicating a substantially higher risk compared to the general population. Recent data suggest that individuals with diabetes are two to four times more likely to develop CAD compared to those without diabetes. Furthermore, CAD tends to manifest at a younger age and progress more rapidly in individuals with diabetes, leading to increased morbidity and mortality rates. Addressing residual risk in diabetes management in the GCC countries implementing holistic and culturally tailored strategies, it is possible to mitigate residual risks, improve outcomes, and enhance the quality of life for individuals living with diabetes in the GCC countries.

CURRICULUM VITAE

Khalid Al Waili

Senior Consultant Medical Biochemist & Lipoidologist, Department of Clinical Biochemistry, Sultan Qaboos University Hospital, University Medical City, Muscat, Oman

Education and Training

1998	Sultan Qaboos University, Oman, BSc, Medicine
2001	Sultan Qaboos University, Oman, M.D, Medicine
2009	McGill University, Canada, FRCPC, Biochemistry
2010	National Lipid Association, USA, ABCL, Lipidology

Employment and Position

2019-Date	Sultan Qaboos University Hospital, Oman, Head of Biochemistry Department
2016-2019	Sultan Qaboos University Hospital, Oman, Assistant Head of Biochemistry Department
2010-Date	Sultan Qaboos University Hospital, Oman, Senior Consultant Biochemist & Lipidologist
2012-Date	Oman Society for Lipid and Atherosclerosis, Vice President

Important Publications

1. Mulder JWCM, Tromp TR, Al-Khnifsawi M, Blom DJ, Chlebus K, Cuchel M, D'Erasmo L, Gallo A, Hovingh GK, Kim NT, Long J, Raal FJ, Schonck WAM, Soran H, Truong TH, Boersma E, Roeters van Lennep JE; Homozygous Familial Hypercholesterolemia International Clinical Collaborators.JAMA Cardiol. Sex Differences in Diagnosis, Treatment, and Cardiovascular Outcomes in Homozygous Familial Hypercholesterolemia. 2024 Apr 1;9(4):313-322. doi: 10.1001/jamacardio.2023.5597.PMID: 38353972.
2. Albackr HB, Al Waili K, Almahmeed W, Jarallah MA, Amin MI, Alrasadi K, Batais MA, Almigbal TH, Youssef A, Alghamdi M, Al Shehri M, Ahmad I, ElToukhy RA, Kholaif N, Kinsara AJ, Al-Kindi M, Barzargani N, Hassan M, Suwaidi SA, Rajan R, Altaradi H, Alhabib KF. The Gulf Achievement of Cholesterol Targets in Out-Patients Study (GULF ACTION): Design, Rationale, and Preliminary Results. Curr Vasc Pharmacol. 2023;21(4):285-292. doi: 10.2174/1570161121666230710145604.PMID: 37431901.

Addressing unmet needs in familial hypercholesterolemia in Oman

Familial hypercholesterolemia (FH) is a common genetic disorder and if not recognized early and treated appropriately can lead to severe atherosclerosis and premature coronary artery disease (CHD). The prevalence of FH varies greatly between different studies depending on clinical criteria used and/or genetic confirmation. The most common clinical criteria used are the Dutch Lipid Clinic Network (DLCN) and the Simon Broome Registry criteria. FH is inherited as a monogenic mutation in the low-density lipoprotein receptor (LDLR), apolipoprotein-B (*Apo B*), or proprotein convertase subtilisin/kexin type 9 (*PCSK9*) genes.

FH remains underdiagnosed worldwide. There are no wide national registries for FH in Oman. The "Oman cascade screening to prevent early onset risk of cardiovascular diseases in FH Young children and adult index cases and their families (OMANORYX) study" is an ongoing study aimed to initiate early detection and treatment of FH in Oman through detection of index cases and cascade screening of first- and second-degree relatives to prevent CVD outcomes. The Gulf Familial Hypercholesterolemia Registry (Gulf FH) was a cross-sectional and prospective study to determine the FH prevalence, genetic characteristics, and current management in the adult patients living in the Arabian Gulf region. The prevalence of FH (based on both probable and possible FH) was 0.96%, 1/104. In Oman, the expected number of FH patients according to the Gulf FH registry prevalence of 1/104 is around 30000 patients. This indicates a significant gap in the diagnosis of FH in Oman, and the OMANORYX study may help to decrease this gap.

FH in Oman is still underdiagnosed and undertreated. Despite the use of high-intensity statin and combination therapies, a significant number of high and very ASCVD FH patients did not reach the LDL-C therapeutic goals. This implies the high need to engage the local health care authorities to set recommendations and quality improvement programs and policies for FH screening, diagnosis, and aggressive management.

CURRICULUM VITAE

Nam Hoon Kim

Professor, Division of Endocrinology and Metabolism, Department of Internal Medicine, Korea University Anam Hospital, Korea University College of Medicine, Republic of Korea

Educational Background & Experience

2004	Korea University College of Medicine, MD
2015	Korea University College of Medicine, PhD
2016-2018	Korea University Anam Hospital, Assistant Professor
2018-2023	Korea University Anam Hospital, Associate Professor
2023-Present	Korea University Anam Hospital, Professor

Research Interests

Diabetes therapeutics, lipid metabolism, diabetic kidney disease, obesity

Recent Publications

1. Kim JY, Kim NH. Initial Combination Therapy in Type 2 Diabetes. Endocrinol Metab (Seoul). 2024 Feb;39(1):23-32.
2. Kim NH, Kim JY, Choi J, Kim SG. Associations of omega-3 fatty acids vs. fenofibrate with adverse cardiovascular outcomes in people with metabolic syndrome: propensity matched cohort study. Eur Heart J Cardiovasc Pharmacother. 2024 Feb 23;10(2):118-127.
3. Kim JY, Choi J, Kim SG, Kim NH. Comparison of on-Statin Lipid and Lipoprotein Levels for the Prediction of First Cardiovascular Event in Type 2 Diabetes Mellitus. Diabetes Metab J. 2023 Nov;47(6):837-845.
4. Kim KJ, Son S, Kim KJ, Kim SG, Kim NH. Weight-adjusted waist as an integrated index for fat, muscle and bone health in adults. J Cachexia Sarcopenia Muscle. 2023 Oct;14(5):2196-2203.
5. Kim JY, Choi J, Kwon Y, Park S, Kim SG, Kim NH. Serum fibroblast growth factor 1 and its association with pancreatic beta cell function and insulin sensitivity in adults with glucose intolerance. Front Endocrinol (Lausanne). 2023 May 22;14:1198311.
6. Kim JY, Kim NH. New Therapeutic Approaches to the Treatment of Dyslipidemia 1: ApoC-III and ANGPTL3. J Lipid Atheroscler. 2023 Jan;12(1):23-36.
7. Kim NH, Choi J, Kim YH, Lee H, Kim SG. Addition of fenofibrate to statins is associated with risk reduction of diabetic retinopathy progression in patients with type 2 diabetes and metabolic syndrome: A propensity-matched cohort study. Diabetes Metab. 2023 May;49(3):101428.
8. Kim NH, Kim NH. Renoprotective Mechanism of Sodium-Glucose Cotransporter 2 Inhibitors: Focusing on Renal Hemodynamics. Diabetes Metab J. 2022 Jul;46(4):543-551.

Anti-inflammatory therapeutics for atherosclerosis: beyond LDL-C lowering

Harnessing inflammatory pathways for novel atherosclerosis interventions focuses on targeting the chronic inflammatory processes that drive plaque formation and progression. Atherosclerosis is increasingly understood as an inflammatory disease, where immune system dysregulation and persistent inflammation within the arterial wall lead to plaque buildup, rupture, and cardiovascular events. As such, therapeutic strategies that modulate specific inflammatory pathways have become a focal point for developing new treatments. By focusing on specific inflammatory pathways, novel therapeutic interventions aim to address the underlying causes of atherosclerosis beyond traditional lipid-lowering treatments. The integration of anti-inflammatory approaches, in combination with existing therapies, has the potential to transform the treatment landscape for atherosclerosis, reducing plaque progression and preventing major cardiovascular events. As more clinical trials are conducted, these strategies could provide new, effective ways to manage the inflammatory nature of this disease.

AAS-KSoLA Joint Symposium

Diabetes and Vascular Dysfunction

Sep 27(Fri) 16:50-18:20 | Room 2 (3F)

CHAIRPERSONS : Georges Grau (The University of Sydney, Australia)
Hyuk-Sang Kwon (The Catholic University of Korea, Republic of Korea)

16:50-17:10	**Targeting inflammation to lessen diabetes-associated cardiovascular complications** Judy B. de Haan (Baker Heart and Diabetes Institute, Australia)
17:10-17:30	**Endothelial dysfunction in diabetic kidney disease** Jae-Han Jeon (Kyungpook National University, Republic of Korea)
17:30-17:50	**Vascular dysfunction in cerebral malaria: a peculiar case of immuno-thrombosis, underpinned by extracellular vesicles** Georges Grau (The University of Sydney, Australia)
17:50-18:20	**Panel Discussion** Jin Hwa Kim (Chosun University, Republic of Korea) Jang Won Son (The Catholic University of Korea, Republic of Korea) Eun-Hee Cho (Kangwon National University, Republic of Korea)

CURRICULUM VITAE

Judy B. de Haan

Professor, Baker Heart and Diabetes Institute, Australia

Education and Training

1982	University of Cape Town, BSc (Hons), Medical Biochemistry
1985	University of Cape Town, MSc, Medical Biochemistry
1994.06	Monash University, Ph.D, Medicine

Employment and Position

2004-	Baker Heart and Diabetes Institute, Lab Head

Important Publications

1. Sharma A, Choi JSY, Stefanovic N, Sharea AA, Simpson D, Vince JE, Murphy A, Ritchie RM, Jandeleit-Dahm K and DE HAAN JB. Specific NLRP3 inhibition protects against diabetes-associated atherosclerosis. Diabetes, 70:772-787, 2021. https://doi.org/10.2337/db20-0357.
2. Mathew G, Sharma A, Pickering RJ, Rosado CJ, Lemarie J, Mudgal J, Thampi M, Sebastian S, Jandeleit-Dahm K, DE HAAN JB*##, Unnikrishnan MK. A novel synthetic small molecule DMFO targets Nrf2 in modulating pro-inflammatory/anti-oxidant mediators to ameliorate inflammation. Free Rad Res. 13:1-18, 2018. doi: 10.1080/10715762.2018.1533636.
3. Deliyanti D, Alrashdi SF, Tan SM, Meyer C, Ward KW, DE HAAN JB*##, Wilkinson-Berka JL*##. Nrf2 activation is a potential therapeutic approach to attenuate diabetic retinopathy. IOVS, 2018 59(2):815-825, 2018 doi: 10.1167/iovs.17-22920.
4. Sharma A, Sellers S, Stefanovic N, Leung C, Tan SM, Huet O, Granville DJ, Cooper ME, Bernatchez P, DE HAAN JB.## Direct eNOS activation provides atheroprotection in diabetes-accelerated atherosclerosis, Diabetes, 64(11):3937-50, 2015. doi: 10.2337/db15-0472. Epub 2015 Jun 26.
5. Tan SM, Sharma A, Stefanovic N, Yuen DYC, Karagiannis TC, Meyer C, Ward KW, Cooper ME, DE HAAN JB.#* A derivative of Bardoxolone methyl, dh404, in an inverse dose-dependent manner, lessens diabetes-associated atherosclerosis and improves diabetic kidney disease. Diabetes, 63(9): 3091-103, 2014.

Awards and Honors (Up to 3)

1. Barbara Ell Seminar Series Lecture Awardee (Victor Chang Res Institute), 2022
2. NSW Ministry for Science and Medical Research Award for Basic Science in Vascular Research

Targeting inflammation to lessen diabetes-associated cardiovascular complications

Type 1 and Type 2 diabetes results in elevated blood glucose levels that drive metabolic perturbations and culminate in robust oxidative and inflammatory stress responses. In turn, these stress responses contribute to micro- and macrovascular complications. Cardiovascular (CV) complications are 2-4 fold more prevalent in the diabetic population than in appropriately controlled non-diabetics, putting these patients at an increased risk of heart attacks and stroke. There is an urgent unmet clinical need to address these debilitating complications. Importantly, no therapy directly addresses the underlying biology. We hypothesize that drugs that specifically target the oxidative and inflammatory stress will lessen diabetes-associated vascular injury. Our laboratory has focused on novel antioxidant and anti-inflammatory approaches to lessen diabetes-mediated CV disease burden. Today's talk will focus on the latest data from our laboratory showing a role for targeted anti-inflammatory approaches to lessen diabetic complications.

CURRICULUM VITAE

Jae-Han Jeon

Associate Professor, Kyungpook National University, Republic of Korea

Education and Training

2005.02	Kyungpook National University, Korea, M.D, Medicine
2014.02	Kyungpook National University, Korea, Ph.D, Internal Medicine

Employment and Position

2013-2017	Kyungpook National University Hospital, Clinical Fellow/Clinical Professor
2017-Present	Kyungpook National University Chilgok Hospital, Assistant/Associate Professor

Important Publications

1. Diabetes Primes Neutrophils for Neutrophil Extracellular Trap Formation through Trained Immunity. Research (Wash D C). 2024 Apr 23;7:0365.
2. Comprehensive overview of the role of mitochondrial dysfunction in the pathogenesis of acute kidney ischemia-reperfusion injury: a narrative review. J Yeungnam Med Sci. 2024 Apr;41(2):61-73.
3. Mitochondrial dysfunctions in T cells: focus on inflammatory bowel disease. Front Immunol. 2023 Sep 22;14:1219422.
4. Inhibition of pyruvate dehydrogenase kinase 4 ameliorates kidney ischemia-reperfusion injury by reducing succinate accumulation during ischemia and preserving mitochondrial function during reperfusion. Kidney Int. 2023 Oct;104(4):724-739.

Research Interest

Diabetic microvascular complications, mitochondria, atherosclerosis, immunomertabolism

Endothelial dysfunction in diabetic kidney disease

The pathogenesis of diabetic kidney disease (DKD) is an intricate interplay of multifaceted mechanisms, among which endothelial dysfunction has emerged as a pivotal player. Endothelial cells, lining the inner surface of blood vessels, orchestrate a symphony of biological functions crucial for vascular homeostasis. In the setting of diabetes, chronic hyperglycemia and associated metabolic perturbations unleash a cascade of molecular events that disrupt this delicate equilibrium. Endothelial dysfunction, characterized by impaired vasodilation, heightened inflammation, oxidative stress, and abnormal permeability, ensues. These alterations culminate in a pro-inflammatory, pro-thrombotic, and pro-fibrotic milieu conducive to the progression of kidney damage.

This talk explores the molecular underpinnings of endothelial dysfunction in DKD, highlighting key players such as endothelial nitric oxide synthase (eNOS), reactive oxygen species (ROS), advanced glycation end-products (AGEs), and the renin-angiotensin-aldosterone system (RAAS). It also elucidates the pivotal role of the endothelial glycocalyx in modulating endothelial barrier function and its vulnerability to glycemic dysregulation. Furthermore, the complex interplay between endothelial dysfunction and the renal microvasculature is scrutinized, shedding light on the vicious cycle wherein impaired endothelial function contributes to glomerular hypertrophy, podocyte injury, and tubular dysfunction, ultimately fueling the progression of DKD.

CURRICULUM VITAE

Georges Grau

Professor, Chair of Vascular Immunology, The University of Sydney, Australia

Education and Training

1979.09	University of Liège, Belgium, M.D., Medicine
1984.04	University of Geneva, Switzerland, Ph.D., Immunology

Employment and Position

1991-1995	Maître d'Enseignement et de Recherche, University of Geneva, Switzerland
1992-1999	Privat-Docent, University of Geneva
1995-1997	Chef de Clinique Scientifique, University of Geneva
1997-1998	Guest Professor, University of Regensburg, Germany
1999-2006	Professor and Chair of Physiology, Université de la Méditerranée, France
2006-Current	Chair of Vascular Immunology, Professor of Pathology, The University of Sydney

Important Publications

1. Renia L, Grau GE, Wassmer SC. CD8+ T cells and human cerebral malaria: a new episteme. J Clin Invest 2020 Feb 17. pii: 135510.
2. Hackett M, Aitken JB, El-Assad F, Mcquillan JA, Carter EA, Ball HJ, Tobin MJ, Paterson D, De Jonge MD, Siegele R, Cohen DD, Vogt S, Grau GE, Hunt NH, Lay PA. Biospectroscopic Insights into the Mechanisms of Murine Cerebral Malaria - Multi-Modal Spectroscopic Imaging Reveals Altered Cerebral Metabolism and Protein Oxidation at the Site of Tissue Hemorrhage. Science Adv 2015 1 (11) e1500911.
3. Schofield L, Grau GE. The immunological basis of malaria pathogenesis. Nat Rev Immunol 2005; 9: 722-735.
4. Combes V, Taylor TE, Juhan-Vague I, Mege JL, Mwenechanya J, Tembo M, Molyneux ME, Grau GE. Circulating endothelial microparticles in Malawian children with severe falciparum malaria complicated by coma. JAMA 2004; 291: 2542-2544.
5. Grau GE, Taylor TE, Molyneux ME, Wirima JJ, Vassalli P, Hommel M, Lambert PH. Tumor necrosis factor and disease severity in children with falciparum malaria. N Engl J Med 1989; 320: 1586-1591.

Vascular dysfunction in cerebral malaria: a peculiar case of immuno-thrombosis, underpinned by extracellular vesicles

We have studied the immune mechanisms involved in several diseases affecting the blood-brain barrier. The pathogenesis of cerebral malaria (CM) includes the sequestration of *P. falciparum*-infected erythrocytes, leucocytes and platelets in brain microvessels.

CM is a case of immunothrombosis, as platelets adhere to endothelial surfaces via immune-modulated cell adhesion molecules. We showed that infected erythrocytes adhere via platelet-decorated ultra-large von Willebrand Factor strings on activated endothelium. Furthermore, we demonstrated that extracellular vesicles (EV), particularly microvesicles and exosomes, are crucial mediators of microvascular damage in CM.

To understand the pathogenic role of EV in CM, we studied them *in vitro* and *in vivo*. We modelled the disease *in vitro* by co-culturing human brain microvascular endothelial cells with *P. falciparum*-infected erythrocytes, and characterised EV released in the supernate, using spectral flow cytometry, nanoparticle tracking analysis and vibrational spectroscopy. Interestingly, the majority of EV released upon contact between parasitised erythrocytes and brain endothelium were in the 100-200 nm range, *i.e.* the exosome range, suggesting that smaller EV may be major players.

In vivo, we used the mouse models of infection by *Plasmodium berghei* ANKA, which causes CM, versus infection by *Plasmodium yoelii*, which does not. We compared lipid profiles of 18k fractions enriched from platelet-free plasma. Using high-resolution liquid chromatography-mass spectrometry (LCMS), we identified over 300 lipid species within 12 lipid classes and found that EVs produced at the time of CM differed dramatically from those of non-CM mice, despite identical levels of parasitaemia. Thus, mouse CM is characterised by specific changes in the lipid composition of circulating EVs and can be considered an appropriate model to study the role of lipids in CM pathophysiology.

Both *in vitro* and *in vitro* models will be used to further characterise EV and to test inhibitors of their release, to gain a better understanding of CM pathogenesis and to propose novel therapeutic avenues.

MSA-KSoLA Joint Symposium

Metabolic Aspect of Atherosclerosis

Sep 27(Fri) 16:50-18:20 | Room 4 (5F)

CHAIRPERSONS : Hyun-Jae Kang (Seoul National University, Republic of Korea)
Min Kyong Moon (Seoul National University, Republic of Korea)

16:50-17:10	**Organokines and atherosclerosis** Kyung Mook Choi (Korea University, Republic of Korea)
17:10-17:30	**Ectopic fat dynamics: unraveling the interplay between myosteatosis and cardiometabolic health** Yun Kyung Cho (University of Ulsan, Republic of Korea)
17:30-17:50	**MASLD, obesity and atherosclerosis** Lee-Ling Lim (University Malaya Medical Centre, Malaysia)
17:50-18:20	**Panel Discussion** Yeoree Yang (The Catholic University of Korea, Republic of Korea) Youngwoo Jang (Gachon University, Republic of Korea) Chang Hee Jung (University of Ulsan, Republic of Korea)

CURRICULUM VITAE

Kyung Mook Choi

Professor, Korea University, Republic of Korea

Education and Training

1991.02	Korea University, Korea, M.D, Medicine
2005-2006	University of Texas, Research Fellow, Endocrinology

Employment and Position

2001-2004	Korea University, Assistant Professor
2004-2009	Korea University, Associate Professor
2009-	Korea University, Professor

Important Publications

1. Song E, Hwang SY, Park MJ, Jang A, Kim KJ, Yu JH, Kim NH, Yoo HJ, Seo JA, Kim SG, Kim NH, Baik SH, Choi KM*. Additive impact of diabetes and sarcopenia on all-cause and cardiovascular mortality: A longitudinal nationwide population-based study. Metabolism 2023;148:155678
2. Roh E, Hwang SY, Yoo HJ, Baik SH, Lee JH, Son SJ, Kim HJ, Park YS, Lee SG, Cho BL, Jang HC, Kim BJ, Kim MJ, Won CW, Choi KM*. Impact of non-alcoholic fatty liver disease on the risk of sarcopenia: a nationwide multicenter prospective study. Hepatol Int 2022 Jun; 16(3):545-554
3. Chung HS, Hwang SY, Kim JA, Yoo HJ, Baik SH, Km NH, Seo JA, Kim SG, Kim NH, Choi KM*. Implications of Fasting Plasma Glucose Variability on the Risk of Incident Peripheral Artery Disease in a Population without Diabetes: A Nationwide Population-Based Cohort Study. Cardiovasc Diabetol 2022 Jan;21(1):15
4. Roh E, Hwang SY, Yoo HJ, Baik SH, Lee JH, Son SJ, Kim HJ, Park YS, Lee SG, Cho BL, Jang HC, Kim BJ, Kim MJ, Won CW, Choi KM*. Association of plasma FGF21 levels with muscle mass and muscle strength in a national multicenter cohort study: Korean Frailty and Aging Cohort Study. Age Ageing 2021 Nov; 50(6):1971-1978
5. Kim JA, Lee JS, Eyun Song, Rho E, Yu JH, Kim NH, Kim NH, Yoo HJ, Seo JA, Kim SG, Kim NH, Baik SH, Choi KM*. Association between Visit-to-Visit Fasting Plasma Glucose Variability and Osteoporotic Fractures in Individuals without Diabetes: A Nationwide Population-Based Cohort Study. J Clin Endocrinol Metab 2021 Aug;106(9):e3449-3460

Organokines and atherosclerosis

Aging results in a progressive and generalized skeletal muscle disorder defined by loss of muscle mass and strength called "sarcopenia", which is Greek word for 'poverty of flesh'. Sarcopenia is common in older adults and is associated with important negative clinical outcomes that imposes a huge socioeconomic burden. In addition, obesity significantly increases the risk of cardiometabolic diseases, such as dyslipidemia, hypertension, type 2 diabetes, coronary heart disease (CHD), and stroke in aging society.

The coexistence of excess body fat and reduced muscle mass and/or strength is defined as "sarcopenic obesity". Sarcopenia and obesity are strongly inter-connected from a pathophysiological mechanism, which is complex and multifactorial. The incidence of sarcopenic obesity is increasing and may have clinical implications such as frailty and an increased risk of hospitalization and mortality.

The expansion of visceral adipose tissue leads to produce several bioactive substances, known as adipokines. Autologous to adipokines, myokines from skeletal muscle and hepatokines from the liver also impact systemic metabolism and homeostasis through autocrine, paracrine, and endocrine mechanisms. The early identification and intervention of sarcopenic obesity may be important to prevent deleterious health outcomes. Better understanding of the pathogenesis of sarcopenic obesity and the role of organokines may provide the perspective for the novel therapeutic intervention in the future.

The objective of today's talk is to summarize recent data about the role of myokines, hepatokines, and adipokines in association with cardiometabolic syndrome and atherosclerosis.

CURRICULUM VITAE

Yun Kyung Cho

Assistant Professor, Asan Medical Center, University of Ulsan College of Medicine, Republic of Korea

Education and Training

2006-2012	University of Ulsan, College of Medicine, M.D, Internal Medicine
2015-2017	University of Ulsan, College of Medicine, M.S, Internal Medicine
2018-2020	Kangwon National University, School of Medicine, M.D, Internal Medicine

Employment and Position

2017-2018	Asan Medical Center, Clinical Fellow
2018-2019	Kangwon National University Hospital, Clinical Fellow
2019-2020	Asan Medical Center, Research Fellow
2020-2022	Hallym University Sacred Heart Hospital, Clinical Assistant Professor
2022-2023	Asan Medical Center, Clinical Assistant Professor
2024-	Asan Medical Center, Assistant Professor

Important Publications

1. Kim MJ, Cho YK, Kim EH, Lee MJ, Lee WJ, Kim HK, Jung CH. Association between metabolic dysfunction-associated steatotic liver disease and myosteatosis measured by computed tomography. J Cachexia Sarcopenia Muscle. 2024 Jul 16. doi: 10.1002/jcsm.13543. Online ahead of print.
2. Kim MJ, Cho YK, Jung HN, Kim EH, Lee MJ, Jung CH, Park JY, Kim HK, Lee WJ. Association Between Insulin Resistance and Myosteatosis Measured by Abdominal Computed Tomography. J Clin Endocrinol Metab. 2023 Nov 17;108(12):3100-3110. doi: 10.1210/clinem/dgad382.
3. Cho YK, Jung HN, Kim EH, Lee MJ, Park JY, Lee WJ, Kim HK, Jung CH. Association between sarcopenic obesity and poor muscle quality based on muscle quality map and abdominal computed tomography. Obesity (Silver Spring). 2023 Jun;31(6):1547-1557. doi: 10.1002/oby.23733. Epub 2023 May 3.
4. Cho YK, Huh JH, Moon S, Kim YJ, Kim YH, Han KD, Kang JG, Lee SJ, Ihm SH. Waist circumference and end-stage renal disease based on glycaemic status: National Health Insurance Service data 2009-2018. J Cachexia Sarcopenia Muscle. 2023 Feb;14(1):585-595. doi: 10.1002/jcsm.13164. Epub 2022 Dec 23.

Ectopic fat dynamics: unraveling the interplay between myosteatosis and cardiometabolic health

Myosteatosis, the abnormal accumulation of fat within skeletal muscle, has been recognized as a key contributor to the pathophysiology of numerous cardiometabolic disorders. Skeletal muscle, central to metabolism and cardiometabolic health, serves as a major site for glucose and fatty acid utilization, particularly during physical activity, thus playing an essential role in energy homeostasis. Additionally, skeletal muscle is integral in maintaining insulin sensitivity, a crucial determinant in glucose regulation and the prevention of conditions such as type 2 diabetes and metabolic syndrome.

In 2023, during this esteemed conference, I introduced the concept of myosteatosis, outlined the tools available for its assessment, and presented epidemiological evidence linking myosteatosis to cardiometabolic diseases, drawing upon studies from our research team.

In this year's iCOLA 2024 conference, I will expand upon these findings by exploring the intricate relationship between myosteatosis and cardiometabolic health, with particular emphasis on its role in the development of atherosclerosis. Furthermore, I will share the latest research advancements in this field, including findings from our own research conducted over the past year. This series of lectures, building upon last year's presentation, will offer a comprehensive examination of the adverse effects of myosteatosis on metabolic health, its contribution to atherosclerosis, and its broader implications for cardiovascular risk and outcomes.

CURRICULUM VITAE

Lee-Ling Lim

Associate Professor of Medicine and Head of Diabetes Care Unit,
Department of Medicine, University of Malaya, Malaysia

Education and Training

2007.03	University of Malaya, Malaysia, MBBS, Medicine
2010.10	Royal College of Physicians, London, UK, MRCP (UK), Internal Medicine
2015.07	Ministry of Health, Malaysia, Fellowship in Diabetes & Endocrinology, Diabetes & Endocrinology subspeciality
2020.07	The Chinese University of Hong Kong, Ph.D, Medical Sciences
2020-2023	Royal Colleges of Physicians, UK, FRCP (London, Edinburgh, Glasgow), Internal Medicine, Diabetes & Endocrinology

Employment and Position

2007-2008	Ministry of Health, Malaysia, House Officer
2008-2010	Ministry of Health, Malaysia, Medical Officer
2010-2012	Ministry of Health, Malaysia, Specialist in Internal Medicine
2012-2015	University of Malaya, Malaysia, Fellow, Diabetes & Endocrinology Subspeciality
2014-2019	University of Malaya, Malaysia, Senior Lecturer
2019-Present	University of Malaya, Malaysia, Associate Professor
2021-Present	The Chinese University of Hong Kong, Clinical Associate Professor (Honorary)
2022	Health Economics Research Centre (HERC), Nuffield Department of Population Health, University of Oxford, Visiting Researcher
2024	Baker Heart and Diabetes Institute, Melbourne, Australia, Baker Honorary

Important Publications

1. Ooi YG, Sarvanandan T, Hee NKY, Lim QH, Paramasivam SS, Ratnasingam J, Vethakkan SR, Lim SK, Lim LL#. Risk Prediction and Management of Chronic Kidney Disease in People Living with Type 2 Diabetes Mellitus. Diabetes Metab J 2024 Jan 26. doi: 10.4093/dmj.2023.0244 (Accepted, in press)
2. Lim LL#, Abdul Aziz A, Dakin H, Buckell J, Woon YL, Roope L, Chandran A, Mustapha FI, Gregg EW, Clarke PM. Trends in all-cause mortality among adults with diagnosed type 2 diabetes in West Malaysia: 2010 - 2019. Diabetes Res Clin Pract 2023;205:110944. doi: 10.1016/j.diabres.2023.110944
3. Tobias DK, Merino J, Ahmad A,…Lim LL,…Rich SS, Franks PW. Second international consensus report on gaps and opportunities for the clinical translation of precision diabetes medicine. Nat Med 2023;29(10):2438-2457. doi: 10.1038/s41591-023-02502-5 (Joint first author)

MASLD, obesity and atherosclerosis

Metabolic dysfunction-associated steatotic liver disease (MASLD) affects more than a quarter of the global population. Its global prevalence is increasing due to the obesity and diabetes pandemic. The metabolic cluster namely obesity, insulin resistance, high blood pressure, and atherogenic dyslipidemia are the key drivers for the development and progression of MASLD. Hepatic entry of increased fatty acids released from adipose tissue, increase in fatty acid synthesis and reduced fatty acid oxidation in the liver, as well as hepatic overproduction of triglyceride-rich lipoproteins may lead to MASLD. Of note, MASLD and atherosclerotic cardiovascular disease (ASCVD) share these common drivers. This inter-related relationship raises questions on co-occurrence, causality, and the need for screening and multidisciplinary care in people with obesity, MASLD and ASCVD. Given the development of ASCVD determines the prognosis of people with MASLD and obesity, preventive measures and effective treatment strategies are needed to reduce their morbidity and mortality.

JAS-KSoLA Joint Symposium

Clinical Implication of Multi-Agonists in Cardiometabolic Diseases

Sep 28(Sat) 08:50-10:20 | Room 1 (3F)

CHAIRPERSONS : Jung-Hyun Noh (Inje University, Republic of Korea)
Byung-Wan Lee (Yonsei University, Republic of Korea)

08:50-09:10	**Efficacy and safety of tirzepatide, a GIP and GLP-1 dual agonist, in persons with type 2 diabetes** Yasuo Terauchi (Yokohama City University, Japan)
09:10-09:30	**Upcoming multi-agonists for cardio-metabolic disease** Chang Hee Jung (University of Ulsan, Republic of Korea)
09:30-09:50	**A potential mechanism of a dual GLP-1/GIP receptor agonist** Yong-ho Lee (Yonsei University, Republic of Korea)
09:50-10:20	**Panel Discussion** Shinae Kang (Yonsei University, Republic of Korea) Osung Kwon (The Catholic University of Korea, Republic of Korea) Dae Young Cheon (Hallym University, Republic of Korea)

CURRICULUM VITAE

Yasuo Terauchi

Professor, Yokohama City University, Japan

Education and Training

1988.03	Tokyo University, Japan, M.D, Medicine
2001.05	Tokyo University, Japan, Ph.D., Internal Medicine

Employment and Position

1988-1990	Tokyo University Hospital, Resident in Internal Medicine
1990-1991	Institute for Diabetes Care, Medical staff Asahi Life Foundation
1992-1998	Tokyo University Hospital, Clinical Research Fellow
1998-2002	Tokyo University, Research Associate
2002-2004	Tokyo University, Assistant Professor
2005-Present	Yokohama City University, Professor and Chairman
2016-2020	Yokohama City University Hospital, Assistant Director
2021-2024	Yokohama City University, Dean, School of Medicine

Important Publications

1. Terauchi Y, Takamoto I, Kubota N, Matsui J, Suzuki R, Komeda K, Hara A, Toyoda Y, Miwa I, Aizawa S, Tsutsumi S, Tsubamoto Y, Hashimoto S, Eto K, Nakamura A, Noda M, Tobe K, Aburatani H, Nagai R, Kadowaki T: Glucokinase and Irs2 are required for compensatory beta-cell hyperplasia in response to high-fat diet-induced insulin resistance. J Clin Invest. 117: 246-257, 2007.
2. Iwasaki T, Nakajima A, Yoneda M, Yamada Y, Mukasa K, Fujita K, Fujisawa N, Wada K, Terauchi Y: Serum ferritin is associated with visceral fat area and subcutaneous fat area. Diabetes Care. 28: 2486-2491, 2005.
3. Suzuki H*, Terauchi Y*, Fujiwara M, Aizawa S, Yazaki Y, Kadowaki T, Koyasu S: Xid-like immunodeficiency in mice with disruption of the p85alpha subunit of phosphoinositide 3-kinase. Science. 283: 390-392, 1999. *Equal contribution

Efficacy and safety of tirzepatide, a GIP and GLP-1 dual agonist, in persons with type 2 diabetes

GIP and GLP-1 are incretin hormones released from the gut in response to food intake. GIP is responsible for 2/3 of the incretin effect in healthy people, generating a more significant impact on insulin secretion than GLP-1. In this lecture, I will introduce proposed roles of GIP and GLP-1 in various tissues.

Now tirzepatide is the only registered GIP and GLP-1 receptor agonist. Mean half-time is approximately 5 days, enabling once-weekly dosing. No dose adjustment of tirzepatide is recommended for patients with renal or hepatic impairment.

Tirzepatide has been studied in a comprehensive development program across different stages of type 2 diabetes. Efficacy and safety of tirzepatide at doses of 5 mg, 10 mg, and 15 mg compared with those of semaglutide at a dose of 1 mg in patients with type 2 diabetes that had been inadequately controlled with metformin monotherapy was reported (Frias JP, et al. N Engl J Med. 2022; 386(7): e17). Efficacy and safety of tirzepatide compared with dulaglutide in Japanese patients with type 2 diabetes who discontinued oral antihyperglycemic monotherapy or were treatment naïve was reported (Inagaki N, et al. Lancet Diabetes Endocrinol. 2022; 10: 9: 623-633). Patients with type 2 diabetes reported higher treatment satisfaction with once-weekly tirzepatide (5, 10, and 15 mg) compared with dulaglutide 0.75 mg after 52 weeks of treatment (Ishii H, et al. Diabetes Ther. 2023; 14: 2173-2183). Tirzepatide had a similar safety and efficacy profile across BMI and age subgroups in East Asian participants (Kiyosue A, et al. Diabetes Obes Metab. 2023; 25(4): 1056-1067). I will introduce these results briefly.

Finally, I will discuss about safety issues and future expectations of tirzepatide in persons with type 2 diabetes.

CURRICULUM VITAE

Chang Hee Jung

Professor, Asan Medical Center, University of Ulsan College of Medicine, Republic of Korea

Education and Training

2002.02	Korea University, Korea, M.D, Medicine
2014.02	Univ. of Ulsan College of Medicine, Korea, Ph.D., Internal Medicine

Employment and Position

2003-2007	Asan Medical Center, Residency
2010-2012	Asan Medical Center, Clinical Fellow
2012-2017	Asan Medical Center, Assistant Professor
2017-2023	Asan Medical Center, University of Ulsan College of Medicine, Associate Professor
2018-2020	University of Virginia, VA, USA, Research Associate
2023-Current	Asan Medical Center, University of Ulsan College of Medicine, Professor

Important Publications

1. Kim MJ, Cho YK, Kim EH, Lee MJ, Lee WJ, Kim HK, Jung CH: Association between metabolic dysfunction-associated steatotic liver disease and myosteatosis measured by computed tomography. J Cachexia Sacopenia Muscle. 2024 Epub ahead of print.
2. Kim MJ, Cho YK, Kim EH, Lee MJ, Lee WJ, Kim HK, Jung CH: Association between Estimated Glucose Disposal Rate and Subclinical Coronary Atherosclerosis. Nutr Metab Cardiovasc Dis. 2024 Epub ahead of print.
3. Cho YK, Jung HN, Kim EH, Lee MJ, Park JY, Lee WJ, Kim HK, Jung CH: Association between sarcopenic obesity and poor muscle quality based on muscle quality map and abdominal computed tomography. Obesity (Silver Spring) 2023. 31(6):1547-1557.
4. Yoon J, Kang HJ, Lee JY, Kim JG, Yoon YH, Jung CH, Kim YJ: Associations Between the Macular Microvasculatures and Subclinical Atherosclerosis in Patients With Type 2 Diabetes: An Optical Coherence Tomography Angiography Study. Front Med (Lausanne) 2022, 9:843176. (Co-corresponding)
5. Jung HN, Kim MJ, Kim HS, Lee WJ, Min SH, Kim YJ, Jung CH: Age-Related Associations of Low-Density. Lipoprotein Cholesterol and Atherosclerotic Cardiovascular Disease: A Nationwide Population-Based Cohort Study. J Am Heart Assoc 2022, 11(9):e024637.

Awards and Honors

2017	Young Investigator Award, Korean Diabetes Association
2024	Scientific Excellence Award, Korean Society of Lipid and Atherosclerosis

Upcoming multi-agonists for cardio-metabolic disease

The increasing prevalence of cardio-metabolic diseases, such as diabetes, obesity, and cardiovascular disorders, demands more effective therapeutic strategies. Traditional single-target treatments often fall short in addressing the complex nature of these conditions. Multi-agonists, which simultaneously target multiple receptors, offer a promising new approach.

Multi-agonists, including dual and triple agonists, can activate receptors like GLP-1 (glucagon-like peptide-1), GIP (glucose-dependent insulinotropic polypeptide), and glucagon. This multi-pathway engagement provides comprehensive benefits such as improved glycemic control, enhanced weight loss, and cardiovascular protection. For instance, dual GLP-1/GIP agonists have shown superior efficacy in reducing HbA1c levels and body weight compared to traditional GLP-1 receptor agonists. Triple agonists targeting GLP-1, GIP, and glucagon receptors are also under investigation, showing promising results in early trials.

The development of these multi-agonists involves sophisticated design to ensure selective receptor activation and minimal side effects, utilizing advanced drug delivery systems and molecular engineering.

This lecture will cover the latest advancements in multi-agonist therapies for cardio-metabolic diseases, discussing their mechanisms, clinical efficacy, and potential to transform future treatment strategies. Attendees will gain a comprehensive understanding of the challenges and opportunities in this innovative field.

CURRICULUM VITAE

Yong-ho Lee

Associate Professor, Yonsei University, Republic of Korea

Education and Training

2005	Yonsei University College of Medicine: M.D. Medicine
2014	Graduate School, Yonsei University College of Medicine; Ph.D. Internal Medicine
2020-2022	Buck Institute for Research on Aging, US, Visiting scientist

Employment and Position

2015-Current	Yonsei University College of Medicine, Associate professor
2022-Current	Korean Academy of Science and Technology, Young Korean Academy of Science and Technology (Y-KAST) member
2024-Current	Korean Diabetes Association (KDA), Director of General Affairs
2023-Current	Korean Society of Lipid and Atherosclerosis, Committee of Scientific Affairs, member

Important Publications

1. Park W, et al, Lee YH (Co-corres), Jayoung Kim, Hong Kyun Kim, Jang-Ung Park. In-depth correlation analysis between tear glucose and blood glucose using a wireless smart contact lens. Nat Commun. 2024;15(1):2828.
2. Chun HJ, Kim ER, Lee M, et al, &, Han DH, Cha BS, Lee YH (Co-corres). Increased expression of sodium-glucose cotransporter 2 and O-GlcNAcylation in hepatocytes drives non-alcoholic steatohepatitis. Metabolism. 2023;145:155612.
3. Kim ER, Park JS, et al, &, Bae SH, Lee YH (Co-corres). A GLP-1/GLP-2 receptor dual agonist to treat non-alcoholic steatohepatitis: targeting the gut-liver axis and microbiome. Hepatology, 2022;75(6):1523-1538.
4. Lee JY, Kim Y, Han KD, Han E, Lee BW, Kang ES, Cha BS, Ko SH, Lee YH (Corres). Analysis of Severe Hypoglycemia among adults with Type 2 Diabetes and Non-alcoholic Fatty Liver Disease. JAMA Network Open, 2022;5(2):e220262.
5. Kim SR, Lee SG, et al, &, Kim JS, Lee YH (Co-corres). SGLT2 inhibition modulates NLRP3 inflammasome activity via changes in ketones and insulin in diabetes and cardiovascular disease. Nature communications 2020;11:2127.

Awards and Honors

2021.11	Ministry of Health and Welfare Award on Biomedical Research, Korea, 2019
2020.3	The 13th Asan Award in Medicine (2020), Award for Young Medical Scientists
2017.11	27th Wunsch Medical Award (Young investigator/Clinical), Korean Academy of Medical Sciences Research Award

Research Interest

Diabetes, NASH, senescence, aging

A potential mechanism of a dual GLP-1/GIP receptor agonist

GLP-1 and GIP are both incretin hormones secreted by the intestines in response to food intake. They play important roles in regulating blood glucose levels and insulin secretion. Tirzepatide is a dual agonist targeting both GLP-1 and GIP receptors, offers a unique therapeutic approach for managing type 2 diabetes and obesity. Despite its powerful benefits on glycemic control and weight reduction, action mechanism of dual agonist has not been fully elucidated. I will present recent evidences regarding potential mechanism of GIP/GLP-1 dual agonist. This presentation will explore the synergistic effects of simultaneously activating both GLP-1 and GIP pathways, highlighting how this dual action may lead to enhanced metabolic outcomes. I will examine the molecular interactions between tirzepatide and its target receptors, discussing how these interactions may differ from single-receptor agonists. Furthermore, I will address the impact of this dual agonism on various tissues, including the pancreas, adipose tissue, liver and the central nervous system.

KNS-KSoLA Joint Symposium (K)

Current Knowledge and Future Perspectives in Dietary Fat Intake for Vascular Health

Sep 28(Sat) 08:50-10:20 | Room 3 (3F)

CHAIRPERSONS : Hye Young Kim (Yong In University, Republic of Korea)
Jeongseon Kim (National Cancer Center, Republic of Korea)

08:50-09:10	**Associations of dietary lipid intake with cardiovascular disease in Koreans based on nutritional epidemiology studies** Jung Hyun Kwak (Inje University, Republic of Korea)
09:10-09:30	**Fat intake and atherosclerotic cardiovascular diseases** Youngwoo Jang (Gachon University, Republic of Korea)
09:30-09:50	**Dietary advanced glycation end products and vascular function** Yoona Kim (Gyeongsang National University)
09:50-10:20	**Panel Discussion** Yuri Kim (Ewha Womans University, Republic of Korea) Jun Hwan Cho (Chung-Ang University, Republic of Korea)

CURRICULUM VITAE

Jung Hyun Kwak

Professor, Inje University, Republic of Korea

Education and Training

2005.02	Sungshin Women's University, Korea, B.S, Food and Nutrition
2007.02	Yonsei University, Korea, M.S, Clinical Nutrition
2010.08	Yonsei University, Korea, Ph.D, Clinical Nutrition

Employment and Position

2010-2016	Aging Science Research Center, Yonsei University, Postdoctoral researcher
2016-2019	Department of Preventive Medicine, Gachon University, Research professor
2019-2020	Department of Food and Nutrition, Eulji University, Research professor
2021-2023	Department of Food and Nutrition, Gangneung-Wonju National University, Research professor

Important Publications

1. Kwak JH, Eun CS, Han DS, Kim HJ. Effects of RAD50 SNP, sodium intake, and H. pylori infection on gastric cancer survival in Korea. Gastric Cancer. 2024 Mar;27(2):210-220.
2. Kwak JH, Kim HJ. Alleviating air pollutant-associated hypertension by potassium intake in Korean adults: a cross-sectional study from the 2012-2016 Korea National Health and Nutrition Examination Survey. Environ Sci Pollut Res Int. 2023 Jun;30(29):73881-73889.
3. Kwak JH, Kim HJ. The Association between Air Pollutants Exposure with Pre- and Hypertension by Vitamin C Intakes in Korean Adults: A Cross-Sectional Study from the 2013-2016 Korea National Health and Nutrition Examination. J Nutr Health Aging. 2023;27(1):21-29.
4. Kwak JH, Park CH, Eun CS, Han DS, Kim YS, Song KS, Choi BY, Kim HJ. Dietary zinc intake and mortality in patients with intestinal-type gastric cancer: A prospective cohort study in Korea. Front Oncol. 2022;12:947405.
5. Kwak JH, Choi YH. Sex and body mass index dependent associations between serum 25-hydroxyvitamin D and pulse pressure in middle-aged and older US adults. Sci Rep. 2021;11(1):9989.

Associations of dietary lipid intake with cardiovascular disease in Koreans based on nutritional epidemiology studies

In 2021, heart disease mortality rate was 61.5 per 100,000 people, an increase of 11.7% compared to 2011. Additionally, as a result of treatment trends for heart disease (based on predominant diseases) over the past five years (2018 to 2022), the number of patients increased by 19.9% (annual average of 4.6%) in 2022 compared to 2018. Well-known risk factors for cardiovascular disease (CVD) include smoking, diabetes, high blood pressure, and dyslipidemia. Additionally, excessive lipid intake has been reported as an important risk factor for CVD, and the lipid intake of Koreans continues to increase. A systemic review and meta-analysis study related to CVD and diet reported that consumption of milk, dairy products, and coffee were protective dietary factors for CVD, while sugar-sweetened beverages were reported to be harmful dietary factors. A study derived from 15 observational studies reported a 1.41-fold increased risk of CVD in subjects with a family history of low EPA/DHA levels (i.e., a low intake of oily fish). In addition, a meta-analysis study related to dietary fat intake and mortality reported that increased intake of saturated fat increased mortality from all causes, including CVD, but intake of polyunsaturated fatty acids decreased mortality from all causes, including CVD. A cross-sectional study using data from the Korean National Health and Nutrition Examination Survey found that a dietary pattern with high intake of red meat, bread, snacks, milk, and dairy products was associated with an increase in total cholesterol. While, a dietary pattern rich in fish intake was inversely associated with increased triglycerides. Reviewing the recently reported associations between dietary lipids and CVD indicators/CVD is an essential for preventing CVD. Therefore, in this lecture, we discuss recently reported meta-analyses and observational studies for CVD and dietary lipid and review guidelines for healthy dietary lipid intake.

CURRICULUM VITAE

Youngwoo Jang

Cardiology, Gachon University Gil Medical Center, Republic of Korea

Education and Training

2008-2012	School of Medicine, Gachon University, Doctor of Medicine
2017-2018	Cardiovascular Institute, Stanford Medicine, Postdoctoral Research Associate
2018-2019	Department of Cardiology, Gachon University, Gil Medical Center, Clinical Fellow

Employment and Position

2022-	Department of Cardiology, Gachon University, Gil Medical Center, Assistant Professor
2019-2021	Department of Cardiology, Gachon University, Gil Medical Center, Clinical Assistant Professor
2022-	Department of Cardiology, Gachon University, Gil Medical Center, Assistant Professor

Fat intake and atherosclerotic cardiovascular diseases

This lecture explores the intricate relationship between dietary fats and atherosclerotic cardiovascular diseases (ASCVD), focusing on the mechanisms by which these fats influence atherosclerotic plaque development. Saturated fats, primarily found in animal products, are linked to increased levels of low-density lipoprotein cholesterol (LDL-C), promoting plaque formation and arterial blockage. In contrast, unsaturated fats, including omega-3 fatty acids from fish oils, are associated with reduced triglyceride levels and potential anti-inflammatory effects, which may stabilize plaques and prevent rupture. We will review key clinical trials and meta-analyses that highlight the impact of dietary fat modifications on lipid profiles and cardiovascular outcomes. Additionally, we will delve into the biological mechanisms, such as lipid oxidation and endothelial function, that underpin these effects. Real-world clinical cases will illustrate practical implications, offering insights into effective dietary strategies for reducing ASCVD risk. This comprehensive review aims to enhance understanding and guide clinical practices in managing dietary fat intake for optimal cardiovascular health.

CURRICULUM VITAE

Yoona Kim

Associate Professor, Gyeongsang National University, Republic of Korea

Education and Training

2017.08	University of South Australia, Australia, Ph.D, Medical Sciences
2003.02	Seoul National University, Korea, MSc, Nutritional Biochemistry
2000.02	Pusan National University, Korea, BSc, Food and Nutrition

Employment and Position

Mar. 2022-Present	Gyeongsang National University, Associate Professor
Mar. 2018-Feb. 2022	Gyeongsang National University, Assistant Professor

Important Publications

1. Kim, Y.; Keogh, J.B.; Deo, P.; Clifton, P.M. Differential Effects of Dietary Patterns on Advanced Glycation End Products: A Randomized Crossover Study. Nutrients. 2020 Jun 12;12(6):1767.
2. Kim, Y.; Keogh, J.B.; Clifton, P.M. Non-nutritive Sweeteners and Glycemic Control. Current atherosclerosis reports 2019 Nov 19;21(12):49.
3. Kim Y, Keogh J, Clifton P. Probiotics, Prebiotics, Symbiotics and Insulin Sensitivity. Nutrition Research Reviews 2018, 31, 35-51.
4. Kim Y, Keogh JB, Clifton PM. Consumption of red and processed meat and refined grains for 4 weeks' decreases insulin sensitivity in insulin-resistant adults: A randomized crossover study. Metabolism. 2017; 68:173-83.
5. Kim Y, Keogh J, Clifton P. A review of potential metabolic etiologies of the observed association between red meat consumption and development of type 2 diabetes mellitus. Metabolism 2015; 64(7):768-79.

Awards and Honors

Jul. 2024	The first prize for original article, The Korean Society of Clinical Nutrition Annual Scientific Meeting
Dec. 2016	The second prize for oral presentation, Nutrition Society of Australia Annual Scientific Meeting
Feb. 2014-Feb. 2017	Australian Postgraduate Award

Research Interest

My research interest is on the prevention and management of cardiometabolic disease using dietary changes to achieve health benefits in obesity, diabetes and CVD. I am also interested in elucidating potential mechanisms to determine the association between diet/nutrition and cardiometabolic disease by conducting research of in vitro, in vivo and humans. In addition, I am currently conducting research on prediction of cardiometabolic disease prevalence and mortality with Korean customized dietary evaluation index, genes and other determinants using big data-based deep learning focusing on national population-based epidemiological studies.

Dietary advanced glycation end products and vascular function

Advanced glycation end products (dAGEs) derived from dietary patterns with a plenty of sugar and/or fat, highly processed foods, and highly heat-treated foods may lead to pathogenesis of cardiovascular disease. This talk aims to show whether dAGEs concentrations in blood or/and tissues influence vascular functions based on human studies. In this talk, characteristics of AGEs and AGEs formation are addressed, and the effects of dietary patterns on carbonyl stress and AGEs concentration in the blood are mentioned. Recent human studies are addressed looking at adverse effects of dietary patterns rich in AGEs on vascular function via increased oxidative stress, inflammation, blood pressure, and endothelial dysfunction in comparison with dietary patterns low in AGEs. This talk addresses two potential mechanisms of how dAGEs in the tissue affect cardiac or vascular dysfunction, stiffness or cardiac fibrosis via a receptor-dependent manner or a receptor-independent manner. This talk presents directions for future research on AGEs and vascular health.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

TSLA-KSoLA Joint Symposium

Remnant Cholesterol in the Statin Era

Sep 28(Sat) 15:40-17:10 | Room 1 (3F)

CHAIRPERSONS : Byung Jin Kim (Sungkyunkwan University, Republic of Korea)
Young Joon Hong (Chonnam National University, Republic of Korea)

15:40-16:00	**How does remnant cholesterol related to cardiometabolic multimorbidity** Jun Hwa Hong (Eulji University, Republic of Korea)
16:00-16:20	**Epidemiologic evidence of hyper TG or remnant cholesterol on CVD** Donna Shu-Han Lin (Shin Kong Wu Ho-Su Memorial Hospital, Taiwan)
16:20-16:40	**Treatments targeting remnant cholesterol or hyperTG in Asians: do we have an option?** Youngwoo Jang (Gachon University, Republic of Korea)
16:40-17:10	**Panel Discussion** Je Sang Kim (Bucheon Sejong Hospital, Republic of Korea) Ye Seul Yang (Seoul National University, Republic of Korea) Hye Jin Yoo (Korea University, Republic of Korea)

CURRICULUM VITAE

Jun Hwa Hong

Associate Professor, Daejeon Eulji Medical Center, Eulji University, Republic of Korea

Education and Training

2024.02	Eulji University, Korea, M.D, Medicine
2015.02	Eulji University, Korea, Ph.D, Internal Medicine

Employment and Position

2013-2014	Chungnam National University Hospital, Daejeon, Korea, Clinical Fellow in Internal Medicine
2014-2016	Kyungpook National University Hospital, Daegu, Korea, Clinical Assistant Professor in Internal Medicine
2016-2022	Eulji University Hospital, Daejeon, Korea, Assistant Professor in Internal Medicine
2022-Present	Eulji University Hospital, Daejeon, Korea, Associate Professor in Internal Medicine

Important Publications

1. Comparison of therapeutic efficacy and safety of sitagliptin, dapagliflozin, or lobeglitazone adjunct therapy in patients with type 2 diabetes mellitus inadequately controlled on sulfonylurea and metformin: third agent study. Diabetes Res Clin Pract. 2023 Aug 11:110872. doi: 10.1016/j.diabres.2023.110872.
2. Comparison of the effects of gemigliptin versus glimepiride on cardiac function in patients with type 2 diabetes uncontrolled with metformin: The gemi-heart study. Diabetes Obes Metab. 2023 Aug;25(8):2181-2190. doi: 10.1111/dom.15095. Epub 2023 May 3.
3. A randomized, active-controlled, parallel, open-label, multicenter, phase 4 study to compare the efficacy and safety of pregabalin sustained release tablet and pregabalin immediate release capsule in type II diabetic patients with peripheral neuropathic pain. Medicine (Baltimore). 2023 Apr 25;102(17):e33701.
4. Effects of Virtual Reality Exercise Program on Blood Glucose, Body Composition, and Exercise Immersion in Patients with Type 2 Diabetes. Int. J. Environ. Res. Public Health 2023, 20(5), 4178.
5. SGLT-2 inhibitors and GLP-1 receptor agonists in metabolic dysfunction-associated fatty liver disease: Trends Endocrinol Metab. 2022 Jun;33(6):424-442. doi: 10.1016/j.tem.2022.03.005. Epub 2022 Apr 28.

How does remnant cholesterol related to cardiometabolic multimorbidity

Cardiometabolic diseases, including type 2 diabetes, ischemic heart disease, and stroke, remain the primary causes of premature death worldwide. The connection between triglyceride-rich lipoproteins and cardiometabolic multimorbidity, characterized by the concurrence of at least two of type 2 diabetes, ischemic heart disease, and stroke, has not been definitively established.

Elevated remnant cholesterol and triglycerides are significantly associated with gradually higher risks of cardiometabolic multimorbidity, particularly the progression of ischemic heart disease to the multimorbidity of ischemic heart disease and type 2 diabetes.

Higher levels of triglyceride-rich lipoproteins have been suggested as a risk factor for multimorbidity. Inefficient lipoprotein lipase (LPL)-mediated lipolysis and hepatic overproduction of very low-density lipoprotein (VLDL) result in accumulation of triglyceride-rich lipoprotein remnants in blood. Importantly, the remnants of triglyceride-rich lipoprotein contain about four-fold higher cholesterol per particle than LDL-C and are small enough to penetrate the endothelial barrier, which was believed to be more atherogenic than LDL-C15,16. Unlike LDL particles, cholesterol in triglyceride-rich lipoprotein remnants could be directly taken up by macrophages, facilitating the formation of foam cells and, subsequently, atherosclerotic plaque. In addition, remnant cholesterol but not LDL-C, was causally linked to low-grade inflammation. Recent studies have reported the causal relevance of triglyceride-rich lipoproteins and their remnants for the risk of cardiovascular disease. However, the importance of triglyceride-rich lipoproteins, namely remnant cholesterol and triglycerides, for progression from first cardiometabolic disease to multimorbidity is not fully understood. It is noteworthy that diet, like fat and cholesterol intake, and lifestyle factors might substantially influence triglyceride-rich lipoprotein metabolism. The complex interplay between lipid species might also confound the observational relationships between triglyceride-rich lipoproteins and cardiometabolic diseases. In this session, I will summarize the causal relation of remnant cholesterol and cardiovascular cardiovascular multimodality.

Effective management of remnant cholesterol and triglycerides as a potential strategy required for mitigating the risks of cardiometabolic multimorbidity.

CURRICULUM VITAE

Donna Shu-Han Lin

Shin Kong Wu Ho-Su Memorial Hospital, Taiwan

Current Position

2023-Present	Attending physician, Division of Cardiology, Department of Internal Medicine, Shin Kong Wu Ho-Su Memorial Hospital
2023-Present	Lecturer designated by the Ministry of Education
2023-Present	Member of the Scientific and Educational Committee of the Taiwan Society of Peripheral Interventions
2023-Present	Member of the Editorial and Research Committee of the Taiwan Society of Peripheral Interventions
2024-Present	Member of the International Affairs Committee of the Taiwan Myocardial Infarction Society
2024-Present	Member of the Young Cardiologist Working Group of the Taiwan Society of Cardiovascular Interventions
2024-Present	Member of the Young Cardiologist Working Group of the Taiwan Society of Cardiology
2024-Present	Member of the Scientific and Educational Committee of the Taiwan Society of Cardiology

Education

2008-2015	M.D., Department of Medicine, College of Medicine, National Yang-Ming University

Working Experience

2023-Present	Attending physician, Division of Cardiology, Department of Internal Medicine, Shin Kong Wu Ho-Su Memorial Hospital
2022-2023	Instructor, Department of Internal Medicine, National Taiwan University College of Medicine
2021-2023	Attending physician, Division of Cardiology, Department of Internal Medicine, National Taiwan University Hospital Hsin-chu branch
2019-2021	Fellow, Division of Cardiology, Department of Internal Medicine, National Taiwan University Hospital
2016-2019	Resident, Department of Internal Medicine, National Taiwan University Hospital
2015-2016	Post-graduate year resident, Taipei Veterans General Hospital

Epidemiologic evidence of hyper TG or remnant cholesterol on CVD

Remnant cholesterol (RC), derived from triglyceride-rich lipoproteins (TRLs), has emerged as a significant contributor to cardiovascular disease (CVD). Unlike low-density lipoprotein cholesterol (LDL-C), RC is often overlooked, yet recent evidence underscores its potent atherogenicity. TRL remnants, particularly very-low-density lipoproteins (VLDL) and intermediate-density lipoproteins (IDL), carry cholesterol that can penetrate the arterial wall, promoting inflammation and plaque formation. Elevated triglycerides (TGs), often associated with metabolic syndrome, insulin resistance, and obesity, correlate with higher RC levels, exacerbating endothelial dysfunction and increasing cardiovascular risk. Studies suggest that remnant cholesterol is an independent risk factor for myocardial infarction, stroke, and other atherosclerotic events, even in individuals with normal LDL-C levels. Targeting remnant cholesterol, especially through lifestyle interventions and novel lipid-lowering therapies, may offer a promising approach to reducing residual cardiovascular risk in patients with dyslipidemia. This underscores the growing need for a broader lipid management strategy that includes not only LDL-C but also remnant cholesterol, especially in populations with hypertriglyceridemia.

CURRICULUM VITAE

Youngwoo Jang

Cardiology, Gachon University Gil Medical Center, Republic of Korea

Education and Training

2008-2012	School of Medicine, Gachon University, Doctor of Medicine
2017-2018	Cardiovascular Institute, Stanford Medicine, Postdoctoral Research Associate
2018-2019	Department of Cardiology, Gachon University, Gil Medical Center, Clinical Fellow

Employment and Position

2022-	Department of Cardiology, Gachon University, Gil Medical Center, Assistant Professor
2019-2021	Department of Cardiology, Gachon University, Gil Medical Center, Clinical Assistant Professor
2022-	Department of Cardiology, Gachon University, Gil Medical Center, Assistant Professor

Treatments targeting remnant cholesterol or hyperTG in Asians: do we have an option?

Remnant cholesterol and hypertriglyceridemia (hyperTG) are significant contributors to cardiovascular risk, especially in Asian populations where genetic predispositions influence lipid metabolism. Recent retrospective cohort studies, including three conducted in East Asian populations, have demonstrated that fenofibrate, when added to statin therapy, can significantly reduce the risk of all-cause death and cardiovascular events. Notably, fenofibrate use for more than a year is particularly effective in lowering cardiovascular risk, including myocardial infarction and ischemic stroke, in individuals with high triglyceride levels. This lecture will explore these findings, highlighting fenofibrate's role in managing remnant cholesterol and hyperTG in Asians. Current evidence underscores the need for tailored treatment strategies to effectively mitigate cardiovascular risk in this population.

SHVM-KSoLA Joint Symposium

Insights into Metabolic and Cardiovascular Dynamics

Sep 28(Sat) 15:40-17:10 | Room 2 (3F)

CHAIRPERSONS : Chi Dae Kim (Pusan National University, Republic of Korea)
Hyoung Kyu Kim (Inje University, Republic of Korea)

15:40-16:00	**Regulation of the sphingosine 1-phosphate receptor 1 in nonalcoholic hepatosteatosis** Tae-Sik Park (Gachon University, Republic of Korea)
16:00-16:20	**Plasma ceramides in the prediction of cardiovascular disease** Linda Peterson (Washington University, USA)
16:20-16:40	**Mechanisms contributing to pregnancy-induced cardiac growth** Helen E. Collins (University of Louisville, USA)
16:40-17:10	**Panel Discussion** Yong Sook Kim (Chonnam National University, Republic of Korea) Sun-Hee Woo (Chungnam National University, Republic of Korea) Yin Hua Zhang (Seoul National University, Republic of Korea)

CURRICULUM VITAE

Tae-Sik Park

Professor, Gachon University, Republic of Korea

Education and Training

1994.02	Korea University, Korea, B.S, Agricultural Chemisty
2001.01	Rutgers University, Korea, Ph.D, Food Science

Employment and Position

2002-2005	Dept. of Cardiovascular Pharmacology, Postdoctoral Scientist
2005-2007	Dept. of Medicine, Columbia University, Associate Research Scientist
2007-	Dept. of Life Sciences, Gachon University, Professor

Important Publications

1. Kim GT, Devi S, Sharma A, Cho KH, Kim SJ, Kim BR, Kwon SH, Park TS. Upregulation of the serine palmitoyltransferase subunit SPTLC2 by endoplasmic reticulum stress inhibits the hepatic insulin response. Exp Mol Med. 2022 May;54(5):573-584.
2. Kim GT, Cho KH, Sharma A, Devi S, Park TS. Annona muricata leaf extract attenuates hepatic lipogenesis and adipogenesis. Food Funct. 2021. 12(10):4621-4629.
3. Kang MH, Yu HY, Kim GT, Lim JE, Jang S, Park TS*, Park JK. Near-infrared-emitting nanoparticles activate collagen synthesis via TGFβ signaling. Sci Rep. 2020. 10(1):13309.
4. Jeon S, Song J, Lee D, Kim GT, Park SH, Shin DY, Shin KO, Park K, Shim SM, Park TS*. Inhibition of sphingosine 1-phosphate lyase activates human keratinocyte differentiation and attenuates psoriasis in mice. J Lipid Res. 2020. 61(1):20-32.
5. Kang MH, Yu HY, Kim GT, Lim JE, Jang S, Park TS*, Park JK. Near-infrared-emitting nanoparticles activate collagen synthesis via TGFβ signaling. Sci Rep. 2020. 10(1):13309.

Awards and Honors

Editorial board member of Journal of Biological Chemistry and Journal of Lipid Research.

Research Interest

Sphingolipid biology, protein expression, metabolism, NASH

Regulation of the sphingosine 1-phosphate receptor 1 in nonalcoholic hepatosteatosis

Sphingosine 1-phosphate (S1P) exerts its biological functions via five different cell surface S1P receptors. Among them, S1P receptor 1 (S1P1) is involved in adipocyte proliferation and differentiation. Since its specific mechanism requires additional understanding, we investigated whether adipocyte-specific S1PR1 deficiency (aS1P1 KO) regulates metabolism in adipocytes and the liver. aS1P1 KO mice fed a high-fat diet (HFD) exhibited a reduction in body weight, fat mass, and adipocyte cell size and a pronounced decrease in HFD-induced hepatosteatosis. Glucose intolerance and insulin resistance were improved by enhanced systemic insulin signaling, leading to hypoglycemia. In addition, hepatic lipid droplets were reduced by aS1P1 deficiency. This is partly due to the upregulation of adiponectin in adipocytes mediated by reduced GSK3 β phosphorylation. We found that adiponectin was elevated in the plasma of aS1P1 KO mice and in cells by pharmacological inhibition of S1P1. Elevated plasma adiponectin levels upregulated the genes involved in fatty acid oxidation in the liver of aS1P1 KO mice and AML12 hepatic cells. Collectively, these findings suggest that S1P1 regulates adiponectin production in adipocytes via GSK3β and hepatosteatosis is alleviated by adiponectin-mediated activation of fatty acid oxidation.

CURRICULUM VITAE

Linda Peterson

Professor of Medicine and Radiology, Cardiovascular Division and Division of Nutritional Sciences and Obesity Medicine, Washington University School of Medicine, St. Louis, Missouri, USA

Education

1982-1986	B.S. Biology, Georgetown University, Washington, D.C.
1986-1990	M.D. Washington University School of Medicine, St. Louis, Missouri
1990-1991	Intern in Medicine, Washington University, Barnes Hospital, St. Louis, Missouri
1991-1993	Resident in Medicine, Washington University, Barnes Hospital, St. Louis, Missouri
1993-1996	Fellow in Cardiology, Washington University, Barnes Hospital, St. Louis, Missouri

Academic Positions

1996-1998	Instructor in Medicine, Cardiovascular Division, Washington University, St. Louis, Missouri
1998-2007	Assistant Professor of Medicine, Cardiovascular Division and Division of Geriatrics and Nutritional Sciences, Washington University, St. Louis, Missouri
2007-2017	Associate Professor of Medicine and Radiology, Cardiovascular Division and Division of Geriatrics and Nutritional Sciences, Washington University, St. Louis, Missouri
2017-Present	Professor of Medicine and Radiology, Cardiovascular Division and Division of Geriatrics and Nutritional Sciences, Washington University, St. Louis, Missouri

University and Hospital Appointments and Committees

1996-Present	Attending Physician, Barnes-Jewish Hospital staff, St. Louis, Missouri
2006-Present	Chief, Cardiovascular Cardiopulmonary Exercise Testing, Washington University School of Medicine, St. Louis, Missouri
2010-Present	Attending physician Cardiac Rehabilitation, BJ Health Care Institute, St. Louis, Missouri
2011-Present	Chief, Cardiac Rehabilitation Section of Cardiovascular Division, Washington University School of Medicine, St. Louis, Missouri
2019-Present	Medical Admissions Alumni Ambassador Program (MAAAP) member, Washington University School of Medicine, St. Louis, Missouri
2019-2020	Department of Biochemistry and Molecular Biophysics Chair search committee member, Washington University School of Medicine
2020-Present	Anti-racism task force; community and research committee, Washington U. School of Medicine, St. Louis, Missouri
2020-Present	Sobel Awards Committee member, WUSM, St. Louis, Missouri
2021-Present	Center for the study of race, ethnicity and equity (CRE2), Faculty affiliate, Washington U. School of Medicine, St. Louis, Missouri
2022	Department of Radiology Chair search committee member, Washington University School of Medicine

Plasma ceramides in the prediction of cardiovascular disease

Ceramides are complex lipids with a sphingoid base and a free fatty acid. They have pleiotropic effects including forming structural components of cell membranes and acting as signaling molecules. Recent evidence shows that the fatty acyl chain length impacts the effects of ceramides. Specific plasma ceramide concentrations have been shown by our group and others to be associated with incident cardiovascular disease, cardiovascular disease (CVD) death and all-cause mortality. Moreover, more recent data has linked plasma ceramide levels to CVD outcomes in patients with heart failure with preserved ejection fraction. Possible mechanisms for the links between ceramides and CVD will be explored.

CURRICULUM VITAE

Helen E. Collins

Assistant Professor, FAHA, Division of Environmental Medicine,
Center for Cardiometabolic Science, University of Louisville, USA

Education and Training

2006.06	University of Leicester, England, BSc (Hons), Biological Sciences
2012.01	University of Leicester, England, PhD, Cardiovascular
2019.09	University of Alabama in Birmingham, USA, Postdoctoral, Myocardial Biology

Employment and Position

2019.10-Present	University of Louisville, Assistant Professor

Important Publications

1. Schulman-Geltzer, EB., Fulghum, KL, Singhal, RA., Hill, BG, Collins, HE*. Cardiac Mitochondrial Function and Substrate Preference During Pregnancy and Postpartum. Am J Physiol Heart Circ Physiol. 2024 Mar 29. Doi:10.1152/ajpheart.00127.2024. Epub ahead of print. PMID: 38551485. *Corresponding author.
2. Schulman-Geltzer, EB, Collins, HE, Hill, BG, Fulghum, KL. Coordinated Metabolic Responses Facilitate Cardiac Growth in Pregnancy and Exercise. Current Heart Failure Reports. 2023 Oct; 20(5):441-450. doi:10.1007/s11897-023-00622-0. Epub 2023 Aug 15. PMID: 37581772; PMCID: PMC10589193.
3. Collins, HE*. Female Cardiovascular Biology and Resilience in the Setting of Physiological and Pathological Stress. Redox Biology. 2023 Jul; 63:102747. doi: 10.1016/j.redox.2023.102747. Epub 2023 May 16. PMID: 37216702; PMCID: PMC10209889. *Corresponding author.
4. Fulghum, K., Smith, JB., McNally, LA., Brittian, KR., Chariker, J, Uchida, S, Jones, SP., Hill, BG., Collins, HE*. Metabolic Signatures of Pregnancy-Induced Cardiac Growth. AJP Heart Circ Physiol 2022 Jul 1;323 (1): H146-H164. doi: 10.1152/ajpheart.00105.2022. Epub 2022 May 27. PMID: 35622533. *Corresponding author.
5. Fulghum, K., Collins, HE., Jones, SP., Hill, BG. Influence of biological sex and exercise on murine cardiac metabolism. J Sport Health Sci. 2022 Jul;11(4):479-494. doi: 10.1016/j.jshs.2022.06.001. Epub 2022 Jun 7. PMID: 35688382.

Mechanisms contributing to pregnancy-induced cardiac growth

Maternal mortality rates are increasing at an alarming rate globally, with some of the highest rates in the US, thus making the US one of the most dangerous places to be pregnant. In fact, cardiovascular diseases are the leading cause of death during late pregnancy and postpartum. However, despite this knowledge, little has been done to examine cardiovascular changes that occur during normal pregnancy, which is vital to provide the initial groundwork for fully understanding the complexities of maternal cardiovascular disease.

During pregnancy, several maternal cardiovascular adaptations occur to facilitate the needs of maternal-fetal circulation, including increases in blood volume, cardiac output, reductions in peripheral resistance, blood pressure changes, and the development of physiological cardiac hypertrophy. This pregnancy-induced cardiac growth is unlike pathological hypertrophy because it is reversible, and the adverse functional decline and fibrosis seen during pathological hypertrophy are not typically observed. However, the mechanisms contributing to the development of pregnancy-induced cardiac growth have been largely understudied.

Changes in metabolism and remodeling of the myocardium have been intimately linked in the setting of pathological hypertrophy; however, the extent to which metabolic changes in the heart contribute to pregnancy-induced cardiac growth is unclear. We and others have shown that pregnancy-induced cardiac growth is associated with reductions in cardiac glucose catabolism associated with pyruvate metabolism. In addition, our recent studies have fully characterized the temporal changes in the maternal heart using an integrated multi-omics approach, which has shed light on not only the specific cellular compartments changing throughout pregnancy but also documented the metabolic changes that occur alongside cardiac growth, its reversal, and the impact of lactation. This talk will discuss these metabolic changes in the maternal heart during pregnancy and postpartum and how they may contribute to pregnancy-induced cardiac growth.

EAS-KSoLA Joint Symposium

Novel Therapeutic Targets in Atherosclerosis

Sep 28(Sat) 15:40-17:10 | Room 4 (5F)

CHAIRPERSONS : Myung-A Kim (Seoul National University, Republic of Korea)
Kyung Woo Park (Seoul National University, Republic of Korea)

15:40-16:00	**Gene editing for dyslipidemia and atherosclerosis** Giuseppe Danilo Norata (University of Milan, Italy)
16:00-16:20	**Intravascular multi-modal imaging-assisted targeted theranostic strategy on atherosclerotic plaque** Jin Won Kim (Korea University, Republic of Korea)
16:20-16:40	**LDL burden: a fresh look to cardiovascular prevention** Alberico L. Catapano (University of Milan and IRCCS Multimedica, Milan, Italy)
16:40-17:10	**Panel Discussion** Hee-Dong Kim (Soonchunhyang University, Republic of Korea) Dong-Hyuk Cho (Korea University, Republic of Korea) Jung-Joon Cha (Korea University, Republic of Korea)

CURRICULUM VITAE

Giuseppe Danilo Norata

Professor, University of Milan, Italy

Education and Training

2003	University of Milan, MA, Pharmaceutical Biotechnology
2002	University of Milan, MA, Pharmacology
2001	University of Siena, PhD, Experimental Medicine Atherosclerosis
1996	University of Milan, MSc, Pharmacy

Employment and Position

From 2018 to date	University of Milan, Milan, Italy, Professor of Pharmacology
From 2016 to 2018	Curtin University, Perth, Western Australia, Adjunct Professor
From 2014 to 2018-	University of Milan, Milan, Italy, Associate Professor of Pharmacology
From 2012 to 2015	School of Medicine & Dentistry Queen Mary University, London, UK, Honorary Senior Lecturer
From 2008 to 2014	University of Milan, Milan, Italy, Assistant Professor
From 2002 to 2008	University of Milan, Milan, Italy, Assistant Researcher

Important Publications

1. ASGR1 deficiency diverts lipids toward adipose tissue but results in liver damage during obesity. Svecla M, Da Dalt L, Moregola A, Nour J, Baragetti A, Uboldi P, Donetti E, Arnaboldi L, Beretta G, Bonacina F, Norata GD. Cardiovasc Diabetol. 2024 Jan 28;23(1):42. doi: 10.1186/s12933-023-02099-6. IF 9,3
2. Genetic deletion of MMP12 ameliorates cardiometabolic disease by improving insulin sensitivity, systemic inflammation, and atherosclerotic features in mice. Amor M, Bianco V, Buerger M, Lechleitner M, Vujić N, Dobrijević A, Akhmetshina A, Pirchheim A, Schwarz B, Pessentheiner AR, Baumgartner F, Rampitsch K, Schauer S, Klobučar I, Degoricija V, Pregartner G, Kummer D, Svecla M, Sommer G, Kolb D, Holzapfel GA, Hoefler G, Frank S, Norata GD, Kratky D. Cardiovasc Diabetol. 2023 Nov 28;22(1):327 IF 9,3
3. Oral strategies to target proprotein convertase subtilisin/kexin type 9 and lipoprotein(a): the new frontier of lipid lowering. Norata GD, Tokgözoğlu L. Eur Heart J. 2023 Nov 8:ehad682. IF 35,855
4. The inhibition of inner mitochondrial fusion in hepatocytes reduces NAFL and improves metabolic profile during obesity by modulating bile acid conjugation. Da Dalt L, Moregola A, Svecla M, Pedretti S, Fantini F, Ronzio M, Uboldi P, Dolfini D, Donetti E, Baragetti A, Mitro N, Scorrano L, Norata GD. Cardiovasc Res. 2023 Oct 31:cvad169. IF 13,081

Gene editing for dyslipidemia and atherosclerosis

Available treatments for the control of dyslipidemia are mainly based on the capability of increasing LDL-R mediated lipoprotein catabolism. This is the case for statins, ezetimibe, bempedoic acid and PCSK9 inhibitors which directly or indirectly increase the efficacy of this pathway. Other strategies which lower LDL-C in an LDL-R independent fashion and therefore are more effective in patients with severe homozygous familial hypercholesterolemia, include the inhibition of MTTP or ANGPTL3. From a pharmaceutical perspective, novel approaches designed to lower plasma cholesterol levels include monoclonal antibodies, antisense oligonucleotides and silencing RNA drugs and allow a less frequent administration with a similar efficacy. The field is now evolving toward testing long-lasting therapeutics including gene editing. This approach permanently alters endogenous gene expression and has the potential to revolutionize disease treatment. Within several gene editing approaches, the CRISPR/Cas9 system has emerged as the key technology because of its elevated efficiency and selectivity. Aim of this presentation is to discuss recent advancement in the field of gene editing in the context of dyslipidemia with a focus on the on-going clincal trials on PCSK9 gene editing in patients at high risk of CVD and heterozygous familial hypercholesterolaemia and the discussion of other targets on the block including ANGPTL3 and apo(a).

CURRICULUM VITAE

Jin Won Kim

Professor. Dr., Cardiology Division, Department of Internal Medicine
(College of Medical School, Cardiovascular Center, Guro Hospital), Republic of Korea

Education and Training

2005.02	KoreaUniversity, Korea, Ph.D, Medical Science
1999.08	Korea University, Korea, Ms, Medical Science
1995.02	Korea University, Korea, M.D.& Bachelor, Medical Science

Employment and Position

2015-Present	Cardiology Division, Department of Internal Medicine, Korea University Medical Center, Guro Hospital, Seoul, Korea, Professor
2009-2015	Cardiology Division, Department of Internal Medicine, Korea University Medical Center, Guro Hospital, Seoul, Korea, Associate Professor
2009-2011	Cardiovascular Research Center, Harvard Medical School, MGH, Boston, MA, USA, Postdoctoral Research Fellow
2006-2009	Cardiology Division, Department of Internal Medicine, Korea University Medical Center, Guro Hospital, Seoul, Assistant Professor
2004-2006	Cardiology Division, Department of Internal Medicine, Korea University Medical Center, Guro Hospital, Seoul, Clinical Assistant Professor
2003-2004	Cardiology Division, Department of Internal Medicine, Korea University Medical Center, Anam Hospital, Seoul, Fellowship /Clinical Instructor
2000-2003	Director, Cardiology, Capital Military Hospital, Military Service
1996-2000	Korea University Medical Center, internal medicine, Residency Training
1995-1996	Korea University Medical Center, Internship Training

Awards and Honors

Jan. 2022	Moorok Namgyeongae Medical Grand Prize
Jun. 2023, 2022	SeokTap Research Award
May 2019, 2017	SeokTap Research Award
Dec. 2017	Commendation by Korea Minister of Health and Welfare
Nov. 2014	Astrazeneca Research Award
Sep, 2012	Yuhan Medical Prize

Intravascular multi-modal imaging-assisted targeted theranostic strategy on atherosclerotic plaque

Atherosclerosis is a leading cause of heart attack and strokes. Characteristic key features of high-risk atherosclerotic plaques are accumulation of macrophages and lipids, which have emerged as a potential target for the atherosclerosis. However, the current therapies can cause off-target damage to healthy vascular cells leading to thrombosis and rupture. Moreover, efficacy of these theranostic strategies has mostly been demonstrated in murine models, which has a limitation for its translational application in coronary arteries. To overcome those hurdles, we recently developed targeted drug delivery platform and photoactivation strategy combined with a customized intravascular structural-molecular imaging. Upon uptake by plaque macrophages, it rapidly resolves plaque inflammation and promotes stabilization via orchestrated therapeutic interaction. These clinically relevant theranostic strategies could offer a new opportunity for the management of high-risk atherosclerotic plaques.

CURRICULUM VITAE

Alberico L. Catapano

Professor, IRCCS Multimedica and UNIMI, Milan, Italy

Education and Training

1975	Faculty of Pharmacy - University of Milan, M.D, Chemistry and pharmaceutical technologies
1979	Faculty of Pharmacy - University of Milan, Ph.D, Clinical Pharmacology in the School of Pharmacology

Employment and Position

1979-1982	University of Milan, Faculty of Pharmacy - Pharmacology Institute, Assistant Professor in the Postgraduate School
1980-1988	University of Milan, Faculty of Pharmacy - Pharmacology Institute, University research
1988-2000	University of Milan Department of pharmacological and Biomolecular Sciences, Associated Professor of Pharmacology
2000-2022	University of Milan Department of pharmacological and Biomolecular Sciences, Professor of Pharmacolgy chiar of pharmacology
2022-To date	IRCCS Multimedica, Head of Cardiovascular Research Line and of the Lipoproteins and Atherosclerosis Laboratory at Multimedica IRCCS
2022-To date	University of Milan, Director of the Center for the Study of Atherosclerosis at Bassini Hospital
2022-To date	Italian Society of Clinical and Sperimental Therapy (S.I.Te.C.S.), President
2022-2023	S.I.S.A Foundation - Via G. Balzaretti, 7 - 20133 Milan, General director
2023-To date	Italian Society for the Study of Atherosclerosis (S.I.S.A.), President
2023-To date	S.I.S.A. Foundation, President

Important Publications

1. Kronenberg F, Mora S, Stroes ESG, Ference BA, Arsenault BJ, Berglund L, Dweck MR, Koschinsky M, Lambert G, Mach F, McNeal CJ, Moriarty PM, Natarajan P, Nordestgaard BG, Parhofer KG, Virani SS, von Eckardstein A, Watts GF, Stock JK, Ray KK, Tokgözoğlu LS, Catapano AL. Lipoprotein(a) in atherosclerotic cardiovascular disease and aortic stenosis: a European Atherosclerosis Society consensus statement. Eur Heart J. 2022 Aug 29:ehac361. doi: 10.1093/eurheartj/ehac361. Epub ahead of print. PMID: 36036785.
2. Olmastroni E, Molari G, De Beni N, Colpani O, Galimberti F, Gazzotti M, Zambon A, Catapano AL, Casula M. Statin use and risk of dementia or Alzheimer's disease: a systematic review and meta-analysis of observational studies. Eur J Prev Cardiol. 2022 May 5;29(5):804-814. doi: 10.1093/eurjpc/zwab208. PMID: 34871380.

LDL burden: a fresh look to cardiovascular prevention

The trapping of LDL and other apolipoprotein B-containing lipoproteins within the artery wall causes atherosclerosis. As more LDL becomes trapped within the artery wall over time, the atherosclerotic plaque burden gradually increases, raising the risk of an acute cardiovascular event. Therefore, the biological efect of LDL on the risk of atherosclerotic cardiovascular disease (ASCVD) depends on both the magnitude and duration of exposure. Maintaining low levels of LDL-cholesterol (LDL-C) over time decreases the number of LDL particles trapped within the artery wall, slows the progression of atherosclerosis and, by delaying the age at which mature atherosclerotic plaques develop, substantially reduces the lifetime risk of ASCVD events. Summing LDL-C measurements over time to calculate cumulative exposure to LDL generates a unique biomarker that captures both the magnitude and duration of exposure, which facilitates the estimation of the absolute risk of having an acute cardiovascular event at any point in time. Titrating LDL-C lowering to keep cumulative exposure to LDL below the threshold at which acute cardiovascular events occur can efectively prevent ASCVD. In this Review, we provide the frst comprehensive overview of how the LDL cumulative exposure hypothesis can guide the prevention of ASCVD. We also discuss the benefts of maintaining lower LDL-C levels over time and how this knowledge can be used to inform clinical practice guidelines as well as to design novel primary prevention trials and ASCVD prevention programmes.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Committee Sessions

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Committee Session 1 (K)

Clinical Research Award Session

Sep 26(Thu) 13:00-14:30 | Room 2 (3F)

CHAIRPERSONS : Sungha Park (Yonsei University, Republic of Korea)
Seung-Hwan Lee (The Catholic University of Korea, Republic of Korea)

13:00-13:20	**Association of triglyceride-to-HDL cholesterol ratio with type 2 diabetes in young adults: a longitudinal study from South Korea** Min-Kyung Lee (Hanyang University, Republic of Korea)
13:20-13:40	**Incidence, predictor, and long-term clinical outcomes of intolerance of high-intensity statin in Korean patients with atherosclerotic cardiovascular disease: data from 2 randomized clinical trials** Sung-Jin Hong (Yonsei University, Republic of Korea)
13:40-14:00	**Optimal lipid levels according to the characteristics of diabetes mellitus** Mee Kyoung Kim (The Catholic University of Korea, Republic of Korea)
14:00-14:30	**Panel Discussion** Eun Young Lee (The Catholic University of Korea, Republic of Korea) Ji-Yong Jang (National Health Insurance Service Ilsan Hospital, Republic of Korea) Jun Hwa Hong (Eulji University, Republic of Korea)

CURRICULUM VITAE

Min-Kyung Lee

Professor, Myongji Hospital, Republic of Korea

Education and Training

2008.02	Catholic Kwandong University, Korea, M.D, Medicine
2022.08	Catholic University, Korea, Ph.D, Internal Medicine

Employment and Position

2013-2015	Kangbuk Samsung Hospital, Fellowship
2015-	Myongji Hospital, Professor

Important Publications

1. Lee MK, Han K, Kim B, Kim JD, Jung Kim M, Kim B, et al. Cumulative exposure to hypertriglyceridemia and risk of type 2 diabetes in young adults. Diabetes Res Clin Pract. 2024;208:111109.
2. Lee MK, Lee SY, Sohn SY, Ahn J, Han K, Lee JH. Type 2 Diabetes and Its Association With Psychiatric Disorders in Young Adults in South Korea. JAMA Netw Open. 2023 Jun 1;6(6):e2319132.
3. Lee MK, Lee JH, Sohn SY, Ahn J, Hong OK, Kim MK, Baek KH, Song KH, Han K, Kwon HS. Cumulative exposure to metabolic syndrome in a national population-based cohort of young adults and sex-specific risk for type 2 diabetes. Diabetol Metab Syndr. 2023 Apr 24;15(1):78.
4. Lee MK, Kim B, Han K, Lee JH, Kim M, Kim MK, et al. Sodium-Glucose Cotransporter 2 Inhibitors and Risk of Retinal Vein Occlusion Among Patients With Type 2 Diabetes: A Propensity Score-Matched Cohort Study. Diabetes care. 2021.
5. Lee MK, Lee DY, Ahn HY, Park CY. A Novel User Utility Score for Diabetes Management Using Tailored Mobile Coaching: Secondary Analysis of a Randomized Controlled Trial. JMIR mHealth and uHealth. 2021;9(2):e17573.

Awards and Honors

The 1st Young Excellent Abstract Award of Japan Atherosclerosis Society 2023

Research Interest

Cardiometabolic disease and their complications

Association of triglyceride-to-HDL cholesterol ratio with type 2 diabetes in young adults: a longitudinal study from South Korea

Objective: As the prevalence of type 2 diabetes in young adults is increasing, predicting and preventing it has become a significant challenge. We aimed to evaluate whether triglyceride-to-HDL cholesterol (TG/HDL-C) ratio, which is a marker for insulin resistance, is associated with type 2 diabetes in young adults.

Methods: This study used data from South Korea National Health Insurance Service between 2009 and 2012. A total of 1,840,251 young adults without type 2 diabetes aged 20-39 years who had undergone four consecutive annual health checkups were included. Participants were classified into five groups based on the exposure score of high TG/HDL-C ratio over a four-year period. A TG/HDL-C ratio of ≥2.8 in male and ≥1.7 in female was defined as high ratio. The risk for developing type 2 diabetes according to different exposure scores was evaluated using multivariable Cox proportional hazards regression model.

Results: During a follow-up period of 6.53 years, 40,286 (2.2%) participants developed type 2 diabetes. The cumulative incidence of type 2 diabetes significantly increased with higher TG/HDL-C ratio exposure scores (log-rank test, $p<0.001$). The adjusted hazard ratios of exposure score of TG/HDL-C ratio for type 2 diabetes were 1.584 (95% CI, 1.488, 1.686), 2.101 (95% CI, 1.980, 2.228), 2.942 (95% CI, 2.787, 3.106), and 4.962 (95% CI, 4.718, 5.219) for groups with score 1-4, respectively, compared with those with a score of 0. Further subgroup analyses stratified by age, sex, and statin use revealed no significant differences in diabetes risk.

Conclusion: Cumulative exposure to high TG/HDL-C ratio was an independent risk factor for type 2 diabetes in young adults.

Keywords: Triglyceride-to-HDL cholesterol ratio, Risk factor, Type 2 diabetes, Young adults

CURRICULUM VITAE

Sung-Jin Hong

Associate Professor, Severance Hospital, Yonsei University, Republic of Korea

Education

2004	Yonsei University College of Medicine: M.D.
2012	Yonsei University College of Medicine; major in Internal Medicine: M.S.
2020	Yonsei University College of Medicine; major in Internal Medicine: Ph.D.

Training and Employment

2009	Residency in internal Medicine, Yonsei University Severance Hospital
2011	Mokpo National Hospital; military service as a public health doctor
2012	Korea Centers for Disease Control and Prevention; military service as a public health doctor
2015	Fellowship, Division of Cardiology, Yonsei University Severance Hospital
2017	Assistant professor, Inje University, Sanggye Paik Hospital
2021	Clinical assistant professor, Yonsei University Severance Hospital
2022	Clinical associate professor, Yonsei University Severance Hospital
Present	Associate professor, Yonsei University Severance Hospital

Important Publications

1. Hong SJ, Lee YJ, Lee SJ, Hong BK, Kang WC, Lee JY, Lee JB, Yang TH, Yoon J, Ahn CM, Kim JS, Kim BK, Ko YG, Choi D, Jang Y, Hong MK; LODESTAR Investigators. Treat-to-Target or High-Intensity Statin in Patients With Coronary Artery Disease: A Randomized Clinical Trial. JAMA. 2023;329:1078-1087.
2. Kim BK, Hong SJ, Lee YJ, Hong SJ, Yun KH, Hong BK, Heo JH, Rha SW, Cho YH, Lee SJ, Ahn CM, Kim JS, Ko YG, Choi D, Jang Y, Hong MK; RACING investigators. Long-term efficacy and safety of moderate-intensity statin with ezetimibe combination therapy versus high-intensity statin monotherapy in patients with atherosclerotic cardiovascular disease (RACING): a randomised, open-label, non-inferiority trial. Lancet. 2022;400:380-390.
3. Kim BK, Hong SJ, Cho YH, Yun KH, Kim YH, Suh Y, Cho JY, Her AY, Cho S, Jeon DW, Yoo SY, Cho DK, Hong BK, Kwon H, Ahn CM, Shin DH, Nam CM, Kim JS, Ko YG, Choi D, Hong MK, Jang Y; TICO Investigators. Effect of Ticagrelor Monotherapy vs Ticagrelor With Aspirin on Major Bleeding and Cardiovascular Events in Patients With Acute Coronary Syndrome: The TICO Randomized Clinical Trial. JAMA. 2020;323:2407-2416.

Incidence, predictor, and long-term clinical outcomes of intolerance of high-intensity statin in Korean patients with atherosclerotic cardiovascular disease: data from 2 randomized clinical trials

High-intensity statin therapy is recommended especially for patients in high-risk of atherosclerotic cardiovascular disease to prevent future adverse cardiovascular events. However, there has been several concerns regarding statin therapy with high-intensity, especially high-intensity statin intolerance. In this study, using data from two randomized clinical trials, in which (1) treat-to-target strategy with titrated intensity of statin therapy (target goal of LDL-cholesterol less than 70 mg/dL) was compared with high-intensity statin therapy in the LODESTAR trial, and (2) moderate-intensity plus ezetimibe combination therapy was compared with high-intensity statin therapy in the RACING trial, the control groups of high-intensity statin therapy were chosen. In these patients who were randomized to receive high-intensity statin therapy, the incidence, predictor and long-term clinical outcomes of intolerance of high-intensity statin were evaluated.

CURRICULUM VITAE

Mee Kyoung Kim

Professor, The Catholic University of Korea, Republic of Korea

Education and Training

2001.02	The Catholic University of Korea, Korea, M.D, Medicine
2012.08	The Catholic University of Korea, Korea, Ph.D, Internal Medicine

Employment and Position

2009-2016	Division of Endocrinology and Metabolism, Department of Internal Medicine, Yeouido St. Mary's Hospital, The Catholic University of Korea, Assistant Professor
2017-2019	Division of Endocrinology and Metabolism, Department of Internal Medicine, Yeouido St. Mary's Hospital, The Catholic University of Korea, Associate Professor
2020-	Division of Endocrinology and Metabolism, Department of Internal Medicine, Yeouido St. Mary's Hospital, The Catholic University of Korea, Professor

Important Publications

1. Kim MK, Lee KN, Han K, Lee SH. Diabetes duration, cholesterol levels, and risk of cardiovascular diseases in individuals with type 2 diabetes. J Clin Endocrinol Metab. 2024 Feb 15:dgae092.
2. Kim MK, Han K, Kim HS, Yoon KH, Lee SH. Lipid cutoffs for increased cardiovascular disease risk in nondiabetic young people. Eur J Prev Cardiol. 2022 Oct 20;29(14):1866-1877.
3. Han K, Kim B, Lee SH, Kim MK. A nationwide cohort study on diabetes severity and risk of Parkinson disease. NPJ Parkinsons Dis. 2023 Jan 27;9(1):11.

Research Interest

Obesity, type 2 diabetes mellitus

Optimal lipid levels according to the characteristics of diabetes mellitus

Diabetes mellitus (DM) is only included in the cardiovascular disease (CVD) risk prediction model as a dichotomous factor, such as having diabetes or not, or is only considered based on the presence or absence of target organ damage in DM. However, not every person with DM experiences the same risk of CVD. In recent decades, the age of DM onset has decreased and there is increasing incidence of type 2 DM in young people. Suboptimal medical attention has been given to young-onset type 2 DM patients, despite their long disease duration, because of the absence of clinical guidelines targeted at this age group, and a failure to consider the diabetes duration in these patients, possibly due to a misconception of their low risk. We used data from the Korea National Health Information Database (NHID) to investigate the association of diabetes duration with CVD risk and to examine the relationship between lipid levels and CVD risk over the duration and/or course of diabetes. Next, we investigated the association of kidney function with CVD risk and examine the relationship between lipid levels and CVD risk relative to kidney function. In Korea, among patients with diabetes without prior CVD, the incidence of myocardial infarction (MI) and ischemic stroke (IS) is higher when accompanied by chronic kidney disease (CKD). In particular, the incidence rate of CVD is higher in patients with CKD (18.3/1000 person-years) than in patients with prior CVD (14.1/1000 person-years). However, in patients with CKD, the magnitude of the excess risk of CVD associated with elevated low-density lipoprotein cholesterol (LDL-C) levels decreases as the estimated glomerular filtration rate (eGFR) decreases. Few studies have focused exclusively on patients with type 2 DM and CKD.

Committee Session 2 (K)

Basic Research Committee Workshop

Sep 26(Thu) 13:00–14:30 | Room 3 (3F)

CHAIRPERSONS : Minho Shong (KAIST, Republic of Korea)
Jun Namkung (Yonsei University, Republic of Korea)

13:00–13:20	**Regulatory mechanism by SREBP–1c in metabolic dysfunction–associated steatohepatitis** Seung–Soon Im (Keimyung University, Republic of Korea)
13:20–13:40	**Long–term metabolic programming by perinatal hypothalamic–pituitary hormones** Jun Young Hong (Yonsei University, Republic of Korea)
13:40–14:00	**The novel roles of intracellular Ca2+ and Phosphoinositide coupling for metabolic signaling and diseases** Byung–Chul Oh (Gachon University, Republic of Korea)
14:00–14:30	**Panel Discussion** KyeongJin Kim (Inha University, Republic of Korea) Hong–Yeoul Ryu (Kyungpook National University, Republic of Korea) Kae Won Cho (Soonchunhyang University, Republic of Korea)

CURRICULUM VITAE

Seung-Soon Im

Professor, Keimyung University School of Medicine, Republic of Korea

Education and Training

2006.02	Yonsei University, Korea, Ph.D, Biochemistry
2007.02	Yonsei University, Korea, Ph.D, Research Fellow

Employment and Position

2007-2009	UC Irvine, USA, Postdoc
2009-2012	Sanford Burnham Presby Medical Research Institute, Staff Scientist
2012-Current	Keimyung University School of Medicine, Professor

Important Publications

1. Lee EH, Lee JH, Kim DY, Lee YS, Jo Y, Dao T, Kim KE, Song DK, Seo JH, Seo YK, Seong JK, Moon C, Han E, Kim M, Ryu S, Shin M, Roh G, Jung H, Osborne TF, Ryu D, Jeon TI, Im SS*. Loss of SREBP-1c ameliorates iron-induced liver fibrosis by decreasing lipocalin-2. Exp Mol Med. 2024 Apr;56(4):1001-1012. doi: 10.1038/s12276-024-01213-2.
2. Lee JH, Lee SH, Lee EH, Cho JY, Song DK, Lee YJ, Kwon TK, Oh BC, Cho KW, Osborne TF, Jeon TI, Im SS*. SCAP deficiency facilitates obesity and insulin resistance through shifting adipose tissue macrophage polarization. J Adv Res. J Adv Res. 2023 Mar;45:1-13. doi: 10.1016/j.jare.2022.05.013.
3. Nguyen TT, Kim DY, Lee YG, Lee YS, Truong XT, Lee JH, Song DK, Kwon TK, Park SH, Jung CH, Moon C, Osborne TF, Im SS*, Jeon TI*. SREBP-1c impairs ULK1 sulfhydration-mediated autophagic flux to promote hepatic steatosis in high fat diet fed mice. Mol Cell. 2021; Sep 16;81(18):3820-3832.e7.
4. Lee JH, Go Y, Kim DY, Lee SH, Kim OH, Jeon YH, Kwon TK, Bae JH, Song DK, Rhyu IJ, Lee IK, Shong M, Oh BC, Petucci C, Park JW, Osborne TF*, Im SS*. Isocitrate dehydrogenase 2 protects mice from high-fat diet-induced metabolic stress by limiting oxidative damage to the mitochondria from brown adipose tissue. Exp Mol Med. 2020 Feb;52(2):238-252. doi: 10.1038/s12276-020-0379-z.
5. Lee JH, Phelan P, Shin M, Oh BC, Han X, Im SS*, Osborne TF*. SREBP-1a-stimulated lipid synthesis is required for macrophage phagocytosis downstream of TLR4-directed mTORC1. Proc Natl Acad Sci U S A. 2018 Dec 26;115(52):E12228-E12234.

Regulatory mechanism by SREBP-1c in metabolic dysfunction-associated steatohepatitis

Sterol regulatory element-binding protein (SREBP)-1c is involved in cellular lipid homeostasis and cholesterol biosynthesis and is highly increased in metabolic dysfunction-associated steatohepatitis (MASH). However, the molecular mechanism and function by which SREBP-1c regulates hepatic stellate cells (HSCs) activation in MASH animal models and patients have not been fully elucidated. In this study, we explored the role of SREBP-1c on MASH and LCN2 gene expression regulation. Wild-type and SREBP-1c knockout (KO) mice fed with a high-fat/high-sucrose diet, carbon tetrachloride (CCl_4)-treated, and with lipocalin-2 (LCN2) overexpression. The role of LCN2 in MASH progression was assessed using mouse primary hepatocytes, Kupffer cell, and HSCs. *LCN2* expression was examined in samples from normal patients and those with MASH. *Lcn2* gene expression and secretion increased in CCl_4-induced liver fibrosis mice models, and SREBP-1c regulated *Lcn2* gene transcription. Moreover, treatment with holo-LCN2 stimulated intracellular iron accumulation and fibrosis gene expression in mouse primary HSCs, but this effect was not observed in SREBP-1c KO HSCs, indicating that SREBP-1c-induced *Lcn2* expression and secretion stimulate HSCs activation through iron accumulation. Further, *Lcn2* expression was strongly correlated with inflammation and fibrosis in patients with MASH. Our findings indicate that SREBP-1c regulates *Lcn2* gene expression, contributing to diet-induced MASH. Reduced *Lcn2* expression in SREBP-1c KO mice protects against MASH development. Therefore, the activation of *Lcn2* by SREBP-1c establishes new connection between iron and lipid metabolism, affecting inflammation and HSC activation. These findings may lead to new therapeutic strategies for MASH.

Keywords: Sterol regulatory element-binding protein-1c, Lipocalin-2, Liver fibrosis; Hepatic stellate cells; Metabolic dysfunction-associated steatohepatitis

CURRICULUM VITAE

Jun Young Hong

Assistant Professor, Yonsei University, Republic of Korea

Education and Training

2007.02	Seoul National University, Korea, B.S., Ocenaography
2009.02	Seoul National University, Korea, M.S., Ocenaography
2015.02	University of Michigan, Ann Arbor, Ph.D., Physiology

Employment and Position

2015-2021	Yale University, Postdoctoral Fellow
2021-	Yonsei University, Assistant Professor

Important Publications

1. Hong JY* and Medzhitov R*. On Developmental Programming of the Immune System. Trends Immunol 44(11):877-889 (2023). (*co-correspondence)
2. Lim J†, Lin EV†, Hong JY†*, Vaidyanathan B, Erickson SA, Annicelli C, Medzhitov R* Induction of natural IgE by glucocorticoids. J Exp Med 219:e20220903 (2022). (†co-first authors, *co-correspondence)
3. Hong JY. Developmental programming by perinatal glucocorticoids. Mol Cells. 45:685-691 (2022).
4. Im S, Kim H, Jeong M, Yang H, Hong JY. Integrative understanding of immune-metabolic interaction BMB Rep 55:259-266 (2022).
5. Hong JY, Lim J, Carvalho F, Cho JY, Vaidyanathan B, Yu S, Annicelli C, IP EWK, Medzhitov R, Long-term programming of CD8 T cell immunity by perinatal exposure to glucocorticoids. Cell 180: 847-861.e15 (2020). [Previewed in the issue, Highlighted in Science, Previewed in Immunity].

Awards and Honors

2024	Young Medical Scientist Research Grant through the Daewoong Foundation
2020	KOLIS Award, Korean American Bioscience Forum 2020
2020	KASBP-Daewoong Fellowship Award, KASBP Fall Symposium

Research Interest

Endocrine, Immunometabolism, Epigenetics

Long-term metabolic programming by perinatal hypothalamic-pituitary hormones

Early life environmental exposure, particularly during perinatal period, can have a life-long impact on organismal development and physiology. The biological rationale for this phenomenon is to promote physiological adaptations to the anticipated environment based on early life experience. Particularly, in the process of developmental plasticity reported in various organisms, specific environments in early life can lead to the development of life-long phenotype for the adaptation to the exposed environment. However, it is still largely unknown whether similar developmental programming exists in mammals, in spite of accumulated epidemiological evidence. Based on the role of developmental endocrine signals in developmental programming in lower organisms, we intended to test their role in mouse models. We focused on the hormones in the hypothalamic-pituitary axis, which is the central integrator regulating growth, reproduction, and metabolism. We found that perinatal glucocorticoid (GC) exposure leads to the persistent reduction of corticosterone levels with the alteration of HPA axis set point at the hippocampus. Mice with perinatal GC exposure did not show any change in glucose tolerance. However, β-hydroxybutyrate level was increased under fasting in mice with perinatal GC exposure. We found ketogenic transcriptional program was enhanced in the livers of the mice with perinatal GC exposure.

We also tested the role of perinatal thyroid hormone on long-term metabolic programming. Adult mice with perinatal thyroid hormone deficiency showed reduced core body temperature and decreased thermogenic activity in brown adipose tissue. Mice with perinatal thyroid hormone deficiency become more obese under a high-fat diet challenge. We found altered immune-metabolic pathways in the brown adipose tissues. These findings showed that perinatal hypothalamic-pituitary hormones play a critical role in the long-term establishment of metabolic phenotypes.

CURRICULUM VITAE

Byung-Chul Oh

Professor, Lee Gil Ya Cancer and Diabetes Institute,
Gachon University College of Medicine, Republic of Korea

Education and Training

2001.08	Seoul National University, Korea, PhD, Biochemistry

Employment and Position

2002-2006	Joslin Diabetes Center, Harvard Medical School, Post-doc
2006-2008	Chungbuk National University, Research Professor
2007-2011	Gachon University of Medicine and Science, Assistant Professor
2011-2017	Gachon University, Associate Professor
2017-Present	Gachon University, Professor
2020-Present	Lee Gil Ya Cancer and Diabetes Institute, Gachon University, Vice President

Important Publications

1. S.-R. Park, et.al., B.-C. Oh, I.-S. Hong, (2024) Exploring Memory Function Beyond Immune Cells: ANGPTL4-Mediated Memory Functions in Tissue Resident Stem Cells. Adv. Sci., 2307545.
2. Na, K., Oh, B.C., and Jung, Y. (2023). Multifaceted role of CD14 in innate immunity and tissue homeostasis. Cytokine Growth Factor Rev. 74, 100-107.
3. Oh, B.-C. (2023). Phosphoinositides and intracellular calcium signaling: novel insights into phosphoinositides and calcium coupling as negative regulators of cellular signaling. Experimental & Molecular Medicine. 10.1038/s12276-023-01067-0.
4. Lee, J.W., et.al., Kim, O.-H., and Oh, B.-C. (2023). Candesartan, an angiotensin-II receptor blocker, ameliorates insulin resistance and hepatosteatosis by reducing intracellular calcium overload and lipid accumulation. Experimental & Molecular Medicine 55, 910-925. 10.1038/s12276-023-00982-6.
5. Kim OH, et al. and Oh, B.-C. (2022) Externalized phosphatidylinositides on apoptotic cells are eat-me signals recognized by CD14. Cell Death Differ 29(7):1423-1432.

The novel roles of intracellular Ca^{2+} and Phosphoinositide coupling for metabolic signaling and diseases

Intracellular calcium (Ca^{2+}) and phosphoinositides (PIPs) play pivotal roles in regulating cellular activities such as metabolism and cell survival. Cells maintain precise intracellular Ca^{2+} and PIP levels through a sophisticated system involving Ca^{2+} channels, transporters, Ca^{2+} ATPases, and signaling effectors, including specific lipid kinases, phosphatases, and phospholipases. Recent studies have highlighted the intricate interplay between Ca^{2+} and PIP signaling, indicating that elevated intracellular Ca^{2+} levels can negatively regulate PIP signaling by inhibiting the membrane localization of PIP-binding proteins containing domains like the pleckstrin homology (PH) and Ca^{2+}-independent C2 domains. This dysregulation is often linked to cancer and metabolic diseases. PIPs recruit various proteins with PH domains to the plasma membrane in response to growth hormones, thereby activating signaling pathways that regulate metabolism, cell survival, and growth. However, abnormal PIP signaling in cancer cells leads to persistent membrane localization and activation of PIP-binding proteins. In obesity, elevated intracellular Ca^{2+} levels hinder the membrane localization of PIP-binding proteins such as AKT, IRS1, and PLCδ through Ca^{2+}-PIP interactions, contributing to insulin resistance and other metabolic disorders. Additionally, excessive intracellular Ca^{2+} levels can cause functional impairments in subcellular organelles, including the endoplasmic reticulum (ER), lysosomes, and mitochondria, further contributing to metabolic diseases. I will discuss how intracellular Ca^{2+} overload negatively impacts the membrane localization of PIP-binding proteins, providing insights into the mechanisms underlying the associated pathologies.

Committee Session 3 (K)

Publication Committee Session: 2024 JLA Best Paper Award

Sep 26(Thu) 13:00-14:30 | Park Studio (5F)

CHAIRPERSONS : Won-Young Lee (Sungkyunkwan University, Republic of Korea)
Hyun Kang (Chung-Ang University, Republic of Korea)

13:00-13:15	**Autophagy enhancers regulate cholesterol-induced cytokine secretion and cytotoxicity in macrophages** So Yeong Cheon (Konkuk University, Republic of Korea)
13:15-13:30	**Lipid-lowering efficacy of combination therapy with moderate-intensity Statin and Ezetimibe versus high-intensity Statin monotherapy: A randomized, open-label, non-inferiority trial from Korea** Hyejung Choi (Hallym University, Republic of Korea)
13:30-13:45	**Higher non-high-density lipoprotein cholesterol was higher associated with cardiovascular disease comparing higher LDL-C in nine years follow up: cohort study** Sangmo Hong (Hanyang University, Republic of Korea)
13:45-14:00	**Clinical characteristics of patients with statin discontinuation in Korea: A nationwide population-based study** Kyung-Soo Kim (CHA University, Republic of Korea)
14:00-14:15	**Metformin reduces the progression of atherogenesis by regulating the Sestrin2-mTOR pathway in obese and diabetic rats** Nagaraj Manickam (Madras Diabetes Research Foundation (MDRF), India)
14:15-14:25	**Discussion**
14:25-14:30	**JLA Award Ceremony**

CURRICULUM VITAE

So Yeong Cheon

Assistant Professor, Department of Biotechnology,
Konkuk University (Glocal Campus), Republic of Korea

Education and Training

2014.08	Yonsei University, Korea, Ph.D., Neuroscience

Employment and Position

2014-2018	Yonsei University, Postdoc, Research Assistant Professor
2018-2019	The University of Cambridge, Postdoc (Visiting researcher)
2020-	Konkuk University, Glocal campus, Assistant Professor

Important Publications

1. Hyperammonemia induces microglial NLRP3 inflammasome activation via mitochondrial oxidative stress in hepatic encephalopathy. Biomed J. 2023 Oct;46(5):100593.
2. Autophagy Enhancers Regulate Cholesterol-Induced Cytokine Secretion and Cytotoxicity in Macrophages. J Lipid Atheroscler. 2023 May;12(2):189-200.
3. Long Noncoding RNAs Regulate Hyperammonemia-Induced Neuronal Damage in Hepatic Encephalopathy. Oxid Med Cell Longev. 2022 Feb 21:2022:7628522.
4. Scopolamine promotes neuroinflammation and delirium-like neuropsychiatric disorder in mice. Sci Rep. 2021 Apr 16;11(1):8376.
5. Intranuclear delivery of synthetic nuclear factor-kappa B p65 reduces inflammasomes after surgery. Biochem Pharmacol. 2018 Dec;158:141-152.

Research Interest

Metabolic disturbance, Intracellular degradative system, Cognitive function, Neuroinflammation, Neurological/ Neurodegenerative diseases, Metabolic diseases. Metabolic encephalopathy

Autophagy enhancers regulate cholesterol-induced cytokine secretion and cytotoxicity in macrophages

Hypercholesterolaemia transforms macrophages into lipid-laden foam cells in circulation, which can activate the immune response and lead to metabolic diseases. Foamy macrophages are responsible for release of pro-inflammatory cytokines and show toxic effects. Intact autophagy plays an important role in regulation of lipid droplets and cytokine secretion. However, compromised autophagy and inflammatory cytokines are involved in the pathogenesis and progression of metabolic diseases. The aim of this study was to identify the role of autophagy as a modulator of the inflammatory response and cytotoxicity in macrophages under hypercholesterolaemic conditions.

High cholesterol-induced cytokine secretion and alteration of autophagy-associated molecules were confirmed by cytokine array and western blot analysis, respectively. To confirm whether autophagic regulation affects high cholesterol-induced cytokine release and cytotoxicity, protein levels of autophagic molecules, cell viability, and cytotoxicity were measured in cultured macrophages treated autophagy enhancers.

Cholesterol treatment increased cytokine secretion, cellular toxicity, and lactate dehydrogenase release in lipopolysaccharide (LPS)-primed macrophages. Concomitantly, altered levels of autophagy-related molecules were detected in LPS-primed macrophages under hypercholesterolaemic conditions. Treatment with autophagy enhancers reversed the secretion of cytokines, abnormally expressed autophagy-associated molecules, and cytotoxicity of LPS-primed macrophages.

Conclusively, Autophagy enhancers inhibit inflammatory cytokine secretion and reduce cytotoxicity under metabolic disturbances, such as hypercholesterolaemia. Modulation of autophagy may be a novel approach to control the inflammatory response observed in metabolic diseases.

CURRICULUM VITAE

Hyejung Choi

Professor, Kangdong Sacred Heart Hospital, Republic of Korea

Education and Training

2012.02	Geoyngsang University, Korea, M.D, Medicine
2017.02	Geoyngsang University, Korea, M.D, Internal Medicine
2023.02	Seoul National University Bundang Hospital, M.D, Cardiology

Employment and Position

2023-2024	Seoul National University Bundang Hospital, Professor
2024.3-	Kangdong Sacred Heart Hospital, Professor

Important Publications

1. Lipid-Lowering Efficacy of Combination Therapy With Moderate-Intensity Statin and Ezetimibe Versus High-Intensity Statin Monotherapy: A Randomized, Open-Label, Non-Inferiority Trial From Korea. J Lipid Atheroscler. 2023 Sep; 12(3): 277-289.

Research Interest

Strain Analysis in Echocardiography
Integration of echocardiography and artificial intelligence in cardiac imaging

Lipid-lowering efficacy of combination therapy with moderate-intensity Statin and Ezetimibe versus high-intensity Statin monotherapy: A randomized, open-label, non-inferiority trial from Korea

This study compared the efficacy and safety of high-intensity statin monotherapy versus moderate-intensity statin plus ezetimibe in ASCVD patients. The combination therapy was more effective in lowering LDL-C levels without increasing adverse effects, suggesting a better treatment option.

Objective: This phase IV, multicenter, randomized controlled, open-label, and parallel clinical trial aimed to compare the efficacy and safety of ezetimibe and moderate intensity rosuvastatin combination therapy to that of high intensity rosuvastatin monotherapy in patients with atherosclerotic cardiovascular disease (ASCVD).

Methods: This study enrolled patients with ASCVD and after a four-week screening period, patients were randomly assigned to receive either rosuvastatin and ezetimibe (RE 10/10 group) or high-intensity rosuvastatin (R20 group) only in a 1:1 ratio. The primary outcome was the difference in the percent change in the mean low-density lipoprotein cholesterol (LDL-C) level from baseline to 12 weeks between two groups after treatment.

Results: The study found that after 12 and 24 weeks of treatment, the RE10/10 group had a greater reduction in LDL-C level compared to the R20 group (-22.9±2.6% vs. -15.6±2.5% [p=0.041] and -24.2±2.5% vs. -12.9±2.4% [p=0.001] at 12 and 24 weeks, respectively). Moreover, a greater number of patients achieved the target LDL-C level of ≤70 mg/dL after the treatment period in the combination group (74.6% vs. 59.9% [p=0.012] and 76.2% vs. 50.8% [p<0.001] at 12 and 24 weeks, respectively). Importantly, there were no significant differences in the occurrence of overall adverse events and adverse drug reactions between two groups.

Conclusion: Moderate-intensity rosuvastatin and ezetimibe combination therapy had better efficacy in lowering LDL-C levels without increasing adverse effects in patients with ASCVD than high-intensity rosuvastatin monotherapy.

CURRICULUM VITAE

Sangmo Hong

Professor, Hanyang University, Republic of Korea

Education and Training

2001.02	Hanyang University, Korea, M.D, Medicine
2011.08	Hanyang University, Korea, Ph.D., Internal Medicine

Employment and Position

Mar. 2002-Feb. 2006	Resident, Department of Internal medicine, Hanyang Univ. Hospital
May 2009-Feb. 2011	Fellowship, Department of Endocrinology and metabolism, Hanyang Univ. Hospital, Seoul, Korea
May 2011-Aug. 2016	Clinical assistant professor Department of Endocrinology and metabolism, Hanyang Univ. Guri Hospital
Sep. 2016-Feb. 2020	Associated professor Division of Endocrinology, Department of Internal Medicine Hallym University Dongtan Sacred Heart Hospital
Mar. 2020-Feb. 2023	Associated professor Division of Endocrinology, Department of Internal Medicine, Hanyang Univ. Guri Hospital
Mar. 2023-Now	Professor Division of Endocrinology, Department of Internal Medicine, Hanyang Univ. Guri Hospital

Important Publications

1. Park, K. Y., Park, J. H., Han, K., Yu, S. H., Lee, C. B., Kim, D. S., ... & Hong, S. (2023, October). Fatty Liver Change in Older Adults as an Important Risk Factor for Type 2 Diabetes: A Nationwide Cohort Study. In Mayo Clinic Proceedings. Elsevier.
2. Hong, S., Kim, K. S., Han, K., & Park, C. Y. (2023). A cohort study found a high risk of end-stage kidney disease associated with acromegaly. Kidney International, 104(4), 820-827.
3. Hong, S., Han, K., Kim, K. S., & Park, C. Y. (2022). Risk of Neurodegenerative Diseases in Patients With Acromegaly: A Cohort Study. Neurology, 99(17), e1875-e1885.

Higher non-high-density lipoprotein cholesterol was higher associated with cardiovascular disease comparing higher LDL-C in nine years follow up: cohort study

Objective: Non-high-density lipoprotein cholesterol (non-HDL-C) may be equivalent to or superior to low-density lipoprotein cholesterol (LDL-C) for the prediction of cardiovascular disease (CVD). However, studies comparing the predictive values of LDL-C and non-HDL-C levels for CVD have yielded conflicting results. In this study, we evaluated the relationship between non-HDL-C, LDL-C, and CVD using a large-scale population dataset from the National Health Information Database (NHID).

Methods: We performed a retrospective observational cohort study of 3,866,366 individuals ≥20 years, from 2009 to 2018, using the NHID. The participants were divided into LDL-C and non-HDL-C quartiles. The outcome variables included stroke, myocardial infarction (MI), and both. All outcomes were analyzed using Cox proportional hazards regression analysis while controlling for baseline covariates (age, sex, smoking, drinking, regular exercise, body mass index, diabetes, hypertension, and statin use).

Results: During 9.1 years of mean follow-up, stroke was diagnosed in 60,081 (1.55%), MI in 31,234 (0.81%), and both stroke and MI in 88,513 (2.29%) participants. Multivariate-adjusted hazard ratios (HRs) for patients in the highest non-HDL-C quartile demonstrated that these patients had a higher risk of stroke (HR, 1.254; 95% confidence interval [CI], 1.224-1.285), MI (HR, 1.918; 95% CI, 1.853-1.986), and both (HR, 1.456; 95% CI, 1.427-1.486) compared with participants in the lowest quartile. These were higher than the HRs for patients in the highest LDL-C quartile for stroke (HR, 1.134; 95% CI, 1.108-1.160), MI (HR, 1.601; 95% CI, 1.551-1.653), and both (HR, 1.281; 95% CI, 1.257-1.306).

Conclusion: In our large population study, higher non-HDL-C levels were associated with CVD than LDL-C levels.

CURRICULUM VITAE

Kyung-Soo Kim

Associate Professor, CHA Bundang Medical Center, CHA University, Republic of Korea

Education and Training

2004.02	CHA University, Korea, M.D, Medicine
2020.08	CHA University, Korea, Ph.D, Internal Medicine

Employment and Position

2012-2014	Division of Endocrinology and Metabolism, Department of Internal Medicine, CHA Bundang Medical Center, CHA University, Fellow
2014-2020	Division of Endocrinology and Metabolism, Department of Internal Medicine, CHA Bundang Medical Center, CHA University, Assistant Professor
2020-	Division of Endocrinology and Metabolism, Department of Internal Medicine, CHA Bundang Medical Center, CHA University, Associate Professor

Important Publications

1. Park J, Jung JH, Park H, Song YS, Kim SK, Cho YW, Han K, Kim KS. Association between exercise habits and incident type 2 diabetes mellitus in patients with thyroid cancer: nationwide population-based study. BMC Med 2024;22:251. (Corresponding author)
2. Kim KS, Hong S, Han K, Park CY. Association of non-alcoholic fatty liver disease with cardiovascular disease and all cause death in patients with type 2 diabetes mellitus: nationwide population based study. BMJ 2024;384:e076388.
3. Kim KS, Hong S, Ahn HY, Park CY. Metabolic dysfunction-associated fatty liver disease and mortality: a population-based cohort study. Diabetes Metab J 2023;47:220-231.
4. Kim KS, Hong S, Han K, Park CY. Fenofibrate add-on to statin treatment is associated with low all-cause death and cardiovascular disease in the general population with high triglyceride levels. Metabolism. 2022;137:155327.
5. Hong S, Kim KS, Han K, Park CY. Acromegaly and cardiovascular outcomes: a cohort study. Eur Heart J 2022;43:1491-9. (Co-first author)

Clinical characteristics of patients with statin discontinuation in Korea: A nationwide population-based study

Objective: To investigate the clinical characteristics of patients with statin discontinuation in Korea, using a nationwide database.

Methods: We analyzed 1,308,390 patients treated with statin for the first time in their life between 2016 and 2017 using the Korean National Health Information Database. The patients participated in the Korean National Health Screening Program within two years before taking statin. Patients with statin discontinuation were defined as those who were not prescribed statin between 365 days and 730 days after the initial statin prescription.

Results: The overall prevalence of statin discontinuation was 39.44%. Patients with statin discontinuation were younger, had lower body mass index (BMI), included a higher number of smokers and drinkers, did not exercise regularly, with fewer cases of hypertension and diabetes mellitus than those without statin discontinuation ($p<0.001$). Compared with patients aged 20-29 years, the risk of statin discontinuation showed a U-shaped relationship with age (odds ratios [ORs]: 0.619 in 30-39 years; 0.454 in 40-49 years; 0.345 in 50-59 years; 0.307 in 60-69 years; 0.324 in 70-79 years; and 0.415 in ≥80 years). In addition, increased BMI was associated with decreased risk of statin discontinuation (ORs: 0.969 with 25.0-29.9 kg/m2, and 0.890 with ≥30.0 kg/m2). Patients with hypertension and diabetes mellitus were at a lower risk of statin discontinuation (OR: 0.414 for hypertension; 0.416 for diabetes mellitus).

Conclusion: The prevalence of patients with statin discontinuation in Korea was 39.44% at 1 to 2 years after initial statin treatment.

CURRICULUM VITAE

Nagaraj Manickam

Senior Scientist and Head, Department of Vascular Biology,
Madras Diabetes Research Foundation, India

Education

1995	Sri Sankara college, Madras University, Kanchipuram, B.Sc, Biochemistry
1997	MIET college, Bharathidasan University, Trichy, M.Sc, Biochemistry
1999	Madras University, Chennai, M.Phil, Biochemistry
2003	Madras University, Chennai, Ph.D, Biochemistry

Position and Honors

Aug. 2010-Till date	Madras Diabetes Research Foundation, Chennai, Scientist
Apr. 2004-Jul. 2010	University of Texas Health Science Center, San Antonio, USA, Post-Doctoral Research Fellow
1999-2003	Madras University, Chennai, Research Fellow

Honors and Awards

Secured University Fourth Rank in M.Sc. Biochemistry:
Life membership : Indian Science Congress Association, India

Mentorship

Madras University recognized Guide for PhD program.
I am currently guiding PhD students for their PhD work involving cell culture, clinical samples as well as animal studies.
I am involved in teaching and training for several students who were coming to our department, MDRF for their summer training as well as for their project work.

Metformin reduces the progression of atherogenesis by regulating the Sestrin2-mTOR pathway in obese and diabetic rats

Nagaraj Manickam, Saravanakumar Sundararajan, Isaivani Jayachandran, Gautam Kumar Pandey, Saravanakumar Venkatesan, Anusha Rajagopal, Kuppan Gokulakrishnan, Muthuswamy Balasubramanyam, Viswanathan Mohan

Background and Objective: In our previous work, we found that Sestrin2 has a strong negative association with plasma atherogenicity and combats the progression of atherogenesis by regulating the AMPK-mTOR pathway. Metformin, an activator of AMPK, is widely used as a first-line therapy for diabetes, but its mechanistic role in preventing atherosclerosis and cardiac outcomes is unclear. Hence, we aimed to assess the effect of metformin on preventing atherosclerosis and to investigate its regulatory role in the Sestrin2-AMPK-mTOR pathway in obese/diabetic rats.

Methods: Animals were fed a high-fat diet to induce obesity and administered streptozotocin to induce diabetes. Then the groups are either untreated or treated with metformin (150 mg/kg body weight) for 14 weeks. Aorta and heart tissues were analyzed for Sestrin2 status by western blotting and immunohistochemistry; AMPK and mTOR activities were investigated using western blotting, and atherogenicity-related events were evaluated using reverse transcription quantitative polymerase chain reaction and histology.

Results: Obese and diabetic rats showed significant decrease in Sestrin2 levels and AMPK activity, accompanied by increased mTOR activity in the heart and aorta tissues. Metformin treatment significantly restored Sestrin2 and AMPK levels, reduced mTOR activity, and restored the altered expression of inflammatory markers and adhesion molecules in obese and diabetic rats to normal levels. A histological analysis of samples from obese and diabetic rats showed atherosclerotic lesions both in aorta and heart tissues. The metformin-treated rats showed a decrease in atherosclerotic lesions, cardiac hypertrophy, and cardiomyocyte degeneration.

Conclusion: This study presents further molecular insights into the beneficial effects of metformin and demonstrates its protective role against atherosclerosis through regulation of the Sestrin2-AMPK-mTOR pathway.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Special Sessions

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Research Group Session (K) – TRL/LP(a) Research TFT Session

Lipoprotein(a): Unraveling its Mysteries and Implications

Sep 26(Thu) 13:00–14:30 | Room 1 (3F)

CHAIRPERSONS : Sang-Hyun Kim (Seoul National University, Republic of Korea)
Byung Jin Kim (Sungkyunkwan University, Republic of Korea)

13:00–13:15	**Lipoprotein(a) metabolism: unlocking its secrets** Jang Hoon Lee (Kyungpook National University, Republic of Korea)
13:15–13:30	**Unveiling the dark side: LP(a)-associated OxPLs and their role in fueling atherosclerosis** Youngwoo Jang (Gachon University, Republic of Korea)
13:30–13:45	**Beyond genetics: unraveling the multifaceted influences shaping LP(a) concentrations** Sang Min Park (Eulji University, Republic of Korea)
13:45–14:00	**Navigating the LP(a) labyrinth: illuminating measurement challenges and methodological odyssey** Sang-Guk Lee (Yonsei University, Republic of Korea)
14:00–14:30	**Panel Discussion** Sangwoo Park (University of Ulsan, Republic of Korea) Minjae Yoon (Seoul National University, Republic of Korea) Ki-Hyun Jeon (Seoul National University, Republic of Korea) Jung Hyun Choi (Pusan National University, Republic of Korea)

CURRICULUM VITAE

Jang Hoon Lee

Professor, Kyungpook National University Hospital, Republic of Korea

Education and Training

1999.02	Kyungpook National University, Korea, M.D, Medicine
2005.02	Kyungpook National University, Korea, Ph.D, Master of Science
2007.03	Korean Ministry of Health & Welfare, Korea, Korean Board of Internal Medicine, Internal Medicine

Employment and Position

2007-2011	Kyungpook National University Hospital, Fellowship
2011-2015	Kyungpook National University Hospital, Assistant Professor
2015-2020	Kyungpook National University Hospital, Associate Professor
2020-	Kyungpook National University Hospital, Professor
2020-	Daegu-Gyeongbuk Regional Cardiocerebrovascular Center, Chief of Cardiovascualr Center

Important Publications

1. Intravascular modality-guided versus angiography-guided percutaneous coronary intervention in acute myocardial infarction. Kim N, Lee JH, Jang SY, Bae MH, Yang DH, Park HS, Cho Y, Jeong MH, Park JS, Kim HS, Hur SH, Seong IW, Cho MC, Kim CJ, Chae SC; Korea Acute Myocardial Infarction Registry - National Institute of Health Investigators. Catheter Cardiovasc Interv. 2020 Mar 1;95(4):696-703. doi: 10.1002/ccd.28359. Epub 2019 May 27.
2. Usefulness of Calculation of Cardiovascular Risk Factors to Predict Outcomes in Patients With Acute Myocardial Infarction. Kim CY, Lee JH, Jang SY, Bae MH, Yang DH, Park HS, Cho Y, Jeong MH, Park JS, Kim HS, Hur SH, Seong IW, Cho MC, Kim CJ, Chae SC; Korea Acute Myocardial Infarction Registry - National Institute of Health Investigators. Am J Cardiol. 2019 Sep 15;124(6):857-863. doi: 10.1016/j.amjcard.2019.06.010. Epub 2019 Jun 25.
3. Coronary Endothelial Dysfunction and the Index of Microcirculatory Resistance as a Marker of Subsequent Development of Cardiac Allograft Vasculopathy. Lee JH, Okada K, Khush K, Kobayashi Y, Sinha S, Luikart H, Valantine H, Yeung AC, Honda Y, Fearon WF. Circulation. 2017 Mar 14;135(11):1093-1095. doi: 10.1161/CIRCULATIONAHA.116.025268. No abstract available.

Lipoprotein(a) metabolism: unlocking its secrets

Lipoprotein(a) [Lp(a)], a molecule first described in 1963 by Berg et al, has attracted intense research as an independent cardiovascular disease (CVD) risk factor and a novel therapeutic target. Lp(a) is a low-density lipoprotein (LDL)-like molecule with an apolipoprotein (b) moiety that is covalently attached to apolipoprotein (a) (Apo[a]), a plasminogen-like protein that confers several pathologic features to Lp(a). Lp(a) contains an LDL-like particle which consists of the apolipoprotein B-100 (apoB-100) with similar lipid composition to LDL. What differentiates Lp(a) from LDL is the characteristic glycoprotein apo(a) which is bound to the LDL-like part through a single disulfide bond. Apo(a) has significant sequence homology to plasminogen whose gene was duplicated and remodeled through several mutations to form the apo(a) gene, also known as the LPA gene. Plasminogen contains five types of kringles (KI-KV) and a serine protease domain, whereas apo(a) contains only two (KIV-KV) and a protease domain. Kringle KIV contains ten subtypes of which KIV2 may present in between 1 and more than 40 copies depending on the number of the corresponding exonsin the LPA gene. This leads to significant heterogeneity between Lp(a) molecules as there are >40 different isoforms, whose size is inversely correlated with Lp(a) levels.

Because of Kringle IV type-2 repeat polymorphism of the lipoprotein(a) (LPA) gene that codes for Apo(a), there is a wide variability in Lp(a) size in the population. A high Apo(a) isoform size correlates with lower plasma concentrations of Lp(a) and vice versa

Produced mainly in the liver, Lp(a) has a wide spectrum of characteristics, including atherogenicity, thrombogenicity, and proinflammatory properties; hence, it may have pathologic effects on multiple systems. Its physiologic function has been a topic of debate, and it is thought to have a role in wound healing. However, many individuals have undetectable Lp(a) levels, which raises the relevance of its function.

CURRICULUM VITAE

Youngwoo Jang

Cardiology, Gachon University Gil Medical Center, Republic of Korea

Education and Training

2008-2012	School of Medicine, Gachon University, Doctor of Medicine
2017-2018	Cardiovascular Institute, Stanford Medicine, Postdoctoral Research Associate
2018-2019	Department of Cardiology, Gachon University, Gil Medical Center, Clinical Fellow

Employment and Position

2022-	Department of Cardiology, Gachon University, Gil Medical Center, Assistant Professor
2019-2021	Department of Cardiology, Gachon University, Gil Medical Center, Clinical Assistant Professor
2022-	Department of Cardiology, Gachon University, Gil Medical Center, Assistant Professor

Unveiling the dark side: LP(a)-associated OxPLs and their role in fueling atherosclerosis

Lipoprotein(a) [Lp(a)] and its associated oxidized phospholipids (OxPLs) have emerged as key contributors to atherosclerosis, representing a 'dark side' in cardiovascular disease. Elevated levels of Lp(a) are linked to an increased risk of atherosclerotic events, partly due to the pro-inflammatory and pro-oxidative properties of OxPLs. These modified lipids, carried by Lp(a), exacerbate endothelial dysfunction, promote foam cell formation, and trigger a cascade of inflammatory responses, accelerating plaque development and instability. Unlike other risk factors, Lp(a)-associated OxPLs are genetically determined, making them a challenging target for traditional therapies. This lecture aims to explore the mechanisms by which Lp(a)-associated OxPLs fuel atherosclerosis, shedding light on their contribution to disease progression. Understanding this intricate interplay opens avenues for novel therapeutic strategies, potentially targeting Lp(a) and its OxPL cargo to mitigate the atherosclerotic burden and reduce cardiovascular risk.

CURRICULUM VITAE

Sang Min Park

Cardiology Division, Department of Internal Medicine,
Nowon Eulji Medical Center, Eulji University College of Medicine, Republic of Korea

Degrees, Training & Employment

2008-2009	Fellowship, Dept. of Cardiology, Severance Hospital, Yonsei University College of Medicine, Seoul, Republic of Korea
2010-2019	Masters and Ph.D., Department of Medicine, the Graduate School of Yonsei University, Seoul, Republic of Korea
2013-2020	Assistant professor, Dept. of Cardiology, Chuncheon Sacred Heart Hospital, Hallym University College of Medicine
2013-Present	Expert, Medical Device Act, Ministry of Food and Drug Safety, government of Republic of Korea
2020-Present	Associate professor, Nowon Eulji Medical Center, Eulji University College of Medicine

Membership of Academic Societies

Korean Society of Internal Medicine
Korean Circulation Society
Korean Society of Interventional Cardiology
Korean Society of Hypertension
Korean Society of Lipid and Atherosclerosis

Beyond genetics: unraveling the multifaceted influences shaping LP(a) concentrations

Elevated levels of Lp(a) have been identified as an additional risk factor in the development of atherosclerotic cardiovascular disease (ASCVD). Lp(a) has a causal link to both ASCVD and aortic valve stenosis.

Lp(a) is a hydrophilic protein derived from plasminogen, rich in carbohydrates, and is formed by the bonding of apolipoprotein(a) (apo(a)) with apo B 100 on an LDL-like particle. In hepatocytes and the space of Disse, apo(a) kringle IV domains 7 and 8 bind noncovalently to lysine residues of apoB100, followed by the formation of a covalent disulfide bond [Fig 1]. Some agents target this noncovalent interaction between apo(a) and apoB100 to inhibit Lp(a) formation.

The synthesis of Lp(a) is mainly controlled by genetic processes. The size polymorphism of the LPA gene determines the number of kringle IV (KIV) units, the key moiety of apo(a), which predict serum Lp(a) levels throughout whole life span.

Besides genetic aspect, the variation of formation of Lp(a) is influenced by ethnicity, explaining the uneven distribution among individuals. Additionally, age, sex, and hormonal effects moderately impact Lp(a) levels. Furthermore, Lp(a) levels are linked to a patient's medical conditions, such as liver and kidney function [Fig 2].

In clinical practice, to address residual ASCVD risk, further discussion will focus on modifying Lp(a) levels beyond genetic factors.

References: 1. Nicholls SJ et al. JAMA 2023;330(11):1042-1053dla1972. 2. Reyes-Soffer G et al. Arterioscler Thromb Vasc Biol. 2022;42:e48-e60. 3. Haberland ME, Le GMM, Frank JS. J Lipid Res 2001;42(4):605-19. 4. Enkhmaa B et al. J. Lipid Res. 2016. 57: 1111-1125.

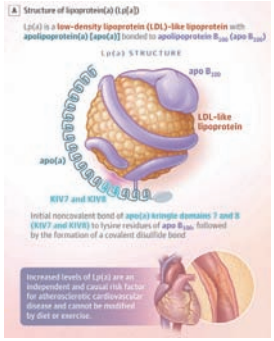


Fig1. Lipoprotein(a) Biology and clinical implication in ASCVD prevention (Nicholls SJ et al. JAMA 2023;330(11):1042-1053dla1972)

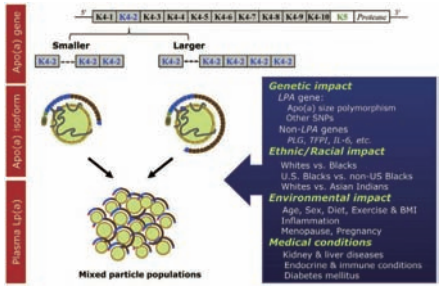


Fig 2. Regulation of plasma Lp(a) levels (Enkhmaa B et al. J. Lipid Res. 2016. 57: 1111-1125.)

CURRICULUM VITAE

Sang-Guk Lee

Professor, Yonsei University College of Medicine, Republic of Korea

Education and Training

2005.02	Yonsei University, Korea, M.D, Medicine
2017.08	Yonsei University, Korea, Ph.D, Laboratory Medicine

Employment and Position

2013-2014	Yonsei University College of Medicine, Clinical and Research Fellow
2014-2020	Yonsei University College of Medicine, Assistant Professor
2020-	Yonsei University College of Medicine, Associate Professor

Important Publications

1. Lee KS, Lee YH, Lee SG. Alanine to glycine ratio is a novel predictive biomarker for type 2 diabetes mellitus. Diabetes, obesity & metabolism. 2024;26(3):980-8.
2. Yun SY, Rim JH, Kang H, Lee SG, Lim JB. Associations of LDL Cholesterol, Non-HDL Cholesterol, and Apolipoprotein B With Cardiovascular Disease Occurrence in Adults: Korean Genome and Epidemiology Study. Annals of laboratory medicine. 2023;43(3):237-43.
3. Ahn S, Lee SH, Chung KS, Ku NS, Hyun YM, Chun S, et al. Development and validation of a novel sepsis biomarker based on amino acid profiling. Clinical nutrition. 2021;40(6):3668-76.
4. Kim SR, Lee SG, Kim SH, Kim JH, Choi E, Cho W, et al. SGLT2 inhibition modulates NLRP3 inflammasome activity via ketones and insulin in diabetes with cardiovascular disease. Nature communications. 2020;11(1):2127.
5. Nam HS, Ha J, Ji D, Kwon I, Lee HS, Han M, et al. Elevation of the Gut Microbiota Metabolite Trimethylamine N-Oxide Predicts Stroke Outcome. Journal of stroke. 2019;21(3):350-2.

Research Interest

His research interests are in clinical metabolomics, clinical mass spectrometry, metabolic disorders and laboratory results standardization. He is currently focusing on the research to find new metabolite biomarkers of various diseases and evaluate metabolic mechanism for disease development.

Navigating the LP(a) labyrinth: illuminating measurement challenges and methodological odyssey

The main elements of Lp(a) are kringle IV (KIV) repeats, and the unique parts consist of a kringle-V (KV) and a protease domain. The KIV2 element, in particular, can be repeated more than 40 times, leading to significant apo(a) size polymorphism, with molecular weights ranging from approximately 250 to 800 kDa. There are various immunoassay-based Lp(a) tests commercially available. Most antibodies against apo(a) used in immunoturbidometric or nephelometric assays are polyclonal, often targeting repetitive motifs within the apo(a) protein. If an antibody is directed against this repetitive motif, the protein might be recognized by the antibody more than once, which makes a measurement in molar terms hardly possible.

As these polyclonal antibodies in nearly all Lp(a) assays detect the repeating KIV2 structure of apo(a), the tests are inherently isoform-dependent. The apo(a) isoform dependent tests, especially in combination with serially diluted single calibrators, typically result in underestimation of high Lp(a) levels (with low molecular weight apo(a) isoforms) and overestimation of low Lp(a) concentrations (with high molecular weight apo(a) isoforms). However, in most current Lp(a) tests, the impact of KIV2 dependence has been effectively minimized within acceptable limits by using multiple (at least five), independent, and well-selected product calibrators with representative isoform compositions across the measuring range.

Raising antibodies against apo(a) that recognize a unique motif in the protein is a challenging task, and only a few antibodies that target a unique epitope of apo(a) have been identified and characterized. Nevertheless, the ultimate goal of performing Lp(a) measurements in molar terms should not be abandoned. Providing companies with easily accessible reference materials, measured using molar-measuring reference methods, will be a crucial next step in improving test performance. Subsequently, traceability to a new SI-traceable apo(a) reference measurement system, based on quantitative protein mass spectrometry, will be established.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

FH/Severe Dyslipidemia 1

JAS-KSoLA Joint Symposium on FH and Severe Dyslipidemia 1

Sep 26(Thu) 14:40-16:10 | Room 4 (5F)

CHAIRPERSON : Sang-Hak Lee (Yonsei University, Republic of Korea)
PANEL : Jae Hyoung Park (Korea University, Republic of Korea)

14:40-15:00	**Clinical and molecular risk factors in severe FH** Soo Heon Kwak (Seoul National University, Republic of Korea)
15:00-15:10	**Discussion**
15:10-15:30	**The current status of HoFH in Japan** Mariko Harada-Shiba (Osaka Medical & Pharmaceutical University, Japan)
15:30-15:40	**Discussion**
15:40-15:48	**Prevalence and clinical characteristics of FH in patients with ACS in Japan: insight from the EXPLORE-J study** Yasuaki Takeji (Kanazawa University, Japan)
15:48-15:55	**Q&A**
15:55-16:03	**Omics markers of FH** Dae Young Cheon (Hallym University, Republic of Korea)
16:03-16:10	**Q&A**

CURRICULUM VITAE

Soo Heon Kwak

Professor, Seoul National University Hospital, Republic of Korea

Education and Training

2002.02	Seoul National University College of Medicine, Korea, M.D, Medicine
2012.08	Seoul National University, Graduate School, Korea, Ph.D, Internal Medicine

Employment and Position

2011-2015	Seoul National University Hospital, Assistant Professor
2015-2021	Seoul National University Hospital, Associate Professor
2021-	Seoul National University Hospital, Professor

Important Publications

1. Choi J, Lee H, Kuang A, et al. Genome-Wide Polygenic Risk Score Predicts Incident Type 2 Diabetes in Women With History of Gestational Diabetes. Diabetes Care. Published online June 28, 2024. doi:10.2337/dc24-0022
2. Lee H, Choi J, Kim JI, et al. Higher Genetic Risk for Type 2 Diabetes Is Associated With a Faster Decline of β-Cell Function in an East Asian Population. Diabetes Care. 2024;47(8):1386-1394. doi:10.2337/dc24-0058
3. Kwak SH, Hernandez-Cancela RB, DiCorpo DA, et al. Time-to-Event Genome-Wide Association Study for Incident Cardiovascular Disease in People With Type 2 Diabetes. Diabetes Care. 2024;47(6):1042-1047. doi:10.2337/dc23-2274
4. Kwak SH, Srinivasan S, Chen L, et al. Genetic architecture and biology of youth-onset type 2 diabetes. Nat Metab. 2024;6(2):226-237. doi:10.1038/s42255-023-00970-0

Research Interest

Familial Hypercholesterolemia, Diabetes, Genetics, Precision Medicine

Clinical and molecular risk factors in severe FH

Familial hypercholesterolemia (FH) is a common autosomal dominant disorder, but the relationship between gene variants and the clinical severity of FH remains unclear. The International Atherosclerosis Society classifies patients at high risk for atherosclerotic cardiovascular disease as having severe FH based on phenotype. This study aimed to investigate the clinical and molecular genetic risk factors in Korean patients with severe FH. A total of 296 patients from the Korean FH Registry were included, with recruitment criteria of LDL-C >190 mg/dL with tendon xanthomas or a family history of FH, or LDL-C >225 mg/dL. DNA sequencing of FH-related genes was performed using targeted exome sequencing. Of the 296 patients, 172 (58%) were classified as having severe FH. These patients were older, predominantly male, and had higher rates of smoking, hypertension, and diabetes compared to those with non-severe FH. They also exhibited significantly elevated triglycerides (TG), lipoprotein(a), and hs-CRP levels. However, there was no significant difference in genetic variants between the severe and non-severe FH groups. In conclusion, while several clinical factors, including age, gender, TG, LDL-C, and HDL-C levels, differed between the groups, no genetic variants specific to severe FH were identified.

CURRICULUM VITAE

Mariko Harada-Shiba

Professor, Osaka Medical and Pharmaceutical University, Japan

Education and Training

1984.03	Shiga University of Medical Science, Japan, M.D, Medicine
1988.03	Shiga University of Medical Science, Japan, Ph.D, Metabolism

Employment and Position

2010-2020	National Cerebral and Cardiovascular Center Research Institute, Director
2020-2021	National Cerebral and Cardiovascular Center Research Institute, Senior fellow
2022-	Osaka Medical and Pharmaceutical University, Professor

Important Publications

1. Harada-Shiba M, Arai H, Ohmura H, Okazaki H, Sugiyama D, Tada H, Dobashi K, Matsuki K, Minamino T, Yamashita S and Yokote K. Guidelines for the Diagnosis and Treatment of Adult Familial Hypercholesterolemia 2022. J Atheroscler Thromb. 2023;30:558-586.
2. Michikura M, Ogura M, Hori M, Furuta K, Hosoda K and Harada-Shiba M. Achilles Tendon Softness as a New Tool for Diagnosing Familial Hypercholesterolemia. JACC Cardiovasc Imaging. 2021;14:1483-1485.
3. Nohara A, Tada H, Ogura M, Okazaki S, Ono K, Shimano H, Daida H, Dobashi K, Hayashi T, Hori M, Matsuki K, Minamino T, Yokoyama S and Harada-Shiba M. Homozygous Familial Hypercholesterolemia. J Atheroscler Thromb. 2021;28:665-678.
4. Harada-Shiba M, Ali S, Gipe DA, Gasparino E, Son V, Zhang Y, Pordy R and Catapano AL. A randomized study investigating the safety, tolerability, and pharmacokinetics of evinacumab, an ANGPTL3 inhibitor, in healthy Japanese and Caucasian subjects. Atherosclerosis. 2020;314:33-40.
5. Defesche JC, Gidding SS, Harada-Shiba M, Hegele RA, Santos RD and Wierzbicki AS. Familial hypercholesterolaemia. Nat Rev Dis Primers. 2017;3:17093.

Awards and Honors

2024	The 25th Japan Atherosclerosis Society Award
2014	The 13th Koikai Award

Research Interest

Familial hypercholesterolemia, Lipoprotein apheresis, Genetic analysis, Drug delivery, Drug discovery, Nucleic acid drugs

The current status of HoFH in Japan

Homozygous familial hypercholesterolemia (HoFH) is characterized by severe hypercholesterolemia, skin xanthomas from the childhood, and atherosclerotic cardiovascular disease such as coronary artery disease, aortic valve stenosis and supraaortic valve stenosis. Patients with HoFH have pathological mutations in two alleles of the gene involved in the LDL receptor pathway such as LDLR, PCSK9, APOB and LDLRAP1. The prevalence of HoFH is around 1 in 360,000. The diagnosis of HoFH can be made by clinical manifestation such as very high levels of LDL-C and presence of skin xanthomas, and genetic analysis. The basic principle of treatment for HoFH is prevention of the onset and progression of atherosclerosis, and early diagnosis and appropriate treatment are of utmost importance. It is important to reduce LDL-C levels as much as possible using a combination of many drugs and lipoprotein apheresis therapy. The patients with HoFH are often unresponsive to medications, but they should be started on a statin, increased in dose, and then monitored for response with the addition of ezetimibe. Among HoFH, those with no LDL receptor activity (negative type) do not respond, but those with a little LDL receptor activity (defective type) may respond to some extent. PCSK9 inhibitor shows its effect through increase of LDL receptor, patients with HoFH show various effect depending on LDL receptor activity. If LDL-C does not decrease to the target LDL-C level by PCSK9 inhibitor, the MTP inhibitor, lomitapide or ANGPTL3 inhibitor, evinacumab can be added. Evinacumab is approved for use in children under 5 years of age in Japan, in addition to use in adult patients. From 2009, HoFH was designated as an intractable disease and their medical cost became fully covered.

CURRICULUM VITAE

Yasuaki Takeji

Assistant Professor, Kanazawa University, Japan

Education and Training

2013.03	Kanazawa University, Japan, M.D, Medicine
2018.03	Kyoto University, Japan, Ph.D, Cardiovascular Medicine

Employment and Position

2013-2015	Toranomon Hospital, Japan, Resident
2015-2018	Kokura Memorial Hospital, Fellow
2018-2022	Kyoto University, Fellow
2022-	Kanazawa Universiy, Staff

Important Publications

1. Takeji Y, Tada H, et al. Prevalence and Clinical Characteristics of Familial Hypercholesterolemia in Patients with Acute Coronary Syndrome according to the Current Japanese Guidelines: Insight from the EXPLORE-J study. J Atheroscler Thromb. 2024 Jul 3. Online ahead of print.
2. Tada H, Takeji Y, et al. Familial hypercholesterolemia is related to cardiovascular disease, heart failure and atrial fibrillation. Results from a population-based study. Eur J Clin Invest. 2024 Feb;54(2):e14119.
3. Tada H, Takeji Y, et al. Association between remnant cholesterol and incident atherosclerotic cardiovascular disease, heart failure, and atrial fibrillation. J Clin Lipidol. 2023 Oct 14:S1933-2874(23)00293-3.
4. Takeji Y, Tada H, et al. Clinical Characteristics of Homozygous Familial Hypercholesterolemia in Japan: A Survey Using a National Database. JACC: Asia.
5. Takeji Y, Taniguchi T, et al. In-hospital outcomes after SAVR or TAVI in patients with severe aortic stenosis. Cardiovasc Interv Ther. 2023 Jun 22.

Awards and Honors

Research Interest
Athelosclerosis
Familial hypercholesterolemia
Structual Heart Disease
Coronary artery disease

Prevalence and clinical characteristics of FH in patients with ACS in Japan: insight from the EXPLORE-J study

Little data exists for evaluating the prevalence and patient characteristics of familial hypercholesterolemia (FH) according to the latest FH 2022 guidelines by the Japan Atherosclerosis Society (JAS), which revised the Achilles tendon thickness (ATT) threshold from 9.0 mm in both sexes to 8.0 mm in men and 7.5 mm in women. This study used a nationwide registry of patients with acute coronary syndrome (ACS) to evaluate the prevalence of FH according to the latest FH criteria and to investigate Achilles tendon imaging for FH diagnosis. Exploration into lipid management and persistent risk in patients hospitalized for acute coronary syndrome in Japan (EXPLORE-J) was a prospective, observational study conducted at 59 centers across Japan, enrolling consecutive patients who presented with acute coronary syndrome (ACS) between April 2015 and August 2016. The current study population consisted of 1944 patients enrolled in EXPLORE-J. The key findings of this study are outlined as follows: 1) According to the JAS criteria 2022, the prevalence of FH (definite or probable) was 127/1944 (6.6%). 2) Among patients with premature ACS, the prevalence of FH (definite or probable) was 43/427 (10.1%). 3) Among patients with pathogenic variants, only 8% fulfilled the FH criteria 2022. In conclusion, According to the latest JAS FH criteria 2022, the prevalence of FH was considerably higher than that reported in previous studies, especially for those with premature ACS.

CURRICULUM VITAE

Dae Young Cheon

Assistant Professor, Hallym University, Dongtan Sacred Heart Hospital, Republic of Korea

Education and Training

2012.02	Hallym University, Korea, M.D, Medicine
2017.02	Hallym University Sacred Heart Hospital, Korea, Intern / Residency, Internal Medicine
2021.02	Seoul National University Hospital, Korea, Fellowship, Cardiology
2023.02	Korea National Open University, Korea, Master of Science, Bioinformatics & Statitics

Employment and Position

2021-2022	Hallym University, Dongtan Sacred Heart Hospital, Fellowship
2022-2023	S.A.A., Clinical Assistant Professor
2023.9-	S.A.A., Assistant Professor

Important Publications

1. Associations between migraine and major cardiovascular events in type 2 diabetes mellitus
2. Risk of dementia according to the smoking habit change after ischemic stroke: a nationwide population-based cohort study
3. Association between physical activity changes and incident myocardial infarction after ischemic stroke: a nationwide population-based study
4. Association Between Changes in Smoking Habits and Incident Fracture After Acute Ischemic Stroke
5. Association between Smoking Habit Changes and the Risk of Myocardial Infarction in Ischemic Stroke Patients: a Nationwide cohort study

Awards and Honors

1. 2023 Pulse of Asia Congress (POA) Best Poster Award
2. 2024 Asia-Pacific Cardiometabolic Syndrome Congress (APMCS) Outstanding Abstract Award

Research Interest

Interventional Cardiology
Epidemiology of Cardio-cerebrovascular disease
Critical care of Cardiology

Omics markers of FH

FH is a genetic disorder characterized by high levels of LDL-C, leading to an increased risk of premature cardiovascular diseases. It is typically caused by mutations in genes like LDLR, APOB or PCSK9. Traditional diagnostic methods rely on these genes, clinical assessments and lipid profiling; however, advancements in omics technologies—such as genomics, transcriptomics, proteomics, and metabolomics—are revolutionizing the identification of biomarkers for FH, enhancing diagnostic precision and treatment strategies.

Genomics studies have shown that over 90% of cases with clinically diagnosed FH are due to mutations in the LDLR gene.

Proteomic studies aim to analyze the entire set of proteins expressed by a cell or organism. In FH, proteomics has been employed to investigate alterations in plasma proteins associated with cholesterol transport and metabolism. For instance, changes in the levels of proteins involved in the LDL receptor pathway, such as apolipoproteins and PCSK9, can serve as potential biomarkers for FH. These proteins not only aid in diagnosis but also help in monitoring therapeutic responses to treatments like statins or PCSK9 inhibitors.

Traditional markers like LDL-C levels, age, and family history provide a general risk assessment but may not capture individual variability. Our research is focused on risk stratification in Korean FH patients using proteomics.

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

FH/Severe Dyslipidemia 2

JAS-KSoLA Joint Symposium on FH and Severe Dyslipidemia 2

Sep 26(Thu) 16:20-17:35 | Room 4 (5F)

CHAIRPERSON : Sang-Hak Lee (Yonsei University, Republic of Korea)
PANEL : Kyuho Kim (The Catholic University of Korea, Republic of Korea)

16:20-16:40	**Polygenic background modifies risk of CAD in individuals with HeFH** Injeong Shim (Massachusetts General Hospital, Broad Institute of MIT and Harvard, USA)
16:40-16:50	**Discussion**
16:50-17:10	**Differential diagnosis of severe hypercholesterolemia in clinical practice** Hayato Tada (Kanazawa University, Japan)
17:10-17:20	**Discussion**
17:20-17:28	**Evaluation of Achilles Tendon Thickness by Ultrasonography as a Predictor of Coronary Artery Disease Severity in Non-Familial Hypercholesterolemia Patients** Shimpei Fujioka (Osaka Medical & Pharmaceutical University, Japan)
17:28-17:35	**Q&A**

CURRICULUM VITAE

Injeong Shim

Research Fellow, Massachusetts General Hospital,
Harvard Medical School, Broad Institute of MIT and Harvard, USA

Education and Training

2024.02	Sungkyunkwan University, Korea, Ph.D., Digital Health
2017.02	Korea Advanced Institute of Science and Technology (KAIST), Korea, M.S., Innovation and Technology Management
2011.05	Johns Hopkins University, USA, B.S., Biomedical Engineering

Employment and Position

2024.09-Present	Massachusetts General Hospital, Harvard Medical School, Broad Institute of MIT and Harvard, Research Fellow
2024.03-2024.08	Samsung Medical Center, Research Fellow

Important Publications

(*contributed equally to the work)

1. Kim, M. S.*, Shim, I.*, Fahed, A. C., Do, R., Park, W. Y., Natarajan, P., Khera, A. V., and Won, H. H. (2024) Association of genetic risk, lifestyle, and their interaction with obesity and obesity-related morbidities. Cell Metabolism 36(7), 1494-1503. https://doi.org/10.1016/j.cmet.2024.06.004
2. Shim, I.*, Kuwahara, H.*, Chen, N.*, ..., Gao, X., Alkuraya, F. S. & Fahed, A. C. (2023). Clinical utility of polygenic scores for cardiometabolic disease in Arabs. Nature Communications 14, 6535. https://doi.org/10.1038/s41467-023-41985-1
3. Reeskamp, L. F.*, Shim, I.*, ..., Khera, A. V. (2023). Polygenic background modifies risk of coronary artery disease among individuals with heterozygous familial hypercholesterolemia. JACC: Advances JACC: Advances 2(9), 100662. https://doi.org/10.1016/j.jacadv.2023.100662
   Co-authorship
4. Nurmohamed, N. S., Shim, I., ..., Reeskamp, L. F. & Fahed, A. C. (2024). Polygenic Risk Is Associated With Long-Term Coronary Plaque Progression and High-Risk Plaque. JACC: Cardiovascular Imaging.
5. Kim, M. S., Song, M., Kim, B., Shim, I., Kim, D. S., Natarajan, P., ... & Won, H. H. (2023). Prioritization of therapeutic targets for dyslipidemia using integrative multi-omics and multi-trait analysis. Cell Reports Medicine, 4(9).

Polygenic background modifies risk of CAD in individuals with HeFH

Heterozygous familial hypercholesterolemia (HeFH) is a monogenic disorder associated with elevated low-density lipoprotein cholesterol (LDL-C) and a significantly increased coronary artery disease (CAD) risk. However, CAD risk among HeFH individuals varies considerably, and recent studies suggest that polygenic background may play a critical role in this variability. This study investigated the influence of polygenic risk on CAD development among genetically confirmed HeFH individuals.

We analyzed data from 1,315 HeFH variant carriers from the Dutch National Cascade Screening Program and 429 carriers from the UK Biobank. CAD risk was assessed based on polygenic scores (GPSCADEUR), representing the cumulative impact of common genetic variants. Despite lipid management, HeFH carriers showed a higher incidence of CAD compared to noncarriers (6.4% vs. 3.4%, HR 1.88, 95% CI: 1.31-2.70). Among carriers, the polygenic score was independently associated with CAD risk, with a similar effect size as LDL-C (HR 1.35 per SD increase in polygenic score, 95% CI 1.07-1.70).

A polygenic score gradient was observed, with CAD risk increasing from 1.24-fold in the lowest quintile to 3.37-fold in the highest quintile of polygenic score. These results were replicated in the UK Biobank, further supporting the additive role of polygenic background in modifying CAD risk in HeFH patients.

In conclusion, polygenic risk significantly modifies CAD risk in HeFH individuals, with high polygenic scores amplifying risk despite lipid-lowering treatment. These findings emphasize the importance of integrating polygenic risk assessment into clinical practice for more personalized CAD prevention strategies in HeFH patients.

CURRICULUM VITAE

Hayato Tada

Assistant Professor, Kanazawa University, Japan

Education and Training

2003.03	Kanazawa University, Japan, M.D, Medicine
2011.11	Kanazawa University, Japan, Ph.D, Cardiovascular Medicine

Employment and Position

2003-2004	Kanazawa University Hospital, Resident
2004-2005	Kouseiren Takaoka Hospital, Resident
2005-2006	Fukui Cardiovascular Center, Clinical Fellow
2006-2012	Kanazawa University Hospital, Medical Staff
2012-2014	Massachusetts General Hospital, Center for Human Genetic Research, Research Fellow
2014-	Kanazawa University Hospital, Assistant Professor

Important Publications

1. Tada H, Kawashiri MA, Ikewaki K, Terao Y, Noguchi T, Nakanishi C, Tsuchida M, Takata M, Miwa K, Konno T, Hayashi K, Nohara A, Inazu A, Kobayashi J, Mabuchi H, Yamagishi M. Altered metabolism of low-density lipoprotein and very-low-density lipoprotein remnant in autosomal recessive hypercholesterolemia: results from stable isotope kinetic study in vivo. Circ Cardiovasc Genet. 2012 Feb 1;5(1):35-41
2. Tada H, Won HH, Melander O, Yang J, Peloso GM, Kathiresan S. Multiple associated variants increase the heritability explained for plasma lipids and coronary artery disease. Circ Cardiovasc Genet. 2014 Oct;7(5):583-7
3. Tada H, Shiffman D, Smith JG, Sjögren M, Lubitz SA, Ellinor PT, Louie JZ, Catanese JJ, Engström G, Devlin JJ, Kathiresan S, Melander O. Twelve-single nucleotide polymorphism genetic risk score identifies individuals at increased risk for future atrial fibrillation and stroke. Stroke. 2014 Oct;45(10):2856-2862
4. Tada H, Melander O, Louie JZ, Catanese JJ, Rowland CM, Devlin JJ, Kathiresan S, Shiffman D. Risk prediction by genetic risk scores for coronary heart disease is independent of self-reported family history. Eur Heart J. 2016 Feb 7;37(6):561-7
5. Tada H, Kawashiri MA, Nohara A, Inazu A, Mabuchi H, Yamagishi M. Impact of clinical signs and genetic diagnosis of familial hypercholesterolaemia on the prevalence of coronary artery disease in patients with severe hypercholesterolaemia. Eur Heart J. 2017 May 21;38(20):1573-1579

Awards and Honors

1. Japanese Circulation Society Young Investigator's Award (1st Prize), 2017
2. Japanese College of Cardiology Young Investigator's Award (2nd Prize), 2017
3. 15th Japan Atherosclerosis Society Goto Yuichiro Award, 2020

Research Interest

Lipid Metabolism
Cardiovascular Genetics

Differential diagnosis of severe hypercholesterolemia in clinical practice

Severe form of hypercholesterolemia is an important phenotype we need to care for based on several reasons. First, we need to make sure if they are familial hypercholesterolemia (FH). If so, then we need to care quite intensively. Second, we also need clarify if they are homozygous FH (HoFH), since we now have several newer agents that can reduce their LDL cholesterol substantially, including lomitapide and evinacumab. Third, there are several differential clinical diagnosis in severe form of FH, such as sitosterolemia were statins are not so effective, whereas ezetimibe is quite effective. Fourth, we need to clarify if such patients are classified as "severe FH" defined by the International Atherosclerosis Society (IAS). This is a very useful biomarker that can risk stratify them based on clinical information. I would like to provide clear message that we need to rethink about what to do when we encounter such cases in this lecture.

CURRICULUM VITAE

Shimpei Fujioka

Cardiovascular, Osaka Medical and Pharmaceutical University Hospital, Japan

Education and Training

2008.04-2014.03 Osaka Medical and Pharmaceutical University, M.D, Medicine

Employment and Position

2014-2016 Takatsuki red cross hospital, Staff
2016-2021 Kokura memorial hospital, Staff
2023- Osaka Medical and Pharmaceutical University hospital, Staff

Research Interest

Echorcardiologist, lipidologist

Evaluation of Achilles Tendon Thickness by Ultrasonography as a Predictor of Coronary Artery Disease Severity in Non-Familial Hypercholesterolemia Patients

Low-density lipoprotein cholesterol (LDL-C) is a major contributor to atherosclerotic cardiovascular diseases. Prolonged exposure to elevated LDL-C levels can lead to the formation of tendon xanthomas. Among these, Achilles tendon thickening is a diagnostic criterion for familial hypercholesterolemia (FH). Traditionally, the evaluation of Achilles tendon thickness (ATT) has been performed using X-ray (Xp-ATT) to diagnose FH. However, we have established a method to measure ATT more accurately using ultrasonography (US-ATT) instead of X-ray.

Previous studies have reported that ATT in FH patients correlate with the severity of coronary artery disease (CAD). However, it remains unclear whether ATT correlates with CAD severity in non-FH patients. In this study, we investigated whether US-ATT could serve as a predictive indicator for the severity of CAD in non-FH patients.

Data from our hospital revealed a significant correlation between Achilles tendon thickening and the Syntax score, as well as the presence or absence of multiple coronary lesions. This correlation was even stronger when measured by ultrasonography compared to X-ray. Furthermore, this correlation was observed not only in FH patients but also in non-FH patients.

Achilles tendon thickness measured by ultrasonography (US-ATT) was significantly associated with the complexity of coronary artery disease even in non-FH patients, showing a stronger correlation than X-ray measurements. Given its greater accuracy, simplicity, and lack of radiation exposure, ultrasonographic assessment of Achilles tendon thickness could serve as an effective alternative method to predict severe coronary artery disease in non-FH patients. This method could potentially improve the early detection and management of CAD in a broader patient population.

2024 KSoLA Awards for Scientific Excellence & Young Investigator (K)

Sep 27(Fri) 16:50-18:20 | Room 1 (3F)

CHAIRPERSONS : Ick-Mo Chung (Ewha Womans University, Republic of Korea)
Jaetaek Kim (Chung-Ang University, Republic of Korea)

16:50-16:55	**2024 KSoLA Award Ceremony for Scientific Excellence**
16:55-17:00	**2024 KSoLA Award Ceremony for Young Investigator**
17:00-17:20	**Treatment target discovery from cardio-protective phenotype** Sang-Hak Lee (Yonsei University, Republic of Korea)
17:20-17:25	**Q&A**

CURRICULUM VITAE

Sang-Hak Lee

Professor, Yonsei University, Republic of Korea

Education and Training

1994.02	Yonsei University, Korea, M.D, Medicine
2005.08	Yonsei University, Korea, Ph.D, Internal Medicine

Employment and Position

2003-2006	Hallym University, Instructor~ssistant Professor
2007-Present	Yonsei University, Assistant Professor~Professor
2010-2011	UC San Diego, Visiting Scholar/Postdoc Fellow

Important Publications

1. Kim J, et al. Statin therapy in individuals with intermediate cardiovascular risk. Metabolism 2024;150:155723
2. An DB, et al. Hepatic Cdkal1 deletion regulates HDL catabolism and promotes reverse cholesterol transport. Atherosclerosis 2023;375:21-29
3. Lee CJ, et al. Cardiovascular risk and treatment outcomes in severe hypercholesterolemia: a nationwide cohort study. J Am Heart Assoc 2022;11:e024379
4. Ann SJ, et al. Role of lncRNA HSPA7 in human atherosclerotic plaque in sponging miR-223 and promoting proinflammatory vascular smooth muscle cell transition. Exp Mol Med 2021;53:1842-1849

Research Interest

Lipoprotein metabolism; Preventive cardiology; Vascular biology; Cardiovascular genetics

Treatment target discovery from cardio-protective phenotype

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Satellite Symposia

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Breakfast Symposium 1 (K)

Sep 27(Fri) 07:30-08:30 | Room 1 (3F)

CHAIRPERSON : Sang Hong Baek (The Catholic University of Korea, Republic of Korea)

07:30-07:50 **Cardiac biomarkers for patients with diabetes**
Chae Won Chung (Chung-Ang University, Republic of Korea)

07:50-08:00 **Panel Discussion**
Minjae Yoon (Seoul National University, Republic of Korea)
Yongin Cho (Inha University, Republic of Korea)

CURRICULUM VITAE

Chae Won Chung

Clinical Assistant Professor, Chung-Ang University, Republic of Korea

Education and Training

2015.02	Seoul National University, Korea, M.D, Medicine
2016.02	Seoul National University Hospital, Korea, Intern, Medicine
2020.02	Seoul National University Hospital, Korea, Resident, Internal Medicine
2022.02	Seoul National University Hospital, Korea, Fellow, Endocrinology and Metabolism

Employment and Position

2022	Seoul National University Hospital, Clinical Assistant Professor
2023-	Chung-Ang University Hospital, Clinical Assistant Professor

Important Publications

1. Chung CW, Kim KS, Sue K. Park, Ju DL, Park YJ, Shin CH, Jun JK, Chung JK, Song YJ, Lee YA, Cheon GJ, Cho SW. Selenium Levels and Their Association with Thyroid Autoimmunity and Severe Preeclampsia in Pregnancy: Insights from A Prospective Ideal Breast Milk Cohort Study. Eur Thyroid J (2024) Online ahead of print. PMID 38888992
2. Chung CW, Jung KY, Jung EH, Lee MJ, Park YJ, Lee JK, Ahn HW, Cho SW. Efficacy of selenium supplementation for mild-to-moderate Graves' ophthalmopathy in a selenium-sufficient area (SeGOSS trial): study protocol for a phase III, multicenter, open-label, randomized, controlled intervention trial. Trials (2023) Apr 14;24(1):272. PMID: PMC10103450
3. Ju DL, Cho SW, Chung CW, Lee YA, Cheon GJ, Park YJ, Shin CH, Jun JK, Chung JK, Park S.K, Song YJ. High intakes of iodine among women during pregnancy and the postpartum period has no adverse effect on thyroid function. European Journal of Nutrition (2023) 62(1):239-249. PMID: 35947162
4. Kang SY, Lee EJ, Chung CW, Jang HN, Moon JH, Shin YJ, Kim KH, Li Y, Shin SM, Kim YH, Kwon SK, Ahn CH, Jung KY, Hong AR, Park YJ, Park DJ, Kwak JY, Cho SW. A beneficial role of computer-aided diagnosis system for less experienced physicians in the diagnosis of thyroid nodule on ultrasound. Scientific reports (2021) Oct 14;11(1):20448. PMID: 34650185
5. Chung CW, Choi HS, Kong SH, Park YJ, Park DJ, Ahn HY, Cho SW. Measurements of Bone Health after Thyroid-Stimulating Suppression Therapy in Postmenopausal Women with Differentiated Thyroid Carcinoma: Bone Mineral Density versus the Trabecular Bone Score. Journal of Clinical Medicine (2021) 10(9), 1964. PMID: 34063726

Awards and Honors

2022	Plenary oral presentation award from Korean Endocrine Society
2023	Excellent oral award from Korean Endocrine Society
2024	Excellent oral award from the Korean Society of Lipid and Atherosclerosis

Research Interest

Diabetes mellitus, Dyslipidemia, Thyroid

Cardiac biomarkers for patients with diabetes

Breakfast Symposium 2

Sep 27(Fri) 07:30-08:30 | Room 2 (3F)

CHAIRPERSON : Jeong-taek Woo (Kyung Hee University, Republic of Korea)

07:30-07:50 **Timeless choice: evidenced-based lipitor more than 25 years**
Dae-Won Kim (The Catholic University of Korea, Republic of Korea)

07:50-08:00 **Panel Discussion**
Hee-Dong Kim (Soonchunhyang University, Republic of Korea)
Hun Jee Choe (Hallym University, Republic of Korea)

CURRICULUM VITAE

Dae-Won Kim

Associate Professor, Daejeon St Mary's Hospital, Republic of Korea

Education and Training

2007.02	Chonbuk University, Korea, M.D, Medicine
2018.08	Catholic University, Korea, Ph.D, Internal Medicine

Employment and Position

2020.03-	Daejeon St Mary's Hospital, Assistant Professor
2024.03-	Daejeon St Mary's Hospital, Associate Professor

Important Publications

1. Association between statin therapy and mortality in patients on dialysis after atherosclerotic cardiovascular diseases. Scientific reports 2023.Jul 6:13 (1):10940 공동교신저자 IF 4.996 (SCI) ISSN 2045-2322
2. Association between body mass index and three-year outcome of acute myocardial infarction. Scientific reports 2024.March 14:365 교신저자 IF 4.996 (SCI) ISSN 2045-2322
3. Comparative Effectiveness Analysis of Percutaneous Coronary Intervention vs. Coronary Artery Bypass Grafting in Patients with Chronic Kidney Disease and Unprotected Left Main Coronary Artery Disease : Insights From a Large-Sized All-Comers Registry. Eurointervention 2020. May 16(1);27-35 제 1저자 IF 6.534 (SCIE) ISSN 1774-024X
4. The association between aortic regurgitation and undetermined embolic infarction with aortic complex plaque. International Journal of Stroke 2018.Jun Vol 13(4) 391-399 published 제 1저자 IF 4.466 (SCI). ISSN 1747-4930
5. Clinical Outcome According to Spasm Type of Single Coronary Artery provoked by Intracoronary Ergonovine Tests in patients without significant organic stenosis. International Journal of Cardiology 2018.Feb 1;252:6-12 published & 제 1 저자 IF 3.471(SCI). ISSN 0167-5273

Awards and Honors

2019.3.9	Young Investigator Award of 2018 from department of internal medicine in Catholic University
2018.8	Ph.D. in the Catholic University of Korea & graduate academic award
2017.4.26	TCTAP 2017 best abstract award

Research Interest

Clinical investigation, AI related research, 3D printing, various intervention issues

Timeless choice: evidenced-based lipitor more than 25 years

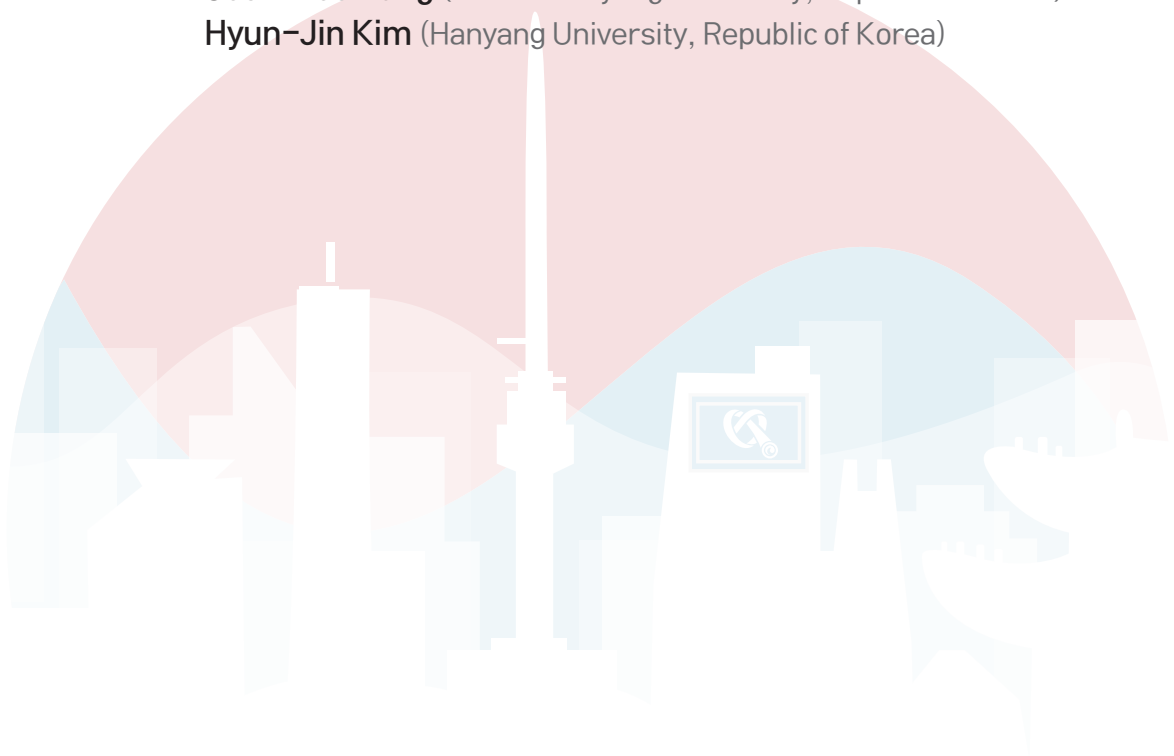
Breakfast Symposium 3

Sep 27(Fri) 07:30-08:30 | Room 3 (3F)

CHAIRPERSON : Hyun Ho Shin (Asan Chungmu Hospital, Republic of Korea)

07:30-07:50 **Treat-to-target LDL-C lowering strategy with Lipitor portfolio**
Jeehoon Kang (Seoul National University, Republic of Korea)

07:50-08:00 **Panel Discussion**
Seon Mee Kang (Soonchunhyang University, Republic of Korea)
Hyun-Jin Kim (Hanyang University, Republic of Korea)



CURRICULUM VITAE

Jeehoon Kang

Seoul National University, Republic of Korea

Education

1996-1999	Deajon Science High School, Daejon Korea
2000-2004	Seoul National University, College of Natural Science, Biomedical Science (BS)
2004-2008	Seoul National University, College of Medicine (MD)
2011-2017	Seoul National University, Department of Molecular Medicine and Biopharmaceutical Sciences. (PhD Candidate)

Training

2008.2-2009.2	Internship, Seoul National University Hospital, Seoul, Korea
2009.3-2013.2	Residency in Internal Medicine, Seoul National University Hospital, Seoul, Korea
2013.3-2016.4	Military Medical Officer, Captain
2016.5-2018.3	Clinical Fellowship in Cardiology, Seoul National University Hospital, Seoul, Korea
2018.4-	Assistant professor, Department of Internal Medicine and Cardiovascular Center, Seoul National University Hospital, Seoul, Korea
2020.3-	Assistant professor, Department of Critical Care Medicine, Seoul National University Hospital, Seoul, Korea
2023.3-	Associate professor, Department of Critical Care Medicine, Seoul National University Hospital, Seoul, Korea

Awards and Recognitions

2012	Best Speaker at the 63th Korean Internal Medicine Conference
2013	Best Medical Officer, 2013
2016	Best Speaker at the 12th KSIC International Conference
2017	Best Speaker at the 13th KSIC International Conference
2019	Young investigator Award, TCTAP 2019
2021	Doosan Yonkang Academic award
2022	Hamchoon Academic award

Treat-to-target LDL-C lowering strategy with Lipitor portfolio

Breakfast Symposium 4

Sep 27(Fri) 07:30-08:30 | Room 4 (5F)

CHAIRPERSON : Jeong Euy Park (Park Jeong Euy Internal Medicine Clinic, Republic of Korea)

07:30-07:50 **Lipid-lowering efficacy of combination therapy with moderate-intensity statin and ezetimibe versus high-intensity statin monotherapy**

Si-Hyuck Kang (Seoul National University, Republic of Korea)

07:50-08:00 **Panel Discussion**

Bukyung Kim (Kosin University, Republic of Korea)
Sung A Bae (Yonsei University, Republic of Korea)

CURRICULUM VITAE

Si-Hyuck Kang

Associate Professor, Interventional Cardiology,
Seoul National University Bundang Hospital, Seoul, Republic of Korea

Education and Training

2015-Present	Postgraduate School, Seoul National University (PhD)
2009-2014	Postgraduate School, Seoul National University (Master of Medical Science)
2001-2005	Seoul National University College of Medicine (MD)
1998-2001	Premedical Course, College of Liberal Arts & Science, Seoul National University Hospital

Brief Chronology of Employment

2022-Present	Associate Professor, Cardiology, Seoul National University Bundang Hospital, Seongnam-si, Korea
2016-2022	Assistant Professor, Cardiology, Seoul National University Bundang Hospital, Seongnam-si, Korea
2020-2022	Visiting researcher, Google Health, Palo Alto, CA, USA
2013-2016	Clinical Fellow, Cardiology, Seoul National University Hospital, Seoul, Korea
2011-2013	Medical Officer, Ministry of National Defense, Seoul, Korea
2010-2011	Medical Officer, UN Command Security Battalion of Joint Security Area
2006-2010	Residency in Internal Medicine, Seoul National University Hospital, Seoul, Korea
2005-2006	Internship, Seoul National University Hospital, Seoul, Korea

Professional Memberships

2018	Member, International Society of Hypertension
2018	Member, European Society of Hypertension
2017	Member, Korean Society of Hypertension
2017	Member, European Society of Cardiology
2016	Member, Korean Society of Interventional Cardiology
2015	Member, Korean Society of Cardiology
2015	Member, Korean Heart Rhythm Society
2012	Member, Korean Society of Echocardiography
2010	Member, Korean Society of Internal Medicine

Lipid-lowering efficacy of combination therapy with moderate-intensity statin and ezetimibe versus high-intensity statin monotherapy

Breakfast Symposium 5

Sep 28(Sat) 07:50-08:50 | Room 1 (3F)

CHAIRPERSON : Shung Chull Chae (Kyungpook National University, Republic of Korea)

07:50-08:10 **New evidence of Atorvastatin: optimal balance between efficacy and safety**

Jun Hwa Hong (Eulji University, Republic of Korea)

08:10-08:20 **Panel Discussion**

Jee Hee Yoo (Chung-Ang University, Republic of Korea)
Dae Young Cheon (Hallym University, Republic of Korea)

CURRICULUM VITAE

Jun Hwa Hong

Associate Professor, Daejeon Eulji Medical Center, Eulji University, Republic of Korea

Education and Training

2024.02	Eulji University, Korea, M.D, Medicine
2015.02	Eulji University, Korea, Ph.D, Internal Medicine

Employment and Position

2013-2014	Chungnam National University Hospital, Daejeon, Korea, Clinical Fellow in Internal Medicine
2014-2016	Kyungpook National University Hospital, Daegu, Korea, Clinical Assistant Professor in Internal Medicine
2016-2022	Eulji University Hospital, Daejeon, Korea, Assistant Professor in Internal Medicine
2022-Present	Eulji University Hospital, Daejeon, Korea, Associate Professor in Internal Medicine

Important Publications

1. Comparison of therapeutic efficacy and safety of sitagliptin, dapagliflozin, or lobeglitazone adjunct therapy in patients with type 2 diabetes mellitus inadequately controlled on sulfonylurea and metformin: third agent study. Diabetes Res Clin Pract. 2023 Aug 11:110872. doi: 10.1016/j.diabres.2023.110872.
2. Comparison of the effects of gemigliptin versus glimepiride on cardiac function in patients with type 2 diabetes uncontrolled with metformin: The gemi-heart study. Diabetes Obes Metab. 2023 Aug;25(8):2181-2190. doi: 10.1111/dom.15095. Epub 2023 May 3.
3. A randomized, active-controlled, parallel, open-label, multicenter, phase 4 study to compare the efficacy and safety of pregabalin sustained release tablet and pregabalin immediate release capsule in type II diabetic patients with peripheral neuropathic pain. Medicine (Baltimore). 2023 Apr 25;102(17):e33701.
4. Effects of Virtual Reality Exercise Program on Blood Glucose, Body Composition, and Exercise Immersion in Patients with Type 2 Diabetes. Int. J. Environ. Res. Public Health 2023, 20(5), 4178.
5. SGLT-2 inhibitors and GLP-1 receptor agonists in metabolic dysfunction-associated fatty liver disease: Trends Endocrinol Metab. 2022 Jun;33(6):424-442. doi: 10.1016/j.tem.2022.03.005. Epub 2022 Apr 28.

New evidence of Atorvastatin: optimal balance between efficacy and safety

Breakfast Symposium 6

Sep 28(Sat) 07:50-08:50 | Room 2 (3F)

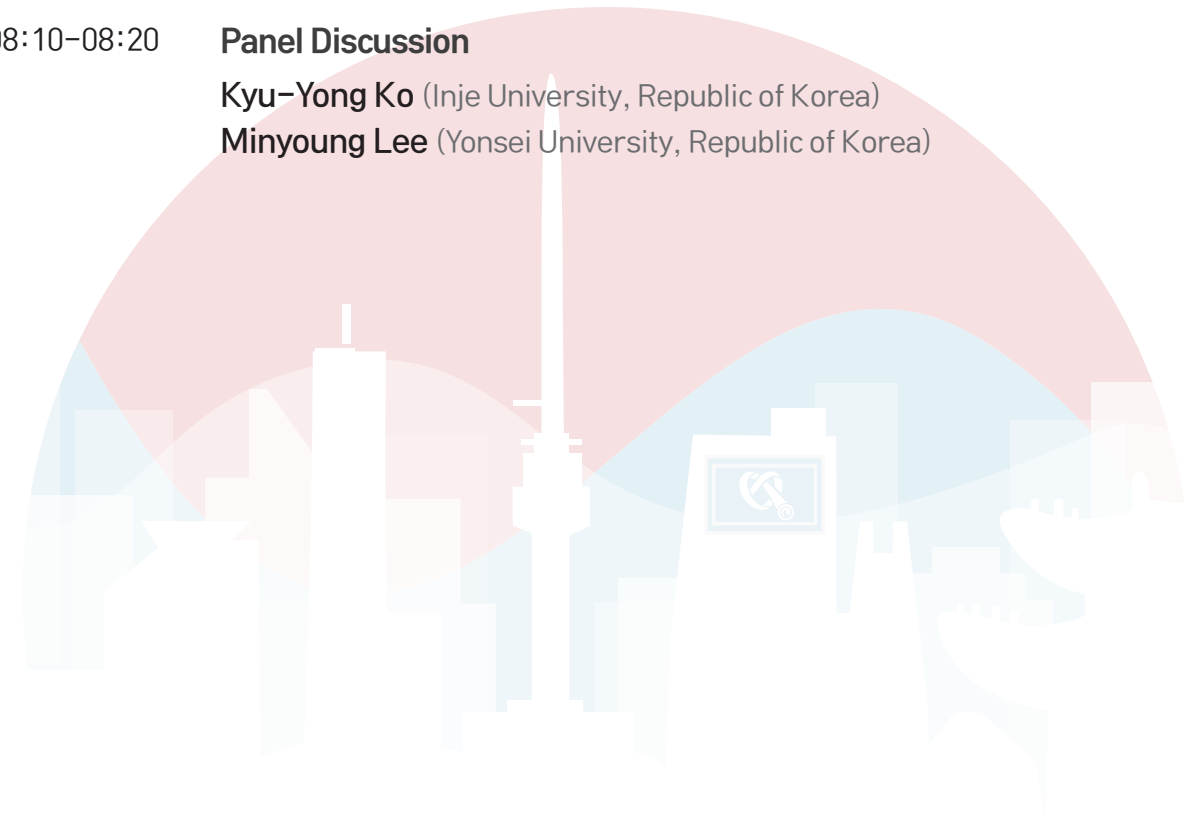
CHAIRPERSON : Hong Seog Seo (Seoul Red Cross Hospital, Republic of Korea)

07:50-08:10 **Beyond LDL-C: the role of fenofibrate in exploring non-HDL-C as a predictor of cardiovascular risk**

Soo Lim (Seoul National University, Republic of Korea)

08:10-08:20 **Panel Discussion**

Kyu-Yong Ko (Inje University, Republic of Korea)
Minyoung Lee (Yonsei University, Republic of Korea)



CURRICULUM VITAE

Soo Lim

Professor, Seoul National University Bundang Hospital, Republic of Korea

Education and Training

1996.02	Seoul National University, Korea, M.D, Medicine
2006.08	Seoul National University, Korea, Ph.D, Internal Medicine

Employment and Position

Mar. 1997-Feb. 2001	Residency in Internal Medicine, Seoul National University Hospital, Seoul, Korea, Resident
Mar. 2011-Aug. 2012	Massachusetts General Hospital/Harvard Medical School, Boston, MA, USA, Research fellow
Sep. 2017-Present	Endocrinology Division, Department of Internal Medicine, Seoul National University Bundang Hospital, Professor

Important Publications

1. Ahmad E*, Lim S* (co-first author), Lamptey R, Webb DR, Davies MJ. Type 2 diabetes. Lancet 2022 Nov 19;400(10365):1803-1820.
2. Neeland IJ, Lim S* (co-corresponding author), Tchernof A, Gastaldelli A, Rangaswami J, Ndumele CE, Powell-Wiley TM, Després JP* (co-corresponding author). The Metabolic Syndrome. Nature Reviews Disease Primers [accepted].
3. Kadowaki T, Isendahl J, Khalid U, Lee SY, Nishida T, Ogawa W, Tobe K, Yamauchi T, Lim S (corresponding author). Effect of once-weekly subcutaneous semaglutide in adults with overweight or obesity, with or without type 2 diabetes, in an East Asian population. Lancet Diabetes Endocrinol 2022 Mar;10(3):193-206.
4. Lim S, Bae JH, Kwon HS, Nauck MA. COVID-19 and diabetes mellitus: from pathophysiology to clinical management. Nature Rev Endocrinol. 2021 Jan;17(1):11-30.
5. Moon JS, Hong JH, Jung YJ, Ferrannini E, Nauck MA, Lim S (corresponding author). SGLT-2 inhibitors and GLP-1 receptor agonists in metabolic dysfunction-associated fatty liver disease. Trends Endocrinol Metab. 2022 Jun;33(6):424-442.

Awards and Honors

- The *Moonsuk* Academic Award from the Korean Society for the Study of Obesity, 2023
- The *Bulgok* Creative Research Award from Seoul National University Bundang Hospital, 2022, 2023
- The Scientific Achievement Award from the Asia-Pacific Cardiometabolic Syndrome Congress, 2019
- The *Hamchoon* Scientific Research Award from Seoul National University College of Medicine Alumni Association, 2016
- The *Namgok* Scientific Research Award from the Korean Endocrine Society, 2013

Research Interest

Diabetes mellitus, dyslipidemia, obesity, fatty liver, and metabolic syndrome

Beyond LDL-C: the role of fenofibrate in exploring non-HDL-C as a predictor of cardiovascular risk

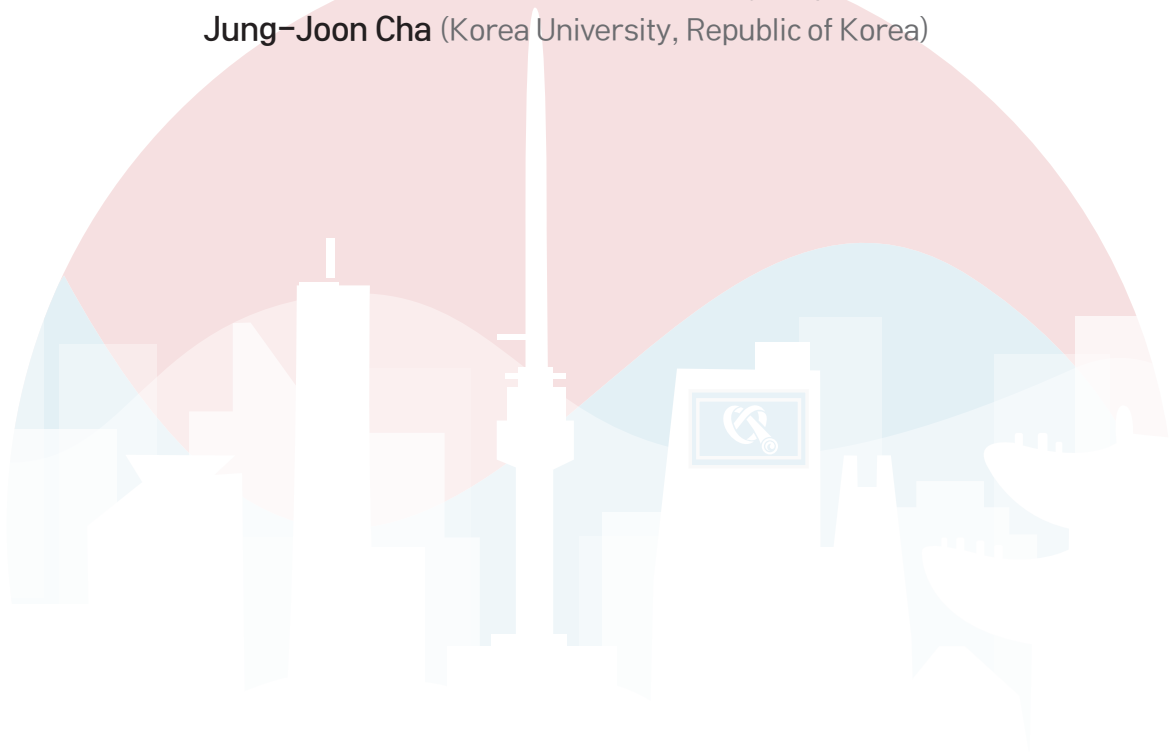
Breakfast Symposium 7 (K)

Sep 28(Sat) 07:50-08:50 | Room 3 (3F)

CHAIRPERSON : Ung Kim (Yeungnam University, Republic of Korea)

07:50-08:10 **Levacalm: safe and effective agent for all hypertension patients**
Jong-Young Lee (Sungkyunkwan University, Republic of Korea)

08:10-08:20 **Panel Discussion**
Joon Ho Moon (Seoul National University, Republic of Korea)
Jung-Joon Cha (Korea University, Republic of Korea)



CURRICULUM VITAE

Jong-Young Lee

Division of Cardiology, Department of Internal Medicine Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, Republic of Korea

Specific Field of Interest and Practice

1. Complex PCI
2. Intravascular imaging
3. CTO
4. Peripheral intervention
5. TAVR
6. Cardiac rehabilitation and sports cardiology

Academic Qualification

2011-2013	Doctor's degree, University of Ulsan College of Medicine, Seoul, Korea
2009-2011	Master's degree, University of Ulsan College of Medicine, Seoul, Korea
1993-1999	M.D., Yeungnam University College of Medicine, Daegu, Korea

Current and Previous Positions

2024.3.-	Professor, Division of Cardiology, Kangbuk Samsung hospital, Sungkyunkwan University school of medicine, Seoul, Republic of Korea
2018.03-2024.02	Associate Professor, Division of Cardiology, Kangbuk Samsung hospital, Sungkyunkwan University school of medicine, Seoul, Republic of Korea
2014.11-	Clinical Associate Professor, Division of Cardiology, Kangbuk Samsung hospital, Sungkyunkwan University school of medicine, Seoul, Republic of Korea
2014.03-2014.10	Clinical Associate Professor, Division of Cardiology, Department of Internal Medicine, University of Ulsan, College of Medicine, Seoul, Korea Chief of Cardiac rehabilitation center
2010.03-2014.02	Clinical Assistant Professor, Division of Cardiology, Department of Internal Medicine, University of Ulsan, College of Medicine, Seoul, Korea
2007.03-2010.02	Cardiology Fellow, Division of Cardiology, Asan medical center, Ulsan Uniiversity, College of Medicine, Seoul, Korea
2003.05-2007.02	Residencyship in Internal Medicine, Gangneung Asan Hospital
2000.03-2003.05	Military Service as a doctor
1999.03-2000.02	Internship, Yeungnam University Hospital, Daegu, Korea

Levacalm: safe and effective agent for all hypertension patients

Breakfast Symposium 8

Sep 28(Sat) 07:50–08:50 | Room 4 (5F)

CHAIRPERSON : Keeho Song (Konkuk University, Republic of Korea)

07:50–08:10 **Renal safety issues in dyslipidemia treatment: why is it important?**
Se Eun Park (Sungkyunkwan University, Republic of Korea)

08:10–08:20 **Panel Discussion**
Minkwan Kim (Yonsei University, Republic of Korea)
Joonyub Lee (The Catholic University of Korea, Republic of Korea)

CURRICULUM VITAE

Se Eun Park

Professor,
Sungkyunkwan University School of Medicine Kangbuk Samsung Hospital, Republic of Korea

Education and Training

2001.02	Younsei University, Korea, M.D, Medicine
2013.02	Yonsei University, Korea, Ph.D, Internal Medicine

Employment and Position

2002-2006	Department of Internal Medicine, Severance Hospital, Yonsei University College of Medicine, Residency
2006-2009	Department of Internal Medicine, Severance Hospital, Yonsei University College of Medicine, Clinical Fellow
2009-	Sungkyunkwan University School of Medicine Kangbuk Samsung Hospital, Clinical Assistant Professor
2023-	Sungkyunkwan University School of Medicine Kangbuk Samsung Hospital, Professor

Important Publications

1. Koo DJ, Lee MY, Jung I, Moon SJ, Kwon H, Rhee EJ, Park CY, Lee WY, Oh KW, Park SE. Increased Risk of NAFLD in Adults withGlomerular Hyperfiltration: An 8-Year Cohort Study Based on 147,162 Koreans. J Pers Med. 2022 Jul 14;12(7):1142.
2. Jung I, Lee DY, Lee MY, Kwon H, Rhee EJ, Park CY, Oh KW, Lee WY, Park SW, Park SE. Autonomic Imbalance Increases the Risk for Non-alcoholic Fatty Liver Disease. Front Endocrinol (Lausanne). 202112:752944.
3. Park SE, Seo MH, Cho JH, Kwon HM, Kim YH, Han KD, Jung JH, Park YG, Rhee EJ, Lee WY. Dose-dependent effect of smoking on risk of diabetes remains after smoking cessation : a nationwide population-based cohort study in Korea. Diabetes Metab J. 2021 45(4):539-546.
4. Lee DY, Lee MY, Cho JH, Kwon H, Rhee EJ, Park CY, Oh KW, Lee WY, Park SW, Ryu S, Park SE. Decreased Vagal Activity and Deviation in Sympathetic Activity Precedes Development of Diabetes. Diabetes Care. 2020 Jun;43(6):1336-1343.

Research Interest

Type 2 diabetes, Insulin resistance, Diabetic complications

Renal safety issues in dyslipidemia treatment: why is it important?

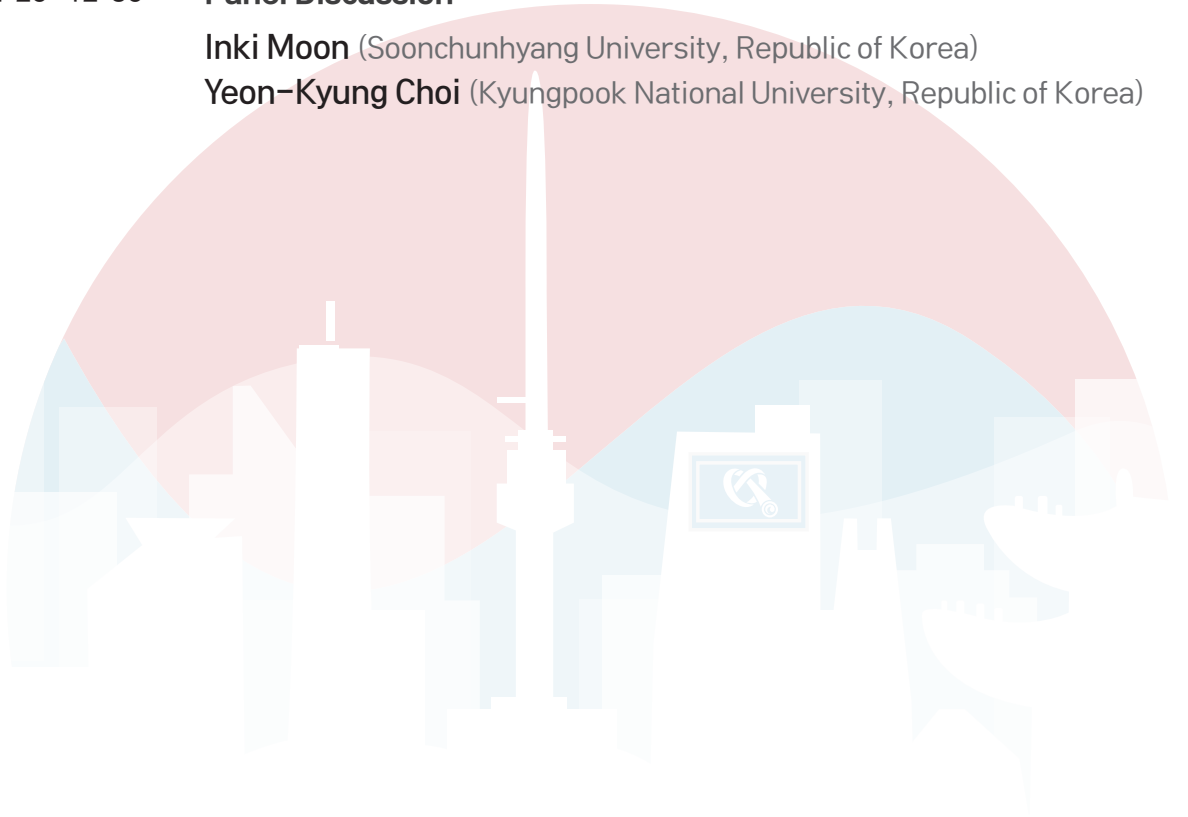
Luncheon Symposium 1 (K)

Sep 27(Fri) 12:00–13:00 | Room 1 (3F)

CHAIRPERSON : Myung Ho Jeong (Gwangju Veterans Hospital, Republic of Korea)

12:00–12:20 **It's time to break therapeutic inertia in dyslipidemia treatment**
Young Sang Lyu (Chosun University, Republic of Korea)

12:20–12:30 **Panel Discussion**
Inki Moon (Soonchunhyang University, Republic of Korea)
Yeon-Kyung Choi (Kyungpook National University, Republic of Korea)



CURRICULUM VITAE

Young Sang Lyu

Associated Professor, Chosun University Hospital, Republic of Korea

Education and Training

2005-2011	Chosun University College of Medicine, M.D., Medicine
2017-2019	Chosun University, M.S., Internal medicine
2019-2021	Chosun University, Ph.D., Internal medicine

Employment and Position

2021.09-	Chosun university, Associated professor
2023-	Korea diabetes association, Vice-Secretary General
2023-	Korea obesity association, Vice-Secretary General

Important Publications

1. 2019 Prevalence and Risk Factors for Undiagnosed Glucose Intolerance Status in Apparently Healthy Young Adults Aged <40 Years: The Korean National Health and Nutrition Examination Survey 2014-2017. nt. J. Environ. Res. Public Health 2019, 16(13), 2393
2. 2020 Impact of Social Jetlag on Weight Change in Adults: Korean National Health and Nutrition Examination Survey 2016-2017. Int J Environ Res Public Health 2020 Jun 18;17(12):4383.
3. 2021 Clinicopathologic characteristics of papillary thyroid cancer originated from isthmus, World J Surg.
4. 2023 Comparison of SGLT2 inhibitors with DPP-4 inhibitors combined with metformin in patients with acute myocardial infarction and diabetes mellitus. Cardiovasc Diabetol. 2023 Jul 22;22(1)
5. 2024 Efficacy and safety of enavogliflozin vs. dapagliflozin as add-on therapy in patients with type 2 diabetes mellitus based on renal function: a pooled analysis of two randomized controlled trials. Cardiovasc Diabetol. 2024 Feb 15;23(1):71.

Research Interest

Diabetes, Complication of diabetes, Obesity, NAFLD

It's time to break therapeutic inertia in dyslipidemia treatment

Luncheon Symposium 2

Sep 27(Fri) 12:00–13:00 | Room 2 (3F)

CHAIRPERSON : Chee Jeong Kim (Chung-Ang University, Republic of Korea)

12:00–12:20	**Cutting edge care of pitavastatin with ezetimibe combination therapy** Chang Hee Jung (University of Ulsan, Republic of Korea)
12:20–12:30	**Panel Discussion** You-Jeong Ki (Eulji University, Republic of Korea) Nam Hoon Kim (Korea University, Republic of Korea)

CURRICULUM VITAE

Chang Hee Jung

Professor, Asan Medical Center, University of Ulsan College of Medicine, Republic of Korea

Education and Training

2002.02	Korea University, Korea, M.D, Medicine
2014.02	Univ. of Ulsan College of Medicine, Korea, Ph.D., Internal Medicine

Employment and Position

2003-2007	Asan Medical Center, Residency
2010-2012	Asan Medical Center, Clinical Fellow
2012-2017	Asan Medical Center, Assistant Professor
2017-2023	Asan Medical Center, University of Ulsan College of Medicine, Associate Professor
2018-2020	University of Virginia, VA, USA, Research Associate
2023-Current	Asan Medical Center, University of Ulsan College of Medicine, Professor

Important Publications

1. Kim MJ, Cho YK, Kim EH, Lee MJ, Lee WJ, Kim HK, Jung CH: Association between metabolic dysfunction-associated steatotic liver disease and myosteatosis measured by computed tomography. J Cachexia Sacopenia Muscle. 2024 Epub ahead of print.
2. Kim MJ, Cho YK, Kim EH, Lee MJ, Lee WJ, Kim HK, Jung CH: Association between Estimated Glucose Disposal Rate and Subclinical Coronary Atherosclerosis. Nutr Metab Cardiovasc Dis. 2024 Epub ahead of print.
3. Cho YK, Jung HN, Kim EH, Lee MJ, Park JY, Lee WJ, Kim HK, Jung CH: Association between sarcopenic obesity and poor muscle quality based on muscle quality map and abdominal computed tomography. Obesity (Silver Spring) 2023. 31(6):1547-1557.
4. Yoon J, Kang HJ, Lee JY, Kim JG, Yoon YH, Jung CH, Kim YJ: Associations Between the Macular Microvasculatures and Subclinical Atherosclerosis in Patients With Type 2 Diabetes: An Optical Coherence Tomography Angiography Study. Front Med (Lausanne) 2022, 9:843176. (Co-corresponding)
5. Jung HN, Kim MJ, Kim HS, Lee WJ, Min SH, Kim YJ, Jung CH: Age-Related Associations of Low-Density. Lipoprotein Cholesterol and Atherosclerotic Cardiovascular Disease: A Nationwide Population-Based Cohort Study. J Am Heart Assoc 2022, 11(9):e024637.

Awards and Honors

2017	Young Investigator Award, Korean Diabetes Association
2024	Scientific Excellence Award, Korean Society of Lipid and Atherosclerosis

Cutting edge care of pitavastatin with ezetimibe combination therapy

Luncheon Symposium 3

Sep 27(Fri) 12:00-13:00 | Room 3 (3F)

CHAIRPERSON : Hyo-Soo Kim (Seoul National University, Republic of Korea)

12:00-12:20 **Efficacy and evidence of ezetimibe atorvastatin combination therapy**
Eun Young Lee (The Catholic University of Korea, Republic of Korea)

12:20-12:30 **Panel Discussion**
Hoyoun Won (Chung-Ang University, Republic of Korea)
Dong-Hwa Lee (Chungbuk National University, Republic of Korea)

CURRICULUM VITAE

Eun Young Lee

Associate Professor, The Catholic University of Korea, Republic of Korea

Education and Training

2006.02	Yonsei University College of Medicine, Korea, M.D, Medicine
2011.02	Yonsei University College of Medicine, Korea, B.S., Internal Medicine
2014.08	Yonsei University College of Medicine, Korea, Ph.D., Internal Medicine

Employment and Position

2006-2011	Yonsei University College of Medicine, Intern, Residency
2011-2014	Yonsei University College of Medicine, Research Fellow
2015-2018	The Catholic University of Korea, Clinical Assistant Professor
2019-2022	The Catholic University of Korea, Assistant Professor
2019-2022	Washington University in St Louis, Visiting scholar
2023-Present	The Catholic University of Korea, Associate Professor

Important Publications

1. Rediscovering Primary Cilia in Pancreatic Islets. Lee EY, Hughes JW. Diabetes Metab J 2023;47:454-469.
2. Risk of Incident Dementia According to Glycemic Status and Comorbidities of Hyperglycemia: A Nationwide Population-Based Cohort Study. Kim WJ, Lee SJ, Lee E, Lee EY, Han K. Diabetes Care 2022;45:134-141.
3. Exposure-weighted scoring for metabolic syndrome and the risk of myocardial infarction and stroke: a nationwide population-based study. Lee EY, Han K, Kim DH, Park YM, Kwon HS, Yoon KH, Kim MK, Lee SH. Cardiovasc Diabetol 2020 Sep 29;19(1):153.
4. Generation of iPSC-derived insulin-producing cells from patients with type 1 and type 2 diabetes compared with healthy control. Kim MJ, Lee EY, You YH, Yang HK, Yoon KH, Kim JW. Stem Cell Res. 2020 Oct;48:101958.
5. Effect of visit-to-visit LDL-, HDL-, and non-HDL-cholesterol variability on mortality and cardiovascular outcomes after percutaneous coronary intervention. Lee EY, Yang Y, Kim HS, Cho JH, Yoon KH, Chung WS, Lee SH, Chang K. Atherosclerosis 2018 17;279:1-9.

Awards and Honors

2020.05	Best Presenter Award, Korean Diabetes Association
2014.08	Academic Award for Excellence, Yonsei University College of Medicine
2013.05	Best Presenter Award, Korean Endocrine Society

Research Interest

Diabetes complication, beta cell, primary cilia, islet transplantation, iPS, insulin resistance

Efficacy and evidence of ezetimibe atorvastatin combination therapy

Luncheon Symposium 4

Sep 27(Fri) 12:00–13:00 | Room 4 (5F)

CHAIRPERSON : Moon-Kyu Lee (Eulji University, Republic of Korea)

12:00–12:20 **Inflammation and its biomarkers & anti-inflammatory therapy in CVD**
Paul M Ridker (Harvard Medical School, USA)

12:20–12:30 **Panel Discussion**
Youngwoo Jang (Gachon University, Republic of Korea)
Dughyun Choi (Soonchunhyang University, Republic of Korea)

CURRICULUM VITAE

Paul M Ridker

Eugene Braunwald Professor of Medicine,
Director, Center for Cardiovascular Disease Prevention,
Brigham and Women's Hospital, Boston, Massachusetts, USA

Education and Training

MD Harvard Medical School, Boston, MA (1986), MPH Harvard School of Public Health, Boston, MA,
Internship, Residency, Cardiovascular Disease Fellowship, Brigham and Women's Hospital, Boston,

Employment and Position

Brigham and Women's Hospital, Harvard Medical School
Director, Center for Cardiovascular Disease Prevention

Important Publications

1. Ridker PM, Lei L, Louie M et al. Inflammation and cholesterol as predictors of cardiovascular events among 13970 contemporary high-risk patients with statin intolerance. Circulation 2024;149:28-354.
2. Ridker PM, Bhatt DL, Pradhan AD, et al. Inflammation and cholesterol as predictors of cardiovascular events among patients receiving statin therapy: a collaborative analysis of three randomized trials. Lancet 2023;401:1293-1301.
3. Ridker PM, Rane M. Interleukin-6 signaling and anti-interleukin-6 therapeutics in cardiovascular disease. Circ Res 2021;128:1728-1746.
4. Ridker PM, MacFadyen JG, Everett BM, Libby P, Thuren T, Glynn RJ for the CANTOS Trial Group. Relationship of C-reactive protein reduction to cardiovascular event reduction following treatment with canakinumab: a secondary analysis from the CANTOS randomised controlled trial. Lancet. 2018; 391:319-328.
5. Ridker PM, Everett BM, Thuren T, et al. Antiinflammatory Therapy with Canakinumab for Atherosclerotic Disease. N Engl J Med. 2017;377:1119-1131.

Awards and Honors

Distinguished Scientist Award, American Heart Association; Elected member National Academy of Medicine (USA); multiple honorary degrees

Research Interest

Inflammation and atherosclerosis, clinical trials, prevention and treatment of atherosclerotic disease.

Inflammation and its biomarkers & anti-inflammatory therapy in CVD

Luncheon Symposium 5

Sep 28(Sat) 12:20–13:20 | Room 1 (3F)

CHAIRPERSON : In-Ho Chae (Seoul National University, Republic of Korea)

12:20–12:40 **New era of siRNA; treatment paradigm shift in ASCVD**
R. Scott Wright (Mayo Clinic, USA)

12:40–12:50 **Panel Discussion**
Sang-Eun Lee (Ewha Womans University, Republic of Korea)
Jin Woo Jeong (Wonkwang University, Republic of Korea)

CURRICULUM VITAE

R. Scott Wright

Professor, Mayo Clinic, USA

Education and Training

1989.05	University of Kentucky, USA, M.D, Medicine
1992.06	Mayo Clinic, Residency, Internal Medicine
1996.06	Mayo Clinic, Fellowship, Cardiology

Employment and Position

1996-Present	Mayo Clinic, Cardiologist and Assistant Professor
2001	Mayo Clinic, Associate Professor
2006	Mayo Clinic, Professor of Medicine
2005	Mayo Clinic, Associate Chair, Division of Cardiology
2017	Mayo Clinic, Senior Chair, IRB and Human Research Protection Program
2018	Mayo Clinic, Associate Editor, Mayo Clinic Proceedings
2018-2021	Mayo Clinic, Member, Officers and Councilors

Important Publications

1. Effects of Inclisiran in Patients with ASCVD: A Pooled Analysis of the ORION-10 and ORION-11 Randomized Trials. Mayo Clinic Proceedings 2024 (in press).
2. Safety and Tolerability of Inclisiran for Treatment of Hypercholesterolemia in 7 clinical trials. JACC 2023;82:2251-61.
3. Pooled Patient-Level Analysis of Inclisiran Trials in Patients with FH or Atherosclerosis. JACC 2021;77:1182-1193.
4. Two Phase 3 trials of inclisiran in patients with elevated LDL cholesterol. N Engl J Med 2020;382:1507.
5. Convalescent Plasma Antibody Levels and the Risk of Death from Covid-19. N Engl J Med 2021;384:1015-1027.

Awards and Honors

2021	Mayo Clinic Team Science award for the US Convalescent Plasma Program
2023	Amateur Radio Hall of Fame CQ Magazine
2021	Sir Richard Doll Lectureship, Oxford University

New era of siRNA; treatment paradigm shift in ASCVD

Luncheon Symposium 6 (K)

Sep 28(Sat) 12:20–13:20 | Room 2 (3F)

CHAIRPERSON : Young-Bae Park (Seoul National University, Republic of Korea)

12:20–12:40 **Why is Shingrix vaccination necessary for patients with diabetes and hypertension?**
Jong-Chan Youn (The Catholic University of Korea, Republic of Korea)

12:40–13:00 **Panel Discussion**
Dong-Hyuk Cho (Korea University, Republic of Korea)
Jong Han Choi (Konkuk University, Republic of Korea)

CURRICULUM VITAE

Jong-Chan Youn

Professor, Division of Cardiology, Department of Internal Medicine,
Seoul St. Mary's Hospital, The Catholic University of Korea, Seoul, Republic of Korea

Education and Training

2002.02	Yonsei University, Seoul, M.D, Medicine
2006.08	Yonsei University, Seoul, M.S, Internal Medicine
2009.08	Yonsei University, Seoul, Ph.D., Cardiology

Employment and Position

2023-	Seoul St. Mary's Hospital, The Catholic University of Korea, Professor
2019-2020	Cedars-Sinai Medical Center, Los Angeles, USA, Post-Doc Scientist
2019-2023	Seoul St. Mary's Hospital, The Catholic University of Korea, Associate Professor
2016-2019	Dongtan Sacred Heart Hospital, Hallym University, Associate Professor
2012-2015	Severance Cardiovascular Hospital, Yonsei University, Assistant Professor

Important Publications

1. Youn JC et al. Temporal Trends, Risk Factors, and Clinical Outcomes of De Novo Lymphoproliferative Disorders After Heart Transplantation. JACC Heart Fail 2024;12(2):395-405.
2. Youn JC et al. Korean Society of Heart Failure Guidelines for the Management of Heart Failure: Treatment. Korean Circ J. 2023;53(4):217-238.
3. Youn JC et al. Characteristics and outcomes of heart transplant recipients with a pretransplant history of malignancy. Am J Transplant. 2022;22(12):2942-2950.
4. Youn JC et al. Pathophysiology of Heart Failure with Preserved Ejection Fraction. Heart Fail Clin. 2021;17(3):327-335.
5. Youn JC et al. Temporal Trends of De Novo Malignancy Development after Heart Transplantation. J Am Coll Cardiol. 2018;71(1):40-49.

Awards and Honors

2018	ISHLT, International Travelling Scholarship Award
2016	Asian Pacific Society of Hypertension Young Investigator Award
2013	Korean Society of Hypertension, The Best Young Investigator Award

Research Interest

Heart Failure, Cardiac Amyloidosis, Cardio-Oncology
Heart Transplantation, Left Ventricular Assist Device (LVAD)
Immune Aging (Immunosenescence), Transplantation Immunology

Why is Shingrix vaccination necessary for patients with diabetes and hypertension?

Luncheon Symposium 7 (K)

Sep 28(Sat) 12:20–13:20 | Room 3 (3F)

CHAIRPERSON : Hak Chul Jang (Seoul National University, Republic of Korea)

12:20–12:40 **Individual treatment strategy for dyslipidemia**
Jin Joo Park (Seoul National University, Republic of Korea)

12:40–12:50 **Panel Discussion**
Dong Oh Kang (Korea University, Republic of Korea)
Ye Seul Yang (Seoul National University, Republic of Korea)

CURRICULUM VITAE

Jin Joo Park

Associate Professor, Seoul National University Bundang Hospital, Republic of Korea

Education and Training

2003.04	Heidelberg University, Germarny, M.D, Medicine
2018.02	Seoul National University, Korea, Ph.D, Molecular genetics

Employment and Position

2011-2013	Seoul National University Hospital, Clinical Fellow
2013-	Seoul National University Bundang Hospital, Assistant, Associate Professor

Important Publications

1. Se Yong Jang*, Jin Joo Park*, Eric Adler, Emily Eshraghian, Faraz S. Ahmad, Claudio Campagnari, Avi Yagil, and Barry Greenberg Mortality Prediction in Patients With or Without Heart Failure Using a Machine Learning Model JACC Adv. 2023 Sep, 2 (7) 100554. (*equal contribution)
2. Park JJ, Jang SY, Adler E, Ahmad F, Campagnari C, Yagil A, Greenberg B. A machine learning-derived risk score predicts mortality in East Asian patients with acute heart failure Eur J Heart Fail 2023 Oct 12. doi: 10.1002/ejhf.3059. Online ahead of print.
3. Park JJ, Greenberg B. Topping Off the Pill Box: Dapagliflozin, Heart Failure, and Polypharmacy. JACC Heart Fail. 2023 Jul 28:S2213-1779(23)00396-7.
4. Park JJ, Yoon M, Cho HW, Lee SE, Choi JO, Yoo BS, Kang SM, Choi DJ. Iron Deficiency in Korean Patients With Heart Failure. J Korean Med Sci. 2023 Jun 12;38(23):e177. doi: 10.3346/jkms.2023.38.e177. (*equal contribution)
5. Park JJ. To Take or Not to Take: The Dilemma With Marginal Donor Heart? Korean Circ J. 2023 Apr;53(4):268-270.

Research Interest

Heart failure research, advanced heart failure, phamacotherapy

Individual treatment strategy for dyslipidemia

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Oral Presentations

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Oral Presentation 1

Sep 26(Thu) 14:40-16:10 | Room 1 (3F)

CHAIRPERSONS : Kae Won Cho (Soonchunhyang University, Republic of Korea)
Jun Namkung (Yonsei University, Republic of Korea)

OP1-1

Saffron extract and reverse cholesterol transport: an innovative approach to atherosclerosis therapy

Yasmin Mohd Zainal Abidin Shukri[1*], Nurul Alimah Abdul Nasir[3], Iman Nabilah Abd Rahim[1], Noor Alicezah Mohd Kasim[1,2]

[1]Institute of Pathology, Laboratory and Forensic Medicine (I-PPerForM), Universiti Teknologi MARA, 47000 Sungai Buloh, Selangor, Malaysia, [2]Department of Pathology, Faculty of Medicine, Universiti Teknologi MARA, 47000 Sungai Buloh, Selangor, Malaysia, [3]Department of Pharmacology, Faculty of Medicine, Universiti Teknologi MARA, 47000 Sungai Buloh, Selangor, Malaysia

Objectives: Reverse cholesterol transport (RCT) is an essential process that transports cholesterol from peripheral tissues to the liver for excretion, preventing cardiovascular diseases. Statins have been shown to enhance RCT however several side effects have arisen so there is a need to find an alternative approach. Saffron is known for its hypolipidemic effects, but its role in the RCT pathway remains unclear. Therefore, this study aims to investigate the role of saffron in RCT genes (ABCA-1, SRB-1, and PPAR-γ).
Objective: To explore the atheroprotective properties of saffron extract (SE) and the gene expression of RCT-related proteins, in atherosclerotic rabbits.
Methods: Thirty-five New Zealand White rabbits were fed a 1% high-cholesterol diet for 8 weeks to induce atherosclerosis. They were then assigned to five groups: baseline, statins, placebo, and saffron extract (SE) at 50 mg/kg/day and 100 mg/kg/day for 8 weeks. Liver tissues were collected for quantitative reverse transcription polymerase chain reaction (qRT-PCR) analysis of ABCA-1, SRB-1, and PPAR-γ gene expression, with relative changes assessed using the 2-$\Delta\Delta$Ct method.
Results: Post-treatment of saffron extract (SE) significantly increased SRB-1 gene expression in the liver of rabbits compared to the pre-treatment group (p0.05). ABCA-1 gene expression increased following treatment with 50 mg/kg/day SE compared to placebo, although not statistically significant (p>0.05).
Conclusions: Saffron extract enhances reverse cholesterol transport (RCT) in rabbits with atherosclerosis by increasing the expression of the SRB-1 and PPARγ genes, supporting its anti-atherogenic effects. Saffron has the potential to be an alternative or complementary therapy to statins for reducing atherosclerosis. Further research is necessary to understand the underlying mechanisms and further advancements in managing cardiovascular disease.
Keywords: Reverse cholesterol transport, Atherosclerosis, Rabbits, Saffron

OP1-2

Comparative effects of alirocumab and evolocumab on protein and gene expression in stimulated human coronary endothelial cells

Rahayu Zulkapli[12,3*], Hapizah Nawawi[1,2], Suhaila Abd Muid[1,2], Seok Mui Wang[1,2]

[1]Institute of Pathology, Laboratory and Forensic Medicine (I-PPerForM), Universiti Teknologi MARA (UiTM), Sungai Buloh Campus, Jalan Hospital, 47000 Sungai Buloh, Selangor, Malaysia, [2]Faculty of Medicine, Universiti Teknologi MARA (UiTM), Sungai Buloh Campus, Jalan Hospital, 47000 Sungai Buloh, Selangor, Malaysia, [3]Faculty of Dentistry, Universiti Teknologi MARA (UiTM), Sungai Buloh Campus, Jalan Hospital, 47000 Sungai Buloh, Selangor, Malaysia

Objectives: The early stage of atherosclerosis development involves inflammation, endothelial injury, and endothelial activation before the formation of atherosclerotic plaques. The overexpression of proinflammatory cytokines (interleukin-6; IL-6) and adhesion molecules (intercellular adhesion molecule 1; ICAM-1 and E-selectin) by endothelial cells, mediated via nuclear factor-kappa beta (NF-κB) activation, occurs before the adherence of circulating monocytes on endothelial cells. It is proven that Evolocumab and Alirocumab reduces the availability of oxidized LDL effectively compared to other lipid-lowering drugs. However, the effects of these PCSK9 inhibitors on the protein and gene expression profiles associated with early inflammatory and endothelial processes remain poorly understood. This study aimed to compare the protein and gene expression of stimulated human coronary artery endothelial cells (HCAEC) between Alirocumab and Evolocumab treatment.
Methods: Methods: HCAEC were stimulated with 1 μg/ml of LPS or 10 μg/ml of Lp(a) and treated with PCSK9 inhibitors. The protein and gene expression of PCSK9, inflammation (IL-6), endothelial activation (E-selectin, ICAM-1), NF-κB p65, and endothelial nitric oxide synthase (eNOS) were measured using ELISA and QuantiGene plex, respectively.
Results: In general, PCSK9 inhibitions in LPS-stimulated HCAEC led to the downregulation of protein expression in endothelial activation (E-selectin and ICAM-1), an increase in NO expression that prevented the endothelial dysfunction via reduction of NF-κB p65 expression. Despite following the same trend of early atherogenesis biomarkers expression, the Lp(a)-stimulated HCAEC opposed NF-κB p65 expression in LPS-stimulated HCAEC. Interestingly, regardless of the NF-κB p65 expression that is responsible for expressing proinflammatory genes, the IL-6 was upregulated in LPS- and Lp(a)-stimulated HCAEC.
Conclusions: Conclusion: Through biomarkers expression, it could be postulated that Alirocumab may have lag effects, while Evolocumab possesses a stabilising effect in terms of protein and gene suppression in both in vitro stimulation models. In summary, PCSK9 inhibition by different PCSK9 inhibitors follows different atherogenesis pathway.
Keywords: Atherosclerosis, PCSK9, PCSK9 Inhibitors, Human coronary endothelial cells, Evolocumab, Alirocumab, Atherogenesis

OP1-3

Obesity-induced imprinting of hematopoietic stem cells exacerbates atherosclerosis progression

Shindy Soedono[1,2*], Vivi Julietta[1], Maria Averia[1], Joo Yuha[1], Hadia Nawaz[2], Kae Won Cho[1,2]

[1]Department of Integrated Biomedical Science, Soonchunhyang University, Republic of Korea,
[2]Soonchunhyang Institute of Medi-bio Science, Soonchunhyang University, Republic of Korea

Objectives: Obesity increases atherosclerosis risk, with weight loss (WL) being the primary treatment. However, WL does not fully resolve obesity-induced atherosclerosis, and the underlying mechanisms remain elusive. In this study, we aim to investigate the effect of obesity history on hematopoietic stem cells (HSC) and their role in atherosclerosis progression.
Methods: WL was induced by switching from a high-fat diet (HFD) to a normal diet (ND), while control groups remained on either the ND or HFD. HSCs from WL or control groups were transplanted into Ldlr-/- mice, followed by a Western diet challenge. Atherosclerosis was assessed by aortic en face analysis and plaque area measurement. HSCs were analyzed by ATAC-seq and RNA-seq for chromatin accessibility and gene expression.
Results: Obesity history increases pro-inflammatory monocytes and BM myelopoiesis. Transfer of WL-derived HSC exacerbates atherosclerosis in Ldlr-/- mice, increasing aortic plaque areas, pro-inflammatory monocytes, and granulocyte-monocyte progenitor (GMP) populations. ATAC-seq and RNA-seq indicate maintained NF-κB-related gene activity in WL HSC with enhanced epigenetic accessibility. Prior obesity heightens pro-inflammatory responses in BM-derived macrophages.
Conclusions: Obesogenic memory in HSC potentially enhances macrophage responses, worsening atherosclerosis progression.
Keywords: Obesity, Atherosclerosis, Inflammation, Macrophage, Hematopoietic stem cells

OP1-4

Cardiovascular disease risk factors are adversely altered by an isocaloric high fat diet enriched with saturated compared to polyunsaturated fat in healthy humans

Nikola Srnic[1,3*], Elspeth Johnson[1], Sion Parry[1], Ferenc Mózes[2], Fredrik Karpe[1,4], Ladislav Valkovic[2], Lisa Heather[3], Leanne Hodson[1,4]

[1]Oxford Centre for Diabetes, Endocrinology, and Metabolism, University of Oxford, United Kingdom, [2]Oxford Centre for Clinical Magnetic Resonance Research, University of Oxford, United Kingdom, [3]Department of Physiology, Anatomy and Genetics, University of Oxford, United Kingdom, [4]NIHR Oxford Biomedical Research Centre, University of Oxford, United Kingdom

Objectives: Dietary fat composition, independent of dietary fat quantity, influences plasma lipid concentrations, and thereby cardiovascular disease (CVD) risk. Despite similar weight gain, overconsuming saturated (SFA) compared to polyunsaturated fat (PUFA) promotes greater liver fat accumulation and a pro-atherogenic lipoprotein profile; however, it remains unclear how dietary fat composition influences CVD risk factors and liver fat in the absence of weight change. Aim: Investigate the effect of consuming an isocaloric SFA or PUFA enriched high-fat diet (HFD) on CVD risk factors in men and women with no known metabolic disease.
Methods: 23 (11 male) volunteers (53±7 yr, BMI 26.9±4.1 kg/m^2) were randomly assigned to consume an isocaloric SFA (n=12) or PUFA (n=11) enriched HFD for up to 24 days. Pre- and post-HFD, fasting and postprandial plasma biochemistry were measured, cardiac and liver fat accumulation and cardiac and vascular function were assessed by MRI/S and echocardiography. The contribution of specific fatty acid sources (e.g. dietary fat) into TG-rich lipoproteins (TRLs) was assessed using stable-isotope tracers.
Results: Body weight remained unchanged with consumption of either isocaloric SFA or PUFA-enriched HFD. There were divergent responses to consumption of a HFD, with improvements in fasting plasma total cholesterol, non-HDL cholesterol, postprandial triglycerides, and in vivo cardiac energetics following consumption of the PUFA-enriched HFD. In contrast, consuming the SFA-enriched HFD increased plasma total cholesterol, non-HDL cholesterol, and liver fat and altered postprandial plasma glucose and insulin excursions. Using stable-isotope tracers, differences in dietary fat incorporation into TRLs was observed after consumption of the SFA- compared to PUFA-enriched HFD.
Conclusions: Our preliminary data indicate there is differential intracellular handling of SFA compared to PUFA, as dietary fat composition, rather than body weight changes, modulated plasma lipids, TRLs fatty acid composition, cardiac energetics, and liver fat accumulation. Consuming a SFA- compared to PUFA-enriched diet, under controlled conditions without weight gain, appears to increase CVD risk.
Keywords: Dietary Fat, Metabolism, Atherosclerosis, Liver fat, Nutrition

OP1-5

HK660S (β-lapachone) ameliorates diabetic cardiomyopathy by enhancing mitochondrial function through activation of NQO1/SOD1 pathway

Bui Van Nam[1,2*], Hyoung Kyu Kim[4], Han Jin[3]

[1]Presenter, Cardiovascular and Metabolic Disease Center, Physiology Department, Inje University, Vietnam, [2]Presenter, Stroke Department, 103 Hospital, Vietnam Military Medical University, Ha Noi, Vietnam, Vietnam, [3]Correspoding Author, Cardiovascular and Metabolic Disease Center, Physiology Department, Inje University, Republic of Korea, [4]Co-Authors, Cardiovascular and Metabolic Disease Center, Physiology Department, Inje University, Republic of Korea

Objectives: This study aimed to investigate the effects of the drug HK660S, a natural compound and newly developed β-lapachone analog that increases mitochondrial function, mitochondrial integrity, energy expenditure and antioxidant capacity in various tissues on DCM (diabetic cardiomyopathy) and explore its underlying mechanisms.
Methods: In vitro treatment: AC16 intact cells were test Oxygen consumption rate (OCR) by treatment with different doses of drug and inhibitor NQO1 in the chamber. In vivo treatment: Type 2 diabetes mellitus (T2DM) was induced in C57BL/6 males mice using high-fat diet (HFD) and low-dose streptozotocin (STZ) treatment. Mice were randomly divided into six groups, fed HK660S 20 and 80 mg/kg/day, and Metformin 200 mg/kg/day combined with HFD treatment for 10 weeks. OCR was checked using Oxygraph-2k, Oroboros Instruments. Calories were measured using a Comprehensive Cage Monitoring System (CCMS, from Columbus Instruments, Columbus, OH) for 48-72 h. Antioxidant markers and protein expression related to mitochondrial biogenesis, morphology and content.
Results: In the in vitro treatment, HK660S ameliorates mitochondrial function. In the in vivo models, HK660S-treated DM mice reduced heart and body weight, food and water intake, blood glucose levels and HbA1C, enhanced cardiac function and Insulin resistance (IR). In addition, treated-DM mice showed increased mitochondrial respiratory capacity and physiological indicators, reversed the decrease in PGC-1α expression, altered the levels of proteins associated with mitochondrial biogenesis, increased mitochondrial content and antioxidant ability through increasing of NADH oxidation by activating NQO1/SOD1 signaling pathway.
Conclusions: These data suggest that HK660S is at least partially cardioprotective. Mitochondrial function is important for cardiomyocyte survival in DCM, and mitochondrial dysfunction is a critical factor in DCM. HK660S restored impaired mitochondrial biogenesis and improved mitochondrial activity, content, and function in cardiomyocytes through enhancing of NADH oxidation by activation NQO1/SOD1 pathway. Therefore, HK660S has the potential to serve as a novel therapeutic agent for the prevention and treatment of DCM.
Keywords: Diabetic cardiomyopathy, Beta-lapachone, Mitochondria, High fat diet

OP1-6

Porphyromonas gingivalis infection induces dyslipidemia; changes in hepatic, intestinal, and oral microbiota

Eun Ji Min[1*], Young Mi Park[2]

[1]Department of Computational Medicine, Graduate School of Ewha Womans University, Ewha Womans University, Republic of Korea, [2]Department of Molecular Medicine, College of Medicine, Ewha Womans University, Republic of Korea

Objectives: Porphyromonas gingivalis(PG) is classified as a pathogen that resides in the subgingival region and is known to cause periodontitis. Periodontitis is known to be associated with Alzheimer's disease, rheumatoid arthritis, and arteriosclerosis. However, mechanisms by which P. gingivalis aggravates these diseases have not yet been revealed.
Methods: A normal chow diet or a western diet-fed ApoE-/- mice were orally inoculated with or without PG for 3 weeks.
Results: Oral administration of PG induced significant changes in hepatic microbiome, showing a significant increase in the abundance of Ralstonia species. We also found that Acholeplasmatales in the Tenericutes phylum in the intestine significantly decreased and Lachnospiraceae family in the Firmicutes phylum decreased in the mice with PG infection. Western diet affected lower genus levels of Firmicutes phylum; decreases of Clostridium_g24, Lactobacillus, LLKB_g, Eubacterium_g17, and Phocea were found in the intestinal microbiome., while Clostridium, Eubacterium_g23, Clostridium_g6, Streptococcus, Lactococcus, and Coprobacillus increased. Multiple subfamilies of the Firmicutes phylum, which predominantly occupy the oral cavity, showed various increases and decreases in the mice with PG infection. Additionally, intestinal microbiome showed increases in Corynebacteriaceae in the Actinobacteria phylum and the Ralstonia family in the Proteobacteria phylum in the mice with PG infection.
Conclusions: Our experiments demonstrated that dysbiosis in the liver, oral cavity, and intestines were induced by oral PG infection and suggest metabolic changes prone to development of atherosclerosis may be driven by microbial changes in various organs.
Keywords: Microbiome, Porphyromonas gingivalis, Dyslipidemia, Liver

OP1-7

Circular RNA circSMAD4 regulates cardiac fibrosis by targeting miR-671-5p and FGFR2 in cardiac fibroblasts

Anna Jeong*, Yongwoon Lim, Yun-Gyeong Lee, Duk-Hwa Kwon, Sera Shin, Nakwon Choe, Hyun Kook

Department of Pharmacology, Chonnam National University, Medical School, Republic of Korea

Objectives: The study aimed to investigate the role of circular RNA circSMAD4 in regulating cardiac fibrosis by targeting miR-671-5p and fibroblast growth factor receptor 2 (FGFR2) in cardiac fibroblasts.

Methods: Our researchers performed various experimental techniques, including RNA sequencing, quantitative real-time PCR (qRT-PCR), and conventional PCR to identify and validate the expression of circSMAD4 and its target genes. We used transverse aortic constriction (TAC) in mice to induce cardiac fibrosis and assess the functional impact of circSMAD4. Additionally, we conducted luciferase reporter assays to confirm the direct interaction between circSMAD4, miR-671-5p, and FGFR2

Results: Our study found that circSMAD4 was significantly upregulated in fibrotic cardiac tissues and cardiac fibroblasts. Knockdown of circSMAD4 attenuated fibroblast proliferation and collagen production, key markers of fibrosis. Mechanistically, circSMAD4 acted as a sponge for miR-671-5p, reducing its availability to target FGFR2. Consequently, this led to increased expression of FGFR2, which further promoted fibrotic processes in cardiac fibroblasts.

Conclusions: Our findings suggest that circSMAD4 plays a crucial role in the regulation of cardiac fibrosis by modulating the miR-671-5p/FGFR2 axis. Targeting circSMAD4 could be a potential therapeutic strategy for treating cardiac fibrosis, highlighting the importance of circular RNAs in cardiovascular diseases

Keywords: Non coding RNA, circRNA, Heart failure

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Oral Presentation 2

Sep 26(Thu) 14:40-16:10 | Room 2 (3F)

CHAIRPERSONS : Young Mi Park (Ewha Womans University, Republic of Korea)
Bohkyung Kim (Pusan National University, Republic of Korea)a

OP2-1

Purinergic adipocyte-macrophage crosstalk promotes inflammatory degeneration of thermogenic brown adipose tissue

Michelle Y. Jaeckstein[1*], Alexander W. Fischer[1], Tobias Stähler[2], Björn Rissiek[3], Markus Heine[1], Janina Behrens[1], Alexander Pfeifer[4], Friedrich Nolte[2], Joerg Heeren[1]

[1]Department of Biochemistry and Molecular Cell Biology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany, [2]Institute of Immunology, University Medical Center Hamburg-Eppendorf, Germany, [3]Department of Neurology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany, [4]Institute of Pharmacology and Toxicology, University Hospital Bonn, Bonn, Germany

Objectives: Disturbed metabolic balance is causally involved in the development of overweight-associated chronic inflammatory diseases such as atherosclerosis, diabetes and non-alcoholic fatty liver disease. Brown adipose tissue (BAT) has the potential to burn large amounts of excess calories for body temperature maintenance. Due to its positive effects on metabolic health, dyslipidemia and beneficial cardiovascular outcomes, BAT represents a new therapeutic concept for the treatment of metabolic diseases. However, in human standard living conditions like obesity, ageing and living at thermoneutrality, BAT activity declines. A process characterized by lipid accumulation, insulin resistance, inflammation and fibrosis. Similarly, inefficient thermogenesis due to loss of uncoupling protein 1 (UCP1) is accompanied by inflamed BAT. Mechanisms driving inflammatory BAT degeneration remain largely enigmatic.
Methods: To investigate the role of sympathetic input, we denervated BAT of Ucp1-/--mice. A new pharmacological model for futile thermogenesis was established co-treating mice with etomoxir (inhibits mitochondrial fatty acid oxidation) and the β3-adrenergic agonist CL316,243. Immunohistochemistry, FACS, RNAseq, indirect calorimetry and expression analyses were employed. For mechanistic insights, cell culture experiments with primary adipocytes and bone marrow-derived macrophages were performed.
Results: BAT degeneration in cold-exposed Ucp1-/--mice is driven by sympathetic innervation. Co-treatment with etomoxir/CL316,243 causes lipid deposition, immune cell infiltration, fibrosis, lower UCP1 levels and reduced energy expenditure. RNAseq analysis revealed various pathways involved in purine nucleotide (ATP) metabolism suggesting a role of ATP-activated purinergic receptors in BAT degeneration. Mechanistically, we showed that brown adipocytes secrete ATP in response to impaired thermogenic activation. Subsequently, released ATP activates P2RX4/P2RX7 expressed on the surface of BAT-resident macrophages. Combined inhibition P2RX4/P2RX7 prevents pro-inflammatory remodeling and loss of thermogenic function under conditions of BAT degeneration (e.g. thermoneutrality).
Conclusions: BAT degeneration is driven by energetic imbalance in brown adipocytes, a process regulated by extracellular ATP via a paracrine purinergic axis between adipocytes and macrophages.
Keywords: BAT, Macrophages, Purinergic Signaling, P2X-receptor, ATP

OP2-2

Ret finger protein deficiency attenuates adipogenesis in HFD-induced obese mice

Yun-Gyeong Lee*, Duk-Hwa Kwon, Sera Shin, Anna Jeong, Hyun Kook

Department of Pharmacology, Chonnam National University Medical School, Republic of Korea

Objectives: Ret finger protein (RFP), a TRIM27, is recognized as an onco-protein implicated in various cancers through genomic integration into tumor suppressor genes. However, its involvement in adipogenesis remains unexplored. In this study, the role of Ret finger protein (RFP) in adipogenesis was explored.
Methods: Hight fat diet (60%Kcal fat), Glucose tolerance test, Triglyceride assay, H&E staining, Oil-Red-O staining, Immuno precipitation (IP), Chromatin IP
Results: RFP showed new implications in fat accumulation and metabolism. RFP knockout (KO) mice fed with a high-fat diet (HFD) had less weight gain and fat accumulation compared to wild-type mice. Additionally, RFP KO normalized free fatty acid and triglyceride levels in the liver. The study also found that RFP KO improved glucose tolerance in HFD-fed mice. Mechanistically, the study utilized 3T3-L1 adipocytes, revealing that silencing RFP inhibited adipocyte differentiation and decreased the expression of adipogenic genes like PPAR-γ, FABP4, and adiponectin. RFP was shown to interact with PPAR-γ, inhibiting its transcriptional activity and affecting downstream adipogenic genes.
Conclusions: In this study, the weight gain and fat accumulation were attenuated in RFP KO mice fed with HFD, compared with WT mice. Impairment of glucose tolerance induced by HFD was attenuated in RFP KO mice. Silencing of RFP inhibited the differentiation of intracellular lipid accumulation in 3T3-L1. RFP did not affect the protein amount of PPAR-γ, however RFP physically interacted with PPAR-γ, and inhibited its transcriptional activity to turn on the downstream adipogenic genes such as FABP4 and adiponectin. These results demonstrate that RFP induces the body fat accumulation by augmentation of adipogenic differentiation, which is mediated in part by potentiation of the PPAR-γ activity in adipocyte differentiation.
Keywords: RFP, Obesity, High fat diet

OP2-3

Differential regulatory effects of exercise and hypocaloric diet on adipose thermogenesis and inflammation in obese mice

Vivi Julietta[1*], Shindy Soedono[1], Eun Bi Ma[2], Joo Yuha[1], Maria Averia[1], Hadia Nawaz[3], Byung Chul Oh[4], Chan Hee Lee[5], Joo Young Huh[2], Kae Won Cho[1,3]

[1]Department of Integrated Biomedical Science, Soonchunhyang University, Republic of Korea, [2]College of Pharmacy, Chonnam National University, Republic of Korea, [3]Soonhunhyang Institute of Medi-bio Science (SIMS), Soonchunhyang University, Republic of Korea, [4]Department of Physiology, Gachon University, Republic of Korea, [5]Department of Biomedical Science, Hallym University, Republic of Korea

Objectives: Adipose tissue (AT) inflammation and thermogenesis are critical regulatory factors contributing to obesity-associated metabolic dysregulation. While diet and exercise are known to attenuate obesity, the impacts of a hypocaloric diet and exercise on weight loss-associated AT metabolism and their underlying mechanisms remain unelucidated. Here, we investigate the effects of equivalent weight loss induced by either exercise or calorie reduction on metabolic dysregulation, AT inflammation, and thermogenesis in obese mice.
Methods: Obese mice fed high-fat diets (HFD) were exercise trained (EX, n=8) or weight-matched to EX via caloric reduction (CR, n=8), and compared with ad libitum HFD-fed mice (Con, n=8). Metabolic parameters were assessed upon 8 weeks of exercise, and inflammatory indicators were examined using flow cytometry, histological analysis, and biochemical assays.
Results: EX and CR both reduced adiposity and improved glucose tolerance and insulin sensitivity. While EX and CR both reduced macrophage accumulation in AT, CR, but not EX, decreased circulating neutrophil and monocyte numbers. Gene expression analysis revealed that only EX significantly increased the expression of anti-inflammatory genes Adipoq and Ym1 in visceral AT. EX also enhanced the expression of fat oxidation-related genes in visceral AT, including Ppara, Pgc1a, and Acox1. Additionally, EX upregulated thermogenesis genes in subcutaneous AT, including Ucp1, Cidea, and Prdm16.
Conclusions: Both EX and CR reduced AT inflammation, however, EX led to more robust changes in anti-inflammatory gene expressions, increased fat oxidation, and enhanced indices of thermogenesis function. Our findings indicate that exercise uniquely regulates AT function, which may be attributed to the metabolic benefits of exercise.
Keywords: Adipose tissue inflammation, Exercise, Calorie reduction, Thermogenesis

OP2-4

Telomere stabilization by metformin mitigates the progression of atherosclerosis via the AMPK-dependent p-PGC-1 alpha pathway

Jin Young Sung*, Seul Gi Kim, So-Young Park, Jae-Ryong Kim, Hyoung Chul Choi

Yeungnam University, Republic of Korea

Objectives: Telomere dysfunction is a well-known molecular trigger of senescence and has been associated with various age-related diseases, including atherosclerosis. However, the mechanisms involved have not yet been elucidated, and the extent to which telomeres contribute to atherosclerosis is unknown. Therefore, we investigated the mechanism of metformin-induced telomere stabilization and the ability of metformin to inhibit vascular smooth muscle cell (VSMC) senescence caused by advanced atherosclerosis.
Methods: A variety of molecular approaches as well as high-fat fed ApoE knockout (KO) mice and oleic acid (OA)-treated VSMCs was used to investigate the effect of metformin in atherosclerotic and senescent phenotypes.
Results: The present study revealed that metformin inhibited the phenotypes of atherosclerosis and senescence in VSMCs. Metformin increased the phosphorylation of AMPK-dependent PGC-1 alpha and thus increased telomerase activity and the protein level of TERT in OA-treated VSMCs. Mechanistically, the phosphorylation of AMPK and PGC-1 alpha by metformin not only enhanced telomere function but also increased the protein level of TERT, whereas TERT knockdown accelerated the development of atherosclerosis and senescent phenotypes in OA-treated VSMCs regardless of metformin treatment. Furthermore, the in vivo results showed that metformin attenuated the formation of atherosclerotic plaque markers in the aortas of HFD-fed ApoE KO mice. Although metformin did not reduce plaque size, it inhibited the phosphorylation of the AMPK/PGC-1 alpha/TERT signaling cascade, which is associated with the maintenance and progression of plaque formation, in HFD-fed ApoE KO mice. Accordingly, metformin inhibited atherosclerosis-associated phenotypes in vitro and in vivo. These observations show that the enhancement of telomere function by metformin is involved in specific signaling pathways during the progression of atherosclerosis.
Conclusions: These findings suggest that telomere stabilization by metformin via the AMPK/p-PGC-1 alpha pathway might provide a strategy for developing therapeutics against vascular diseases such as atherosclerosis.
Keywords: Telomere, Metformin, AMPK, PGC-1 alpha, VSMC senescence

OP2-5

PRDX5 exacerbates atherosclerosis via the TLR4/MyD88/NF-κB and P38 pathways in endothelial cells

Hyae Yon Kweon*, Eun Ju Song, Hye In Kong, Goo Taeg Oh

Life Science, Ewha Womans University, Republic of Korea

Objectives: Peroxiredoxin 5 (PRDX5) is one of the six mammalian peroxiredoxins with a unique atypical 2-Cys form and shows a wide subcellular distribution. Since PRDX5 is expressed in vascular endothelial cell, it is expected to be associated with atherosclerosis. However, the effect of PRDX5 on the atherosclerosis is unclear.

Methods: For in vivo analysis, normal chow dieted 60-weeks old Apolipoprotein E knockout (ApoE-/-) and Prdx5-/-; ApoE-/- mice were used for experiments. For in vitro, human umbilical vein endothelial cells (HUVECs) were stimulated with oxidized LDL (oxLDL; 50ng/ml) for 24hrs following serum starvation by incubating with serum-free EGM-2 for 1hr.

Results: We observed elevated PRDX5 expression under atherosclerotic conditions in both humans and mice. Unexpectedly, Prdx5-/-; ApoE-/- mice exhibited reduced plaque formation, with no discernible difference in aortic hydrogen peroxide (H2O2) levels compared to ApoE-/- mice. Additionally, there was a notable decrease in macrophage accumulation and vascular inflammation in the atherosclerotic aorta of Prdx5-/-; ApoE-/-. For in vitro analysis, HUVECs stimulated with oxLDL showed upregulated PRDX5 expression in both lysate and culture medium. Moreover, PRDX5 knockdown in oxLDL-stimulated (oxLDL-siPRDX5) HUVECs significantly reduced the migration and adhesion of the human monocytic cells (THP-1) to HUVECs, indicating diminished vascular immune responses. Mechanistically, both in vivo and in vitro, PRDX5 deficiency inhibited the TLR4/MyD88 signaling pathway, resulting in reduced NF-κB and P38 phosphorylation. Furthermore, treatment with recombinant PRDX5 (rPRDX5) protein restored TLR4/MyD88 signaling in oxLDL-siPRDX5 HUVECs.

Conclusions: These data demonstrate that extracellular PRDX5 contributes to endothelial inflammation not as an antioxidant enzyme but as a damp, by activating TLR4/MyD88/NF-κB and P38 signaling pathways, thereby exacerbating the progression of atherosclerosis.

Keywords: Atherosclerosis, Peroxiredoxin 5, Endothelial Dysfunction, TLR4 Singnaling Pathway

OP2-6

Prdx3 defends abdominal aortic aneurysm by suppressing vascular smooth muscle cell senescence

Moajury-Jung[2*], Seong Keun Sonn[1], Goo Taeg Oh[1]

[1]Heart-Immune-Brain Network Research Center, Department of Life Sciences, Ewha Womans University, Republic of Korea,
[2]Division of Life Science, Ewha Womans University, Republic of Korea

Objectives: Abdominal aortic aneurysm (AAA) is a dilation of abdominal aorta, characterized by vessel wall inflammation and proteolytic degradation of the extracellular matrix. Recent studies have highlighted the significant role of vascular smooth muscle cell (VSMC) senescence in the development of AAA. Reactive oxygen species (ROS) is one of the main causes of cellular senescence. Prdx3, which is located in mitochondria, known to alleviate ROS in various cell types and is linked to the pathogenesis of cardiovascular disease. However, Whether Prdx3 protects against VSMC senescence and AAA progression has not been studied.

Methods: To demonstrate damaged mitochondrial ROS due to the Prdx3 deficiency promotes VSMC senescence, primary VSMCs were isolated from wild type and Prdx3-/- mouse aortas. To clarify the molecular mechanism underlying Prdx3-deficient cellular senescence, RNA sequencing was performed using human VSMCs transfected with Prdx3 siRNA and control siRNA. To examine the effect of Prdx3 deficient VSMCs in AAA, Prdx3flox/flox SM22-Cre mice and Prdx3flox/flox mice were infused with AngⅡ for 28 days.

Results: Prdx3-/- mouse VSMCs showed elevated expression of senescence marker and senescent cell features. Total RNA sequencing analysis revealed significant activation of Interferon gamma signaling in Prdx3-deficient human VSMCs, induced by the cGAS-STING signaling pathway that detects damaged cytosolic mtDNA. Moreover, Prdx3flox/flox SM22-Cre mice showed severe aortic dilation of diameter and enlarged lesion area in abdominal aorta and also represented decreased physiological function and increased expression of senescence markers. Histological analysis demonstrated increased aortic calcification in the aortas of Prdx3flox/flox SM22-Cre mice.

Conclusions: Prdx3 plays a protective role in the development of AAA, mitigating vascular calcification and tissue damage accelerated by VSMC senescence induced by damaged mitochondrial ROS.

Keywords: Abdominal aortic aneurysm (AAA), Peroxiredoxin3 (Prdx3), Senescence, Vascular smooth muscle cells (VSMCs)

Oral Presentation 3

Sep 26(Thu) 14:40-16:10 | Room 3 (3F)

CHAIRPERSONS : SungWan Chun (Soonchunhyang University, Republic of Korea)
Seung-Hwan Lee (The Catholic University of Korea, Republic of Korea)

OP3-1

A 10-year prospective cohort study of blood lipid variability, cognitive decline, and dementia in 9846 community-dwelling older adults

Zhen Zhou[1*], Chris Moran[1], Anne M. Murray[2], Sophia Zoungas[1], Mark Nelson[3], Stella Talic[1], Rory Wolfe[1], Robyn Woods[1], Joanne Ryan[1]

[1]School of Public Health and Preventive Medicine, Monash University, Australia, [2]Berman Center for Outcomes and Clinical Research, Hennepin Healthcare Research Institute, United States, [3]Menzies Institute for Medical Research, University of Tasmania, Australia

Objectives: Lipid metabolism in older adults is affected by various factors including biological ageing, functional decline, reduced physiological reserve, and nutrient intake. This study aims to investigate the association between lipid variability and risk of cognitive decline and dementia in older adults.
Methods: ASPREE was a randomized trial of aspirin and extended into an observational study, ASPREE-XT with a maximum follow-up of 11 years. Included in this study were participants who had cholesterol measured at baseline, and first three-year annual visits. Only those who initiated or discontinued lipid-lowering therapy during the measurement period were excluded as this study aims to explore change in lipid levels unrelated to changes in treatment. Year-to-year variability in total cholesterol (TC), Low-density-lipoprotein cholesterol (LDL-C), high-density-lipoprotein cholesterol (HDL-C), and triglycerides was quantified using variability independent of the mean (VIM). Associations with incident dementia and cognitive impairment-no dementia (CIND) were analysed using multivariable Cox proportional-hazards models. Linear mixed model was used for assessing the association with changes in different cognitive function domains including global, memory, processing speed, verbal fluency, and a composite over 11 years.
Results: The analysis included 9,846 individuals, with 509 incident dementia and 1,760 CIND events recorded over a median follow-up of 5.8- and 5.4-years post-variability assessment. The HRs (95%CI) comparing the highest vs. lowest quartiles of TC and LDL-C variability, were 1.60 (1.23-2.08) and 1.48 (1.15-1.91) for dementia, and 1.23 (1.08-1.41) and 1.27 (1.11-1.46) for CIND. Restricted cubic splines revealed a monotonic increased risk of dementia with higher TC and LDL-c variability (Fig 1). TC and LDL-C variability also associate with a faster decline in global cognition, episodic memory, psychomotor speed, and the composite score ($p<0.001$). No strong evidence was found for associations with HDL-C and triglycerides.
Conclusions: Tracking cholesterol variability may serve as a novel biomarker for risk of dementia and cognitive decline in older populations.
Keywords: Lipid, Variability, Dementia, Cognition, Aged

OP3-2

Low-density lipoprotein cholesterol estimation in youth: Sampson equation superior in predicting mid-adult carotid plaque

Yaxing Meng[1,2*], Feitong Wu[1,2], Juhani S. Koskinen[3,4,5,6], Markus Juonala[5,6], James Goode[1,2], Katja Pahkala[3,4,7], Suvi P. Rovio[3,4], Juha Mykkänen[3], Russell Thomson[8], Stephen R. Daniels[9], Mika Kähönen[10], Jorma S. A. Viikari[5,6], Olli T. Raitakari[3,4,11,12], Costan G. Magnussen[1,2,3,4]

[1]Baker Heart and Diabetes Institute, Australia, [2]Baker Department of Cardiometabolic Health, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Melbourne, Australia, [3]Research Centre of Applied and Preventive Cardiovascular Medicine, University of Turku, Finland, [4]Centre for Population Health Research, University of Turku and Turku University Hospital, Turku, Finland, [5]Division of Medicine, Turku University Hospital, Finland, [6]Faculty of Medicine, Satakunta Central Hospital, Finland, [7]Paavo Nurmi Centre, Unit of Health and Physical Activity, University of Turku, Finland, [8]Analytical Edge, Analytical Edge, Australia, [9]Department of Pediatrics, University of Colorado Anschutz Medical Campus,United States, [10]Department of Clinical Physiology, Tampere University Hospital and Faculty of Medicine and Health Technology, Tampere University, Finland, [11]Department of Clinical Physiology and Nuclear Medicine, Turku University Hospital, University of Turku, Finland, [12]InFLAMES Research Flagship, University of Turku, Finland

Objectives: Accurate estimation of low-density-lipoprotein-cholesterol (LDL-C) in youth is essential for preventing atherosclerotic cardiovascular disease (ASCVD). Despite alternatives to the Friedewald equation promising better accuracy, its pervasive use continues. To compare the association between different LDL-C estimation equations in youth and the presence of carotid plaque in mid-adulthood.
Methods: This study included 2,058 participants from the Cardiovascular Risk in Young Finns Study, a population-based cohort, who had available fasting blood samples from youth aged 3-18 years and carotid ultrasound data in mid-adulthood aged 41-56 years. LDL-C levels were estimated using the Friedewald, Martin-Hopkins, Sampson, and DeLong equations—different mathematical formulations using the same lipid inputs. Participants were considered discordant when LDL-C categorization (acceptable <110 mg/dL vs. dyslipidemia ≥110 mg/dL) differed between equations.
Results: After a follow-up of 38 years, 39.7% of participants had carotid plaques. Youth LDL-C dyslipidemia (vs. acceptable) was consistently associated with carotid plaque across equations, with relative risks (RR) ranging from 1.36 to 1.42. However, the Sampson and DeLong equations provided improvement in risk classifications compared to the Friedewald and Martin-Hopkins equations, with continuous-net-reclassification-improvement ranging from 0.19 to 0.39 (all $P<0.05$). Youth with acceptable LDL-C by the Friedewald equation but classified as dyslipidemia by the Martin-Hopkins [RR (95% confidence interval) 2.44 (2.12-2.80)], Sampson [1.58 (1.17-2.14)], or DeLong [1.42 (1.10-1.83)] equations had increased risk for carotid plaque compared to those with concordant LDL-C. Increased risk was also observed for those with acceptable Martin-Hopkins LDL-C but dyslipidemia by Sampson or DeLong [1.39 (1.09-1.78), 1.31 (1.06-1.64)]. No increased risk was found for those with dyslipidemia by DeLong but acceptable LDL-C by Sampson [1.18 (0.81-1.72)].
Conclusions: Sampson appears superior for estimating LDL-C in youth for predicting carotid plaque—avoiding underestimation by Friedewald and Martin-Hopkins, and overestimation by DeLong. Adopting the Sampson equation to estimate youth LDL-C could improve the early detection and management of future ASCVD risk.
Keywords: Dyslipidemias, Plaque, Atherosclerosis, Pediatrics, Life course, Cholesterol

OP3-3

The impact of myosteatosis on cardiac function in a healthy population: insights from abdominal CT imaging

Yun Kyung Cho[1,2*], Myung Jin Kim[1,2], Eun Hee Kim[3], Min Jung Lee[3], Hyo-Jung Nam[3], Woo Je Lee[1,2], Hong-Kyu Kim[3], Chang Hee Jung[1,2]

[1]Department of Internal Medicine, Asan Medical Center, University of Ulsan College of Medicine, Republic of Korea,
[2]Asan Diabetes Center, Asan Medical Center, Republic of Korea,
[3]Health Screening and Promotion Center, Asan Medical Center, University of Ulsan College of Medicine, Republic of Korea

Objectives: Ectopic fat deposition in skeletal muscle, termed myosteatosis, is a key factor of insulin resistance and contributes to the pathogenesis of various metabolic disturbances. This study aimed to evaluate the association between myosteatosis, assessed by abdominal computed tomography, and cardiac function in a healthy Korean population.
Methods: This cross-sectional study included 7,716 participants (4,902 [63.5%] men and 2,814 [36.5%] women, mean age 53.2±8.0) who underwent routine health check-ups in Asan Medical Center (Seoul, Korea). To evaluate myosteatosis, the total abdominal muscle area (TAMA) at the L3 vertebral level was segmented into normal-attenuation muscle area (NAMA), low-attenuation muscle area (LAMA), and inter/intra-muscular adipose tissue (IMAT). The subjects were categorized into quartiles based on the NAMA/TAMA index, calculated by dividing the NAMA by the TAMA and multiplying by 100. Cardiac function was assessed by transthoracic echocardiography.
Results: Higher NAMA/TAMA index levels were associated with decreased absolute values of the E/E' ratio and increased E/A ratio in both men and women. Multiple linear regression analysis revealed a significant correlation between the NAMA/TAMA index and both the E/A and E/E' ratios after adjusting for covariates, while no significant correlation was found with left ventricular (LV) ejection fraction or LV mass index. In the subgroup analysis, the association between myosteatosis and E/E' ratio remained significant in non-obese patients but became insignificant in obese patients.
Conclusions: The degree of myosteatosis was significantly associated with diastolic function in an asymptomatic healthy population, while systolic function remains unaffected.
Keywords: Ectopic Fat Deposition, Myosteatosis, Cardiac Function

OP3-4

The impacts of diabetic retinopathy and chronic kidney disease on cardiovascular disease and all-cause mortality in patients with type 2 diabetes mellitus: findings from the UK Biobank cohort study

Yeon Soo Park[1,2*], Bo Kyung Koo[3], Soo Heon Kwak[2], Min Kyong Moon[1,3]

[1]Department of Internal Medicine, Seoul National University College of Medicine, Republic of Korea,
[2]Department of Internal Medicine, Seoul National University Hospital, Republic of Korea,
[3]Department of Internal Medicine, Seoul Metropolitan Government Boramae Medical Center, Republic of Korea

Objectives: Chronic kidney disease (CKD) and diabetic retinopathy (DR) are established risk factors for cardiovascular disease (CVD) in type 2 diabetes mellitus (T2DM), but their specific individual risks and combined impact on CVD are unclear. This retrospective cohort study analyzed UK Biobank data to explore the effects of CKD and DR on CVD risk and all-cause mortality, individually and combined.
Methods: Participants with T2DM and no prior CVD were identified. We performed Cox proportional hazards regression analysis (adjusted for age, sex, BMI, smoking, drinking, hypertension, dyslipidemia, duration of diabetes, baseline HbA1c, and insulin use).
Results: Among 17,686 T2DM participants (mean age: 58.33±7.13 years; 10,368 [58.6%] male), 1,125 CVD cases and 1,488 deaths occurred over a median follow-up of 7.5 years. In people without CKD, the CVD incidence rate (IR; per 1000 person-years) was 6.2, increasing to 15.92 with CKD. The CVD IRs were 7.18 in people without DR, 16.07 in those with non-proliferative diabetic retinopathy (NPDR), and 37.16 in those with proliferative diabetic retinopathy (PDR). IRs by CKD and DR presence combined were as follows: in people without CKD, 5.57 for non-DR and 11.72 for DR; in people with CKD, 13.25 for non-DR and 32.60 for DR. Using patients without CKD and DR as the reference, the adjusted hazard ratios for CVD were: 1.67 (95% CI: 1.34-2.08) for DR in non-CKD patients; and in CKD patients, 1.92 (95% CI: 1.64-2.24) for non-DR and 2.91 (95% CI: 2.34-3.62) for DR. Generally, the individual and combined impacts of CKD and DR on all-cause mortality reflected their effects on CVD risk.
Conclusions: Patients with T2DM who have both CKD and DR require special attention due to the significant synergistic effects of these comorbidities on CVD risk. Notably, the impact of PDR on CVD risk exceeds that of CKD, highlighting the importance of retinopathy in assessing cardiovascular risk.
Keywords: Type 2 diabetes, Chronic kidney disease, Diabetic retinopathy, Cardiovascular disease, UK biobank

OP3-5

Cardiometabolic risk factors and lifestyle in Norwegian patients with a severe mental illness

Madeleine E Angelsen[1,2*], Emma Njålsdatter Johannessen[2], Kjetil Retterstøl[1], Dawn E. Peleikis[3]

[1]Department of Nutrition, University of Oslo, Norway, [2]Psychiatric Ward, Lovisenberg Diaconal Hospital, Norway, [3]Asker Municipality Psychiatric Ward, Vestre Viken HF, Norway

Objectives: Patients with severe mental illness have increased death from cardiovascular disease, and modifiable risk factors are common. The lifestyle of Norwegian patients with severe mental illness is yet to be studied thoroughly. We wanted to study the lifestyle and dietary habits of patients receiving treatment for a severe mental illness in a Norwegian municipality psychiatric ward, to quantify the prevalence of metabolic syndrome and assess dietary quality in this patient group in Norway.

Methods: Patients with schizophrenia or bipolar disorder type 1 were recruited from Asker Psychiatric ward (DPS) in Norway. Anthropometry and blood parameters were measured or obtained from medical journals. A validated digital questionnaire (DIGIKOST) yielded data on dietary intake, exercise, and tobacco- and alcohol habits. Qualitative statements were collected to nuance the findings.

Results: A total of 42 patients, 23 men and 19 women, were included in the study. Mean age was 41 and 42 years, respectively. More than half of the patients had abdominal obesity. Prevalence of the metabolic syndrome was 50%, with especially high prevalence of hyperglycemia and -triglyceridemia. Dietary quality was low to moderate. Patients reported little physical activity and frequent smoking. Barriers for a healthy lifestyle related to psychiatric treatment such as antipsychotic medication and hospitalization was described. The patients wanted dietary tutoring and assistance to lose weight.

Conclusions: The severe mentally ill patients in our study were posed to increased cardiovascular risk, reflected in the high prevalence of metabolic syndrome. Frequent smoking, little exercise and unfortunate dietary habits will likely contribute to the disease burden and increase death and morbidity from cardiovascular events. Results from our assessment revealed a great potential to reduce cardiovascular risk in Norwegian patients with severe mental illness.

Keywords: Psychiatry, Obesity, Metabolic syndrome, Diet, Cardiovascular disease, Schizophrenia, Bipolar disease

OP3-6

Non-calcified plaque on coronary CT angiography (CCTA) in asymptomatic South Asian individuals with zero CAC: insights from the South Asians CCTA (SACTA) study

Ayeeshik Kole[1*], Ronald D. Bass[1], Faraaz Azam[1], Shailesh Jaiswal[1], Parthvi B. Patel[1], Sneha Deodhar[1], Sina Rahmani[1], Theodoros Kelesidis[2], Amil Shah[1], Fernando Kay[3], Amit Khera[1], Parag Joshi MD[1], Anand Rohatgi[1]

[1]Department of Internal Medicine, Division of Cardiology, University of Texas Southwestern Medical Center, Dallas, Texas, United States, [2]Department of Internal Medicine, Division of Infectious Diseases and Geographic Medicine, University of Texas Southwestern Medical Center, Dallas, Texas, United States, [3]Department of Radiology, Division of Cardiothoracic Imaging, University of Texas Southwestern Medical Center, Dallas, Texas, United States

Objectives: South Asian individuals (SAs) in the United States experience a disproportionate burden of atherosclerotic cardiovascular disease (ASCVD), inadequately captured by traditional risk scores. Despite strong negative predictive value of zero coronary artery calcium (CAC) for short-term ASCVD risk, presence of non-calcified plaque (NCP) detected by coronary computed tomography angiography (CCTA) is the strongest risk predictor for future ASCVD and may be present despite CAC=0. Given premature risk of ASCVD in SAs, non-obstructive NCP in the absence of CAC may represent an early phenotype to identify SAs at increased risk. The South Asian CCTA Study (SACTA) was designed to address these gaps, particularly the relation between CAC=0 and NCP in this high-risk demographic.

Methods: SACTA (NCT05367297) is a study of asymptomatic, self-identified SAs to assess coronary plaque using CCTA. Imaging was performed using a dual-source 2x192-slice scanner per departmental protocol and standardized clinical radiology reads reported CAC score, plaque burden, maximal stenosis, and high-risk plaque features.

Results: To date, we enrolled 186 participants without history of ASCVD, 72% male, mean age 49.8±9.7 years, BMI 25.4 ±3.2, 20.8% with reported history of diabetes, 57% with dyslipidemia, and 30.7% with hypertension. Mean A1c was 5.7± 0.8% and LDL-C was 2.8±1.0 mmol/L. Among the 121 participants with CAC=0 (65.1%), 7.4% had evidence of CCTA-detected NCP, of whom 77.8% had maximal stenosis

Conclusions: The prevalence of CAC=0 among asymptomatic SAs was 65.1%, consistent with prior SA cohorts. Here, we demonstrate that 1 in 13 asymptomatic SAs with CAC=0 have non-obstructive NCP, 20% of whom having high-risk plaque features. These findings may play an important role in understanding factors underlying premature ASCVD risk in SAs and refine personalized approaches to preventive care.

Keywords: Atherosclerosis, High-risk Plaque, Coronary CT Angiography, South Asian CVD, Lipid-lowering Therapies

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentations

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 1-A

Sep 27(Fri) 14:40-15:40 | Mini-Oral A (Studio 5, 6F)

MODERATOR : Eun-Hee Cho (Kangwon National University, Republic of Korea)

MOP1-A-1

Sex difference in reverse cholesterol transport in hepatic CDKAL1-deficient mices

Ji Eun Lee[1*], Hyeonji Lee[1], Dayeon Kyun[4], Sang-Hak Lee[3], Soo-jin Ann[2]

[1]Graduate Program of Biomedical Engineering, Yonsei University Graduate School, Seoul, Republic of Korea, [2]Integrative Research Center for Cerebrovascular and Cardiovascular Diseases, Yonsei University College of Medicine, Seoul, Republic of Korea, [3]Division of Cardiology, Department of Internal Medicine, Yonsei University College of Medicine, Seoul, Republic of Korea, [4]Yonsei University Graduate School, Seoul, Republic of Korea

Objectives: Recently, the impact of reverse cholesterol transport (RCT) in atherosclerosis and vascular pathology is of global scientific interest. Recently, hepatic CDKAL1 has been reported to play a role in RCT. The aim of this study was to analyze sex difference in reverse cholesterol and identify relevant biological mechanisms in mice deficient of hepatic CDKAL1.

Methods: Cholesterol efflux capacity and in vivo RCT were compared between males and females of liver-specific CDKAL1 KO and control mice (n=4). Standard radioisotope protocol and cholesterol loaded macrophage were used in each experiment, respectively. From the liver cells of each group, major molecules of HDL catabolism and bile acid pathway were compared.

Results: Cholesterol efflux capacity were not different between the sexes and strains of mice. The mean radioactivities of total sterols (1.1±0.4 and 2.5±0.6% of injected CPM/g in males and females, respectively; p=0.021), bile acid (0.7±0.18 and 1.2±0.06% of injected CPM/g, respectively, p=0.021) and cholesterol (0.41±0.12 and 0.6±0.07% of injected CPM/g, respectively, p=0.029) from feces were upper in the females compared to males. Sex difference of the results in control mice were not significant. In the liver cells, endothelial lipase and hepatic lipase expression did not differ between the sexes, whereas SR-B1 expression tended to be higher in females (0.55±0.20 and 0.79±0.3 AU, respectively p=0.055) Conversely, ABCG8 expression was lower in females (1.70±0.07 and 1.00±0.25 AU, respectively p=0.004).

Conclusions: Higher RCT in females than in males was identified in liver-specific CDKAL1-deficient mice. Hepatic SR-B1 upregulation that potentially underlies this difference may be one of the mechanisms associated with sex-dependent cholesterol metabolism.

Keywords: Reverse cholesterol transport

MOP1-A-2

Preventing stroke from cerebral cavernous malformations using diet induced microbiome modification

Jaesung Peter Choi*

Centre for Inflammation, University of Technology Sydney (UTS) & Centenary Institute, Australia

Objectives: Cerebral cavernous malformation (CCM) is a vascular malformation that mainly forms in the central nervous system and affects approximately 1 in 200 people worldwide. CCM is considered as one of the main causes of hemorrhagic stroke in children. Neurosurgery is the only treatment option for some patients. Clinical symptoms of CCM disease are highly variable, ranging from asymptomatic to neurological deficits and hemorrhagic stroke, even among individuals with identical mutations and family history. Recent studies showed that stimulation of Toll-like receptor 4 (TLR4) in the surface of brain endothelial cells by lipopolysaccharide (LPS) derived from gram-negative bacteria leads to upregulation of mitogen-activated protein kinase kinase kinase 3 (MEKK3) which associated with CCM lesion formation. These suggest that gut microbiome, alongside genetic factors, plays an influential role in the severity of CCM disease.

Methods: We generated CCM1 knockout mouse model using Cdh5CreERT2 (thereafter Ccm1iECKO) to test the role of high-fat diet in CCM. Brains were harvested to measure CCM lesion burden micro-CT. Gut morphology was analyzed by histology. Faecal samples were collected for metagenomics, lipidomics and metabolomics sequencing.

Results: After six weeks of high-fat diet intervention, mice treated with high and low-fibre diets had no significant alteration in CCM lesion burden. However, high-fibre diet increased the thickness of the ileum muscle layer and the number of goblet cells in the gut. Interestingly, female mice's CCM lesion burden significantly decreases after high-fat diet (HF) treatment. However, the same trend in male mice is not statistically significant.

Conclusions: Although there is extensive ongoing research on the role of microbiome in different diseases, our knowledge of the exact mechanisms is limited. A recent cohort study on human CCM patients showed an inverse relationship between obesity and CCM lesion burden, in line with our results in HF-treated mice. However, whether these regressions are due to changes in gut microbiome profile or other components in the HF-diet remains unclear and warrants further investigation.

Keywords: Cerebral cavernous malformation, High-fat, Microbiome, Sphingolipid, Mouse

MOP1-A-3

Interplay of lipid uptake and lipid production in brown adipose tissue

Janina Behrens*, Michelle Y. Jaeckstein, Markus Heine, Jörg Heeren, Ludger Scheja

Department of Biochemistry and Molecular Cell Biology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

Objectives: Brown adipose tissue (BAT) is activated by cold and maintains body core temperature by non-shivering thermogenesis, a process fuelled by lipids. Thus, lipid uptake into BAT increases after cold indicating high lipid utilization capacity. Beside lipid uptake, brown adipocytes perform de novo lipogenesis (DNL) at a high rate, which is transcriptionally controlled by carbohydrate-response-element-binding protein (ChREBP). Notably, the interplay of lipid production and lipid uptake in BAT remains unclear. To address this question, mouse-models with impaired DNL and lipid uptake were studied.
Methods: ChREBPfl/fl-Ucp1-Cre, ChREBPfl/fl-Ucp1-Cre-CD36-KO and ChREBPfl/fl-Lplfl/fl-Ucp1-Cre mice were housed at 22°C or 6°C. Metabolism and mechanisms were studied by bulk RNA-seq, lipidomics, immunohistochemistry, radioactive tracer studies and indirect calorimetry.
Results: ChREBP deficiency in BAT led to massive reduction of the DNL-enzymes Acly, Acc and Fasn. Additionally, lipidomic analysis revealed significant less endogenous and more exogenous fatty acids in BAT upon ChREBP-deficiency. Consistently, lipid uptake into ChREBP-deficient BAT from circulating triglyceride-rich lipoproteins was significantly increased, which was accompanied by enhanced lipoprotein lipase (Lpl) protein levels in capillaries. Unexpectedly, the LPL inhibitor ApoC3 showed robust expression in BAT and was reduced upon ChREBP deficiency, which may explain LPL induction. To further address the interplay between DNL and lipid uptake in BAT, Lpl-ChREBP- and CD36-ChREBP-double knockout (dKO) mice were generated. Lipid uptake from circulation was reduced to baseline in both dKO models and plasma levels of non-esterified fatty acids (NEFA) were higher compared to controls. Notably, energy expenditure was unchanged and both dKO models were cold tolerant.
Conclusions: Lack of lipids derived from DNL in brown adipocytes appears to be compensated by increased fatty acid uptake from circulation. Thus, DNL-inhibition expands lipid uptake capacity and might be a potential target to enhance plasma lipid clearance by BAT. Surprisingly, blocking both, lipid production and uptake did not impair cold tolerance indicating further compensatory mechanism in BAT.
Keywords: DNL, ChREBP, CD36, BAT, LPL

MOP1-A-4

Potential renoprotective effects of Boerhaavia diffusa mediated through reduction of lipids and oxidative stress in chronic kidney disease

On Ying Angela Lee*, Martin Ho Yin Yeung

The Department of Health Technology and Informatics, The Hong Kong Polytechnic University, China

Objectives: Chronic kidney disease (CKD) is a major public health issue associated with increased morbidity and mortality worldwide. Oxidative stress and abnormal lipid metabolism play key roles in the progression of CKD. Reactive oxygen species (ROS) accumulation induces oxidative damage to renal tissues and contributes to renal dysfunction. Additionally, hyperlipidemia is commonly seen in CKD and the excess lipids in the kidney can aggravate renal injury. Boerhaavia diffusa (BD) is a medicinal plant from India used traditionally for urinary disorders. Recent studies have shown that extracts from BD possess antioxidant and hypolipidemic properties. However, the renoprotective effects of BD specifically concerning attenuating oxidative stress and hyperlipidemia in the kidney, remain largely unexplored. This study aims to evaluate the role of BD in alleviating CKD progression by focusing on its impact on renal oxidative stress and lipid metabolism.
Methods: A hyperlipidemic cell model was established by treating human proximal tubule cells (HK-2 cells) with palmitate for 24 hours. Cells were then treated with methanolic BD extracts (MBE) with different concentrations for 24 hours. Lipid accumulation was assessed by oil-red-O staining. Intracellular ROS was measured by DCFDA staining and apoptosis by Annexin V-FITC staining using flow cytometry. Lipid profiles between the treatment group and control group were analyzed and compared using UHPLC/ESI-Orbitrap-LC/MS.
Results: Oil-Red-O staining showed that MBE treatment reduced lipid accumulation in a dose-dependent manner, indicating its hypolipidemic effects. Flow cytometry analysis revealed MBE treatment decreased both late and overall apoptotic events, demonstrating potent antioxidant activities. Moreover, LC/MS analysis identified that most lipid groups were substantially decreased following MBE treatment.
Conclusions: In summary, this study provided preliminary evidence that MBE may protect against renal injury in chronic kidney disease by reducing oxidative stress, lipid levels, and apoptosis.
Keywords: Hyperlipidemia, Boerhaavia diffusa, Renoprotection, Chronic kidney disease, Oxidative stress, Lipotoxicity, Antioxidant

MOP1-A-5

Metabolic and thermogenic regulation disorders in brown adipose tissue due to UBXN4 deficiency

Seon Bu Yang*, Jaetaek Kim

Endocrinology and Metabolism, Department of Internal Medicine, College of Medicine, Chung-Ang University, Republic of Korea

Objectives: Brown adipose tissue (BAT) plays a critical role in thermogenesis and energy metabolism. UBXN4, a protein involved in the ubiquitin-proteasome pathway, has been implicated in various cellular processes including protein degradation and stress response. This study investigates the impact of UBXN4 deletion on the expression of key metabolic genes in BAT under cold exposure.

Methods: BAT-specific UBXN4 knockout (BUBKO) and wild-type (WT) mice were exposed to cold environment (4-8°C) for 6 hours. The expression levels of key metabolic genes were analyzed. Additionally, body temperature measurements and histological analysis of BAT were performed.

Results: Cold exposure significantly reduced the expression of PGC-1α, PPAR-α, and FASN in BUBKO compared to WT BAT indicating involvement of UBXN4 in the regulation of key metabolic pathways. However, no significant differences were observed in the expression levels of MFN2, SDHA, TFAM, and OPA1 suggesting that UBXN4 does not influence mitochondrial dynamics or oxidative phosphorylation. Additionally, BUBKO mice exhibited a 1-2°C lower body temperature under cold exposure and lacked lipid accumulation in BAT.

Conclusions: Our data underscore the essential role of UBXN4 in thermogenesis and energy storage. Further research is needed to elucidate the mechanisms by which UBXN4 regulates metabolism and its potential therapeutic implications.

Keywords: Brown adipose tissue, UBXN4, Thermogenesis, Energy metabolism, Cold exposure

MOP1-A-6

Lipophagy as therapeutic approach for obesity and metabolic dysfunction associated fatty liver disease

Tae Hyun Bae[1,2*], Joo-Won Park[3]

[1]Cellular Degradation Biology Research Center, College of Medicine, Seoul National University, Republic of Korea,
[2]Department of Biomedical Sciences, College of Medicine, Seoul National University, Republic of Korea,
[3]Department of Biochemistry, College of Medicine, Ewha Womans University, Republic of Korea

Objectives: Intracellular lipid catabolism can be achieved not only by lipase-based lipolysis, but also by autophagic degradation of lipid droplets called lipophagy. Since N-terminal (Nt)-arginylated proteins have been recently revealed as N-degrons for an autophagic N-recognin, p62, we investigated the role of Nt-arginylation in lipophagy and possible therapeutic application of Nt-arginylation mimics for metabolic dysfunction associated fatty liver disease (MAFLD) and obesity.

Methods: The role of N-degron pathway in p62-mediated lipophagy was investigated in HepG2, Hep3B, and NIH3T3 cells. Cells, loaded by free fatty acids to accelerate lipid accumulation, were analyzed by immunocytochemistry, western blotting, and triglyceride quantification. Severity of hepatic steatosis and fibrosis was examined in hepatocyte-specific Arginyltransferase 1 (ATE1) knockout mice fed with high fat diet. Finally, the effect of Nt-artinylation mimicry on obesity, hepatic steatosis, steatohepatitis, and fibrosis was examined in high fat diet-fed C57BL/6 male mice.

Results: Influx of fatty acids and high fat diet feeding specifically elevated Nt-arginylation of endoplasmic reticulum proteins including BiP, catalyzed by ATE1. Nt-arginylation initiated p62-mediated lipophagy, and ablation of the ZZ domain of p62, where arginylated substrates are recognized, abrogated the p62 recruitment to lipid droplets. Furthermore, high fat diet feeding in liver specific ATE1-/- mice caused severe hepatic steatosis, steatohepatitis, and fibrosis compared to controls. Finally, Nt-arginylation mimicry was effective in both preventing and alleviating obesity, hepatic steatosis and steatohepatitis in a high fat diet-induced MAFLD model.

Conclusions: Nt-arginylation initiated lipophagy by acting as a degron for p62 oligomerization and activation, and Nt-arginylation mimicry would be clinically applicable for NAFLD via lipophagy activation.

Keywords: Obesity, p62, N-terminal arginylation

MOP1-A-7

A bibliometric analysis of cardiovascular disease: risk factors, therapies, and the rise of PCSK9 inhibitors

Nurmala Widya Absari*, Esna Taqwaningtyas, Ratna Amalia Fairuz

GP, UII, Indonesia

Objectives: Cardiovascular disease (CVD) is a primary global health concern, accounting for 17.9 million deaths in 2020. Elevated low-density lipoprotein (LDL) cholesterol is a primary risk factor for CVD. PCSK9 inhibitors are a promising therapeutic option for lowering LDL cholesterol and reducing CVD risk. This bibliometric analysis explores the research landscape of CVD and PCSK9 inhibitors.
Methods: A VOSviewer bibliometric analysis was conducted using 2,000 Web of Science Core Collection database records. Keywords were analyzed based on their frequency, co-occurrence, and network density.
Results: The bibliometric analysis identified several key themes in CVD research: Lipid metabolism: LDL cholesterol, HDL cholesterol, triglycerides, and other lipid-related keywords were prominent, reflecting the importance of lipid dysregulation in CVD pathogenesis. Cardiovascular diseases: Keywords such as coronary heart disease, stroke, atherosclerosis, and heart failure highlighted the diverse range of CVD conditions. Therapeutic approaches: The keyword network represented therapeutic interventions such as medications, surgery, lifestyle modifications, and rehabilitation. Risk factors: Hypertension, smoking, obesity, diabetes, and other risk factors for CVD were evident in the analysis. Research methodologies: Epidemiological studies, clinical trials, basic research, and biomarker studies were among the research methods employed in CVD research. The analysis also revealed the emergence of PCSK9 inhibitors as a promising therapeutic strategy for CVD. Keywords such as PCSK9, evocumab, alirocumab, and LDL-C reduction were associated with this emerging treatment modality.
Conclusions: This bibliometric analysis provides a comprehensive overview of CVD research, highlighting the disease's multifaceted nature, the diverse risk factors involved, and the range of therapeutic approaches. The analysis also underscores the potential of PCSK9 inhibitors to reduce CVD risk and improve patient outcomes.
Keywords: Cardiovascular disease (CVD), PCSK9 inhibitors

MOP1-A-8

Microcurrent wave mitigates mouse intracranial arterial dolichoectasia development

Dong Rak Kwon*

Department of Rehabilitation Medicine, Catholic University of Daegu School of Medicine, Daegu, Republic of Korea

Objectives: To investigate the therapeutic efect of microcurrent electrical stimulation in a mouse IADE model.
Methods: The study involved dividing twenty 8-week-old C57BL/6J male mice into five groups to investigate the effects of microcurrent on cerebral arteries after intracranial arterial dolichoectasia (IADE). Group 1 served as the control, Group 2 modeled IADE, Group 3 received preventative microcurrents, Group 4 received microcurrents starting after surgery for IADE treatment, and Group 5 evaluated the toxicity of microcurrents. After four weeks of treatment, the mice were euthanized for the analysis of arterial diameter, thickness, and composition using ImageJ, focusing on the proportions of smooth muscle cells, elastin, and collagen within specific arterial regions.
Results: The cerebral arterial diameter was significantly higher in group 2-D (117.79±17.05) compared to group 1-C (76.64±12.03), and group 3-M+D (77.29±24.47). Additionally, the cerebral arterial thickness in group 2-D (9.31±2.26) was significantly lower than in group 1-C (16.16±1.6), and group 3-M+D (15.67±2.86) (Figure 2, Table 1). The diameter of group 4-D+M (100.28±25.99) was lower than that of group 2 and the thickness of group 4-D+M (12.82±5.17) was higher than that of group 2-D although no significant difference was observed (Figure 2, Table 1). The proportion of SMC and elastin in the cerebral arterial wall was significantly lower in group 2-D (SMC: 38.05±10.32, elastin: 53.13±9.08) compared to group 1-C (SMC: 70.93±7.18, elastin: 53.13±9.08), group 3-M+D (SMC: 67.03±6.17, elastin: 47.22±8.73) and group 4-D+M (SMC: 70.45±9.35, elastin: 51.2±6.82), respectively. Additionally, the proportion of collagen in the cerebral arterial wall was significantly lower in group 2-D (42.46±14.12) compared to group 1-C (6.94±2.76), group 3-M+D (13.31±4.67), and group 4-D+M (13.3±3.84), respectively (Figure 2, Table 1) with no toxicity observed in the toxicity evaluation group (Group 5-M).
Conclusions: The study revealed that microcurrent is effective in preventing IADE development, although these beneficial effects warrant further investigation.
Keywords: Intracranial arterial dolichoectasia (IADE), Microcurrent therapy, Hypertension and inflammation, Cerebral arterial wall remodeling

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024
The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 1-B

Sep 27(Fri) 14:40-15:40 | Mini-Oral B (Studio 6, 6F)

MODERATOR : In-Kyung Jeong (Kyung Hee University, Republic of Korea)

MOP1-B-1

Prevalence and treatment gaps of hyperlipidaemia among patients with type 2 diabetes in Malaysia

Anis S. Abd Raof[1*], Zanariah Hussein[2], Nurain Md Noor[2], Norlaila Mustafa[3], Rohana Abdul Ghani[5], Wan Mohamad Wan Bebakar[6], Siew-Pheng Chan[1], Lee-Ling Lim[1,7,8]

[1]Department of Medicine, Faculty of Medicine, University of Malaya, Malaysia, [2]Department of Medicine, Hospital Putrajaya, Malaysia, [3]Department of Medicine, Faculty of Medicine, Universiti Kebangsaan Malaysia, Malaysia, [5]Department of Medicine, Faculty of Medicine, Universiti Teknologi MARA, Malaysia, [6]School of Medical Sciences, Universiti Sains Malaysia, Malaysia, [7]Department of Medicine and Therapeutics, The Chinese University of Hong Kong, Prince of Wales Hospital, Hong Kong SAR, China, [8]Asia Diabetes Foundation, Shatin, Hong Kong, China

Objectives: Patients with type 2 diabetes (T2D) are at high risk for atherosclerotic cardiovascular disease (ASCVD). Achieving multiple cardiometabolic risk factor targets and optimizing guideline-directed medical therapy significantly reduce ASCVD risk. Compared with glucose- and blood pressure-lowering, lipid-lowering management has significant challenges in real-world practice in high-income countries/regions. Similar data is lacking in low- and middle-income countries/regions. We aimed to examine the prevalence and treatment patterns of hyperlipidaemia among patients with T2D in Malaysia, a middle-income country in Southeast Asia.
Methods: The cross-sectional TARGET-T2D study involved patients with T2D who received regular care at diabetes specialist and general medicine clinics of 21 publicly-funded hospitals across Malaysia in 2022-2023. We defined hyperlipidaemia as the presence of either hypercholesterolaemia or dyslipidaemia. Hypercholesterolaemia was defined as either an uncontrolled level of low-density lipoprotein cholesterol (LDL-C) based on the 2023 European Society of Cardiology cardiovascular risk stratification criteria or any prescription of LDL-C lowering therapy (statins, ezetimibe, proprotein convertase subtilisin/kexin type 9 [PCSK9] inhibitors, or small interfering RNA [siRNA]). Dyslipidaemia was defined as either plasma triglyceride ≥1.7 mmol/L, high-density lipoprotein cholesterol (HDL-C) <1.3 mmol/L in women (<1.0 mmol/L in men), or any prescription of triglyceride-lowering therapy (fenofibrate or gemfibrozil).
Results: A total of 11,399 patients were analyzed (mean age 57.2±14.2 years; 45% men; HbA1c 8.4±2.0%; LDL-C 2.5±1.1 mmol/L). The prevalence of hypercholesterolaemia and dyslipidaemia was 43.5% and 3.1%, respectively. Use of statin therapy was 88.3%. Considering the ESC 2023 criteria, 62.7% of patients were classified as very high-risk, 23.3% as high-risk, and 13.1% as moderate-risk. The proportions of patients who achieved risk-stratified LDL-C targets were low at 6.7%, 5.6%, and 8.0%, respectively.
Conclusions: Although 90% of patients with T2D were at high cardiovascular risk and 88.3% statin use, fewer than 15% achieved risk-stratified LDL-C targets. Tailored strategies are needed to narrow these treatment gaps.
Keywords: Atherosclerotic cardiovascular disease, Type 2 diabetes, Hyperlipidaemia

MOP1-B-2

Prevalence of metabolic syndrome in patients with subclinical and overt hypothyroidism visiting tertiary care centre of western Nepal

Binaya Tamang*, Buddhi Raj Pokhrel, Amit Chandra Jha, Narayay Gautam

Department of Biochemistry, Universal College of Medical Sciences, Nepal

Objectives: Thyroid hormones are major regulatory hormones that control the rate of metabolic functions; thus, alteration in the their level may be associated with metabolic syndrome.The objective of our study was to find out the prevalence of metabolic syndrome in subclinical & overt hypothyroidism. Also, to compare the various Lipid profile parameters, blood pressure as well as waist circumference between them.
Methods: A hospital based cross sectional study was conducted at Universal college of medical sciences, Bhairahawa from March to September 2019. A total of 222 hypothyroid patients were enrolled in the study. Metabolic syndrome was diagnosed by National Cholesterol education program-Adult treatment panel III revision criteria. The anthropometric indices were recorded. fT3, fT4 and TSH were measured by Maglumi -1000 (CLIA) and the Lipid profile, fasting blood sugar were estimated by ERBA XL 200 analyzer. Data were analyzed by using SPSS 16.0.
Results: Patients were aged between 10-60 years, with a mean age of 38.89 years. The prevalence of metabolic syndrome was 44.1% of which 80.6% were female. Furthermore, The prevalence of metabolic syndrome was found to be 43.7% in subclinical hypothyroidism and 46.6% in overt hypothyroidism. However, all lipid profile parameters (total cholesterol, Triacylglycerol, HDL-cholesterol, LDL-cholesterol and VLDL-cholesterol), blood pressure and waist circumference were not found to be significantly different between subclinical and overt hypothyroidism.
Conclusions: Our study showed the high prevalence of metabolic syndrome in patients with overt and subclinical hypothyroidism. Hypothyroidism and Metabolic syndrome are the recognized risk factors for cardio vascular disease. Screening for metabolic syndrome in patients with hypothyroidism can reduce the risk of cardio vascular disease as well as reduce the mortality rate due to its complications.
Keywords: Metabolic syndrome, Subclinical hypothyroidism

MOP1-B-3

Reference range of lipoprotein(a) in the Thai population at King Chulalongkorn Memorial Hospital

Wachirawit Thipkunok*, Poranee Ganokroj, Wachirawit
Laboratory Medicine, King Chulalongkorn Memorial Hospital, Thailand

Objectives: Establish a reference range for lipoprotein(a) among the Thai population and study its correlation with other lipoprotein levels.
Methods: A cross-sectional study was conducted at King Chulalongkorn Memorial Hospital's check-up clinic. The subjects were classified into normal and dyslipidemia groups based on their fasting lipid profile results. Lipoprotein(a) levels were analyzed; the reference range was calculated as 2.5th and 97.5th percentile values.
Results: For the analysis, 494 subjects were included, of which 64% were women. Of these, 215 were classified as normal and 279 as dyslipidemia group. Lipoprotein(a) distribution is skewed to the right in all groups. The median concentration was 14 nmol/L in the normal group and 28 nmol/L in the dyslipidemia group. The reference range of lipoprotein(a) was <0.001).
Conclusions: This study establishes a reference range of lipoprotein(a) for a healthy Thai population, consistent with other studies, and provides essential results for future analyses.
Keywords: Lipoprotein(a) level, Cardiovascular risk, Atherosclerotic cardiovascular disease, Reference range

MOP1-B-4

HIV-associated atherosclerosis data received by optical coherence tomography

Nuriiat Efendieva*
Cardiology, Pirogov Russian National Research Medical University, Russian Federation

Objectives: Cardiovascular disease is a major cause of morbidity and mortality in people with HIV. The detection of subclinical atherosclerosis through optical coherence tomography allows us to identify patients at an increased risk of cardiovascular disease as a primary prevention strategy; this test is not routine. The study aimed to characterise the changes of the structure of the coronary wall and the thickening of the intima by Optical Coherence Tomography in HIV-infected patients with or without symptoms of coronary heart disease.
Methods: Fifty-two HIV-infected individuals had a mean age of 49.8±11.4 years. There were 75% men, diabetes 30,8%, hypertension 30,8%, smokers 34,62% and 7,7 % with cholesterol levels ≥99 mg/dl. Control group included 120 non-HIV-infected controls with coronary heart disease. All the participants from HIV-group receive ART, 100% of participants had plasma HIV RNA <20 copies/mL and 78,85% of them have symptoms of coronary artery disease.
Results: The average diffuse homogeneous thickening of the intima in patients with HIV was 0.67±0.24 mm, and 0.34 ±0.18 mm in control group, with normal values not exceeding 0.05 mm. There was impaired three-layer structure of coronary wall in 90,4% (47 of 52) HIV-infected participants and in 60% of control group, atherosclerotic plaque had only 34,62% of HIV group. All HIV-infected patients receive ART more than 5 years.
Conclusions: OCT demonstrated that the inflammatory process resulting from HIV-infection or HAART may be relevant in the changes of coronary arteries in HIV-positive patients. The changes are predominantly represented by thickening of the intima, impaired three-layer structure of arterial wall and accelerating atherosclerosis.
Keywords: Chronic inflammation, HIV infection

MOP1-B-5

Echocardiographic evaluation of LV parameters and insulin resistance in non-diabetic STEMI patients

Javad Alizargar*

Medicine, Kashan University, Iran

Objectives: Previous research has established the Triglyceride Glucose (TyG) index as an indicator of insulin resistance (IR) with connections to cardiovascular risk factors. This study aims to provide novel insights into how TyG index-based IR is related to left ventricular (LV) parameters within a large sample size dataset. Furthermore, it seeks to examine the potential impact of TyG index-based IR on mortality in individuals experiencing acute ST-segment elevation myocardial infarction (STEMI) without diabetes.

Methods: This study analyzed data from 23,780 myocardial infarction patients in the UK Biobank. Separate linear regression analyses were conducted to explore the associations between the insulin resistance index and LV parameters in non-diabetic individuals, while controlling forage, BMI and gender.

Results: Among the analyzed patients, 19,901 (84.31%) were non-diabetic. Of these, 962 underwent echocardiography, with the following mean±SD parameters: LV ejection fraction (51.96±8.18), LV end diastolic volume (156.02±55.06), LV end systolic volume (77.03±41.99), LV stroke volume (78.97±20.88), Cardiac output (4.58±1.19), Cardiac index (2.36±0.57). The mean TyG index in these patients was 8.83±0.54. Linear regression analysis demonstrated significant associations between TyG index and LV ejection fraction, LV end diastolic volume, LV end systolic volume, LV stroke volume, Cardiac output, and Cardiac index (p-values<0.05). TyG was statistically correlated with the days lived after the MI diagnosis (r=0.03, p0.01). However, TyG index was not found to be associated with mortality or survival in these patients.

Conclusions: In non-diabetic STEMI patients, the TyG index is associated with LV parameters but does not demonstrate a clear link to mortality, suggesting potential for cardiovascular assessment without survival prediction.

Keywords: Echocardiography, LV parameters, Insulin resistance, Cardiovascular assessment

MOP1-B-6

A novel therapeutic agent for inducing atherosclerosis regression: mechanistic insights into saffron extract

Iman Nabilah Abd Rahim[1,2*], Effat Omar[1,2], Suhaila Abdul Muid[1,3], Hapizah Nawawi[1,2], Noor Alicezah Mohd Kasim[1,2]

[1]Institute of Pathology, Laboratory and Forensic Medicine (I-PPerForM), Faculty of Medicine, Universiti Teknologi MARA, Sungai Buloh, Selangor, Malaysia, [2]Department of Pathology, Faculty of Medicine, Universiti Teknologi MARA, Sungai Buloh, Selangor, Malaysia, [3]Department of Biochemistry & Molecular Medicine, Faculty of Medicine, Universiti Teknologi MARA, Sungai Buloh, Selangor, Malaysia

Objectives: Saffron extract (SAF) has garnered attention for its hypolipidemic effects and low toxicity. However, its potential in promoting fatty streak regression in early atherosclerosis remains underexplored. This study aims to investigate the effects of SAF on atherosclerosis regression and elucidate its underlying mechanisms in early atherosclerotic New Zealand white rabbits (NZWR).

Methods: Twenty-four male NZWR were fed a high-cholesterol diet (HCD) for 4 weeks to induce early atherosclerosis, followed by 8 weeks of oral treatment with either 50mg/kg/day SAF (SAF50; n=6),100mg/kg/day SAF (SAF100; n=6),2.5mg/kg/day simvastatin (n=6),or distilled water (n=6). Blood samples were collected at baseline, post-HCD feeding, and post-treatment for lipid profile analysis. The aorta was dissected to measure the lesion area using Sudan IV staining and to assess matrix metalloproteinases-9 (MMP-9) expression via immunohistochemistry. Nuclear factor-kappa B p65 (NF-κBp65) gene expressions in the aortas were evaluated using qRT-PCR. Results were expressed as mean±SEM. Paired t-tests and one-way ANOVA were conducted, with a significance level set at p<0.05.

Results: Low-density lipoprotein cholesterol (LDL) and total cholesterol (TC) decreased significantly by 89.25±0.03% and 85.70±0.03%, in SAF50 group, and by 92.38±0.02% and 86.80±0.03%, respectively, in SAF100 group compared to pre-treatment (p<0.01).

Conclusions: SAF suppresses NF-κB signaling, resulting in reduced inflammatory cytokines, decreased MMP-9-mediated extracellular matrix degradation, and lowered LDL and TC levels, ultimately promoting the regression of fatty streak in early atherosclerosis. These results introduce a novel perspective on the potential of SAF as an adjuvant therapy in the treatment of atherosclerosis.

Keywords: Atherosclerosis regression, Matrix metalloproteinase-9, Rabbits, Saffron, Atherosclerosis

MOP1-B-7

Triglyceride and glucose index at mid-pregnancy is a simple and easy-to-calculate marker associated with large for gestational age newborns in women with gestational diabetes mellitus

Kyung-Soo Kim*, Arim Choi, Hyunju Park, Soo-Kyung Kim, Yong-Wook Cho

Division of Endocrinology and Metabolism, Department of Internal Medicine,
CHA Bundang Medical Center, CHA University School of Medicine, Republic of Korea

Objectives: The aim of this study was to evaluate the association between triglyceride and glucose (TyG) index at mid-pregnancy and large for gestational age (LGA) newborns in women with gestational diabetes mellitus (GDM).
Methods: We enrolled 1,062 pregnant women diagnosed with GDM from December 2005 to June 2017. GDM was diagnosed by a 'two-step' approach with Carpenter and Coustan criteria. We performed laboratory tests including triglyceride and glucose levels at mid-pregnancy. LGA was defined if birth weights of newborns were above the 90th percentile for their gestational age. The TyG index was calculated as the Ln[fasting TG (mg/dL) x fasting plasma glucose (mg/dL)/2].
Results: Mean age was 33.2 years and mean pre-pregnancy body mass index was 22.4 kg/m2. The prevalence of LGA was 6.9 % (n=73). TyG index was significantly higher in mothers of LGA newborns compared with those of non-LGA newborns (9.32 vs. 9.26, P=0.019), but triglyceride and triglyceride to high-density lipoprotein cholesterol ratio (TG/HDL-C) were not different between two groups. The prevalence of delivering LGA newborns was increased with increasing tertile of TyG index (T1, 4.5%; T2, 7.3%; T3, 8.8%; P for trend <0.05). After adjustment for maternal age and pre-pregnancy body mass index, the highest tertile of TyG index was 2.13 times (95% confidence interval 1.14-4.00) more likely to have LGA newborns than the lowest tertile. However, there was no difference between the groups according to TG/HDL-C tertiles.
Conclusions: In women with GDM, TyG index at mid-pregnancy is associated with an increasing risk of delivering LGA newborns.
Keywords: Gestational diabetes, Glucose, Triglycerides

MOP1-B-8

Real-world effects of imeglimin on cardiovascular risk factors in Japanese patients with type 2 diabetes: a retrospective longitudinal study

Hisayuki Katsuyama*, Mariko Hakoshima, Hiroki Adachi, Hidekatsu Yanai

Department of Diabetes, Endocrinology and Metabolism, National Center for Global Health and Medicine Kohnodai Hospital, Japan

Objectives: Imeglimin is a newly developed antidiabetic agent and is available only in Japan. In clinical trials, imeglimin showed excellent hypoglycemic effects in patients with type 2 diabetes (T2DM). The study aimed to examine the real-world efficacy of imeglimin on various cardiovascular risk factors in patients with T2DM.
Methods: In this retrospective longitudinal study, we selected patients with T2DM who took imeglimin continuously for at least 3 months and collected the results of blood tests and anthropometric measurements. We compared the data at the first prescription of imeglimin with those at 3, 6 and 12 months after the initiation of imeglimin. Paired T-tests were employed to analyze the differences in each value.
Results: We enrolled 68 patients for this study. After the start of imeglimin treatment, HbA1c decreased by 0.7 % at 3 months, 1.1% at 6 months, and 1.0% at 12 months after the start of imeglimin. There were also decreases in body weight, non-HDL cholesterol, and LDL cholesterol levels during imeglimin treatment, whereas HDL cholesterol decreased slightly. The decreases in HbA1c were observed regardless of age, gender, body mass index, duration of diabetes, renal function,and concomitant use of hypoglycemic agents. The effects on serum lipids were pronounced in obese patients.
Conclusions: This is the first report showing the real-world effects of imeglimin in patients with T2DM. Besides the glucose-lowering effects, favorable effects of imeglimin on body weight and serum lipids were also observed.
Keywords: Dyslipidemia, Type 2 diabetes, Imegimin

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024
The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 1-C

Sep 27(Fri) 14:40-15:40 | Mini-Oral C (Studio 7, 6F)

MODERATOR : Jin Han (Inje University, Republic of Korea)

MOP1-C-1

The potential of endothelial progenitor cells using Intravascular Therapeutic Microrobot System (ITMS) as a novel therapy of atherosclerosis

Anindya Amanda Damayanti*

Cardiology, Universitas Islam Indonesia, Indonesia

Objectives: Coronary heart diseases (CHD) is characterized by narrowing of the blood vessels with a high chance of death worldwide. Currently, heparin and percutaneous coronary intervention (PCI) are used to treat thrombus. PCI procedure has several disadvantages, the need for expert to carry out this procedure is still lacking, especially in developing countries. Therefore, further research upon the treatment is urgently needed.
Methods: This review is done by making data analysis from online scientific journals which fulfill inclusion and exclusion criteria. Previously published journal articles were read and reviewed to understand the concept better and help find the main idea of EPC's potential of treating CHD.
Results: To address such problem, Intravascular Microrobot system (ITMS) will perform specific movements and inject endothelial progenitor cells (EPCs). The movement will resolve thrombus occlusion and EPCs will help the process of regenerating damaged endothelium. Paracrine mechanism will associated with the vascular repair that influences the progression of atherosclerosis. It was found that EPCs will reduce the adhesion of pro-inflammatory molecules, cytokines, and oxidative stress.
Conclusions: The experiments showed positive results and managed to reduce the pro-inflammatory cytokine and regenerate the endothelial wall.
Keywords: Atherosclerosis, EPCs, Microrobot

MOP1-C-2

Study on the mechanism of the Chuanxiong-Chishao pair and its active ingredients in preventing atherosclerosis by inhibiting ferroptosis

Miao Zhang*, Yin Cai

Department of Health Technology and Informatics, The Hong Kong Polytechnic University, China

Objectives: Atherosclerosis is a chronic cardiovascular disease characterized by the accumulation of lipids, inflammatory cells, and fibrous elements in arterial walls, leading to plaque formation. This study investigated whether the Chuanxiong-Chishao herbal pair and its active phytochemicals can inhibit the conversion of macrophages into atherosclerotic foam cells, a key pathological process. The study also explored the correlation between this process and ferroptosis.
Methods: An in vitro model of atherosclerotic foam cell formation was established using oxidized low-density lipoprotein (ox-LDL)-induced THP-1 macrophages. The THP-1 cells were treated with the Chuanxiong-Chishao herbal pair and its active components. Lipid accumulation was assessed using Oil Red O staining. The expression of ferroptosis-related genes, including FTH1, GPX4, NOX1, p53, PTGS2, and SLC7A11, was analyzed by qPCR.
Results: Oil Red O staining showed reduced lipid droplet formation in THP-1 cells treated with the Chuanxiong-Chishao herbal pair and its active ingredients compared to the model group. The qPCR analysis revealed that the model group had significantly decreased mRNA levels of FTH1, GPX4, and SLC7A11, and increased NOX1, p53, and PTGS2 expression. The herbal treatment groups exhibited significantly upregulated FTH1, GPX4, and SLC7A11, and suppressed NOX1, p53, and PTGS2 mRNA levels compared to the model group ($p<0.05$).
Conclusions: The Chuanxiong-Chishao herbal pair and its active components can inhibit the transformation of ox-LDL-induced THP-1 macrophages into foam cells. This effect appears to be associated with the regulation of ferroptosis-related genes, including the upregulation of FTH1, GPX4, and SLC7A11, and the suppression of NOX1, p53, and PTGS2. These findings provide insights into the potential mechanisms by which the herbal pair may exert protective effects against atherosclerosis development.
Keywords: AS, Chishao, Chuanxiong, TCM

MOP1-C-3

Asiatic acid protects against tumor necrosis factor alpha (TNF-α)-or hydrogen peroxide (H2O2)-stimulated oxidative stress in human aortic endothelial cells

Lai Yen Fong[1*], Jian Lee[1], Wei Chih Ling[1], Chin Theng Ng[3], Muhammad Nazrul Hakim Abdullah[4], Yang Mooi Lim[1], Yoke Keong Yong[5], Choy Hoong Chew[2]

[1]Department of Preclinical Sciences, M. Kandiah Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, Malaysia, [2]Department of Allied Health Sciences, Faculty of Science, Universiti Tunku Abdul Rahman, Malaysia, [3]Unit of Physiology, Faculty of Medicine, AIMST University, Malaysia, [4]Department of Biomedical Sciences, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia, [5]Department of Human Anatomy, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia

Objectives: Oxidative stress describes a condition where the production of pro-oxidant molecules overwhelmes the anti-oxidant mechanisms in cells, leading to the development of chronic inflammatory diseases such as atherosclerosis. Targeting oxidative stress hence, might be promising in prevention of these chronic diseases. Asiatic acid is one of the pentacyclic triterpenoid derived from Centella asiatica L. Urban and has been reported to possess many biological activities including anti-hypertensive, anti-hyperlipidemic and neuroprotective effects. The objective of this study was to investigate the effect of asiatic acid on endothelial oxidative stress induced by tumor necrosis factor alpha (TNF-α)- or hydrogen peroxide (H2O2).
Methods: Human aortic endothelial cells were pretreated with either culture media or 10-40 µM of asiatc acid for 6 h before the cells were induced with 500 µM of H2O2 for 1 h. Reactive oxygen species (ROS) levels and catalase (CAT) activity were measured. To identify the key therapeutic target of asiatic acid, the protein expression of p47phox, a cytosolic subunit of NADPH oxidases (NoX) that regulates ROS production, was also assessed using Western blot analysis.
Results: We demonstrated that pretreatment of asiatic acid at 40 µM significantly suppessed TNF-α-induced elevated ROS levels. Our optimization data also showed that 500 µM of H2O2 caused a maximal reduction of CAT activity at 1 h. Asiatic acid was found to alleviate decreased CAT activity triggered by H2O2 at all tested doses. Furthermore, asiatic acid also inhibits H2O2-stimulated increased p47phox expression.
Conclusions: Our findings suggest that asiatic acid protects against endothelial oxidative stress by decreasing p47phox expression. Asiatic acid could have potential applications in prevention of chronic inflammatory diseases through its anti-oxidant capability.
Keywords: Asiatic acid, Anti-oxidant, p47phox

MOP1-C-4

The metabolic phenotype of intimal foamy macrophages is shaped by Hypoxia-Inducible Factor-2α in atherosclerotic lesions

Kyu Seong Park[1*], Gwanghun Kim[2], Sang-eun Park[1], Hyun Mu Shin[2], Hang-Rae Kim[2], Jae-Hoon Choi

[1]Department of Life Science, Hanyang University, Republic of Korea,
[2]Department of Biomedical Sciences, Seoul National University College of Medicine, Republic of Korea

Objectives: Macrophages play a critical role in atherosclerosis. Diverse macrophage subtypes perform distinct functions while residing within atherosclerotic lesions. Compared to non-foamy macrophages, foamy macrophages, which accumulate lipid droplets by engulfing oxidized LDLs in the intimal layer, express higher levels of transcripts related to lipid metabolism. These lipid-laden macrophages exhibit an anti-inflammatory phenotype, suggesting potential targets for treating atherosclerosis. This research aims to elucidate the transcriptional regulator of foamy macrophages responsible for shaping their cellular phenotypes in atherosclerotic lesion.
Methods: To identify transcription factors in foamy macrophages, foamy and non-foamy macrophages were sorted from atherosclerotic lesion and subjected to assay for transposase-accessible chromatin (ATAC)-sequencing analysis. Integrating this data with our previous bulk RNA sequencing result, several transcription factors were suggested as key regulatory factors affecting gene expression. Especially, Hif-2α mRNA and HIF-2α selective peaks were increased in foamy macrophages compared to their non-foamy counterparts. Additionally, HIF-2α protein expression in the foamy macrophages was validated in the atherosclerotic lesion.
Results: To explore HIF-2α's function in foamy macrophages, we generated myeloid-specific Hif-2α deficient mice (Lyz2-Cre; Hif-2αfl/fl) and performed bulk RNA-sequencing on bone marrow-derived macrophages from the mice. In the results, 187 genes were upregulated and 582 genes were downregulated in HIF-2α-deficient macrophages compared to wild-type macrophages. Pathway enrichment analysis suggested significantly downregulated pathways related to several cell clearance processes, such as phagosome and efferocytosis, and metabolic processes, including metabolic pathways, lipid and atherosclerosis, and sphingolipid metabolism. Additionally, Ldlr KO mice receiving bone marrow transplants from Lyz2-Cre; Hif-2αfl/fl mice and fed a western diet for 16 weeks exhibited a tendency towards decreased collagen content compared to wild-type counterparts.
Conclusions: The integration of ATAC-seq and RNA-seq identified Hif-2α as a key regulator of foamy macrophages, shaping their metabolic phenotype. Further in vivo studies are required to understand the exact role of HIF-2α in macrophages during atherogenesis.
Keywords: Macrophage, Atherosclerosis, HIF2a, ATAC-sequencing

MOP1-C-5

Asiatic acid alleviates hypercholesterolemia and oxidative stress in high-fat diet-induced apolipoprotein E-knockout mice

Jian Lee[1*], Wei Chih Ling[1], Chin Theng Ng[3], Muhammad Nazrul Hakim Abdullah[4], Yang Mooi Lim[1], Yoke Keong Yong[5], Choy Hoong Chew[2], Lai Yen Fong[1]

[1]Department of Preclinical Sciences M. Kandiah Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, Malaysia, [2]Department of Allied Health Sciences, Faculty of Science, Universiti Tunku Abdul Rahman, Malaysia, [3]Unit of Physiology, Faculty of Medicine, AIMST University, Malaysia, [4]Department of Biomedical Science, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia, [5]Department of Human Anatomy, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia

Objectives: We previously demonstrated that asiatic acid, an active constituent found in Centella asiatica L. Urban, suppresses tumor factor necrosis alpha (TNF-α)-induced endothelial barrier dysfunction and nuclear factor kappa B (NFκB) activation. However, the in vivo anti-atherosclerotic effect of asiatic acid has not been reported yet. This study aims to evaluate anti-atherosclerotic effect of asiatic acid in high-fat-diet (HFD)-fed apolipoprotein E (ApoE)-knockout mice and the underlying mechanism.
Methods: ApoE-knockout mice was divided into five groups (n= 4-6). All animals were fed with HFD for 16 weeks except for the normal control group which had normal-chow diet. After 9 weeks of HFD induction, the mice were treated either with normal saline, 10, 20 mg/kg of asiatic acid or 5 mg/kg of simvastatin via intragastric administration. Body weight and food intake were monitored every week. At the end of the induction period, serum lipid profile was measured. Atherosclerotic lesion formation in the aorta were observed using en face Oil Red O and Hematoxylin and Eosin (H&E) staining. Lipid peroxidation levels in the liver tissue were also measured using thiobarbituric acid reactive substances (TBARS) assay kit.
Results: Mice treated with 20 mg/kg of asiatic acid showed significantly lower weight gain compared to HFD-fed mice, but there was no difference in food intake between all the groups. Besides, asiatic acid, at both 10 and 20 mg/kg, slightly decreased the raised total cholesterol and low-density lipoprotein levels stimulated by HFD. Oil Red O and H&E staining images revealed that asiatic acid failed to prevent atherosclerotic plaque formation in HFD-fed mice. Interestingly, asiatic acid was found to reduce hepatic oxidative stress significantly.
Conclusions: These findings suggest that asiatic acid inhibits hypercholesterolemia and oxidative stress in HFD-induced apoE-deficient mice. However, these protective effects of asiatic acid do not prevent the development of atherosclerosis.
Keywords: Asiatic acid, ApoE knockout mice, Hypocholesterolemia, Anti-oxidant, Atherosclerosis

MOP1-C-6

ANGPTL4 inhibits atherosclerosis by modulating the phenotypic transition of vascular smooth muscle cells

Dong Im Cho[1*], Yong Sook Kim[2], Hyang Hee Cho[1], Meeyoung Cho[1], Bo Gyeong Kang[1], Soo Ji Yoo[1], Jin Yoo[1], Injoo Hwang[1], Youngkeun Ahn[3]

[1]Cell Regeneration Research Center, Chonnam National University Hospital, Republic of Korea, [2]Biomedical Research Institute, Chonnam National University Hospital, Republic of Korea, [3]Department of Cardiology, Chonnam National University Hospital, Republic of Korea

Objectives: Atherosclerosis, a chronic inflammation of blood vessels, remains a global killer. The stability of fatty deposits within these vessels is critical, as unstable plaques can rupture and trigger heart attacks or strokes. This study investigated a protein called angiopoietin-like 4 (ANGPTL4) with known anti-inflammatory properties, to see if it could influence plaque stability and prevent atherosclerosis.
Methods: We used mice genetically prone to atherosclerosis (ApoE-/-) and administered ANGPTL4 protein twice weekly. We examined how ANGPTL4 affected plaque size, vascular inflammation, and plaque stability.
Results: ANGPTL4 treatment significantly reduced plaque size and lessened inflammation in the aortas of the mice. Within the plaques and their fibrous caps, we observed a higher number of desirable smooth muscle cells and a lower number of inflammatory cells in the ANGPTL4 group. Importantly, the fibrous caps were significantly thicker in the ANGPTL4 group, indicating greater stability.
Conclusions: This study demonstrates that ANGPTL4 has powerful anti-atherosclerotic effects. It promotes plaque stability by suppressing a detrimental process and influencing smooth muscle cell behavior. These findings highlight ANGPTL4 as a promising target for future therapies to prevent and treat atherosclerosis by stabilizing vulnerable plaques and reducing the risk of cardiovascular events.
Keywords: Angiopoietin-like 4, Inflammation, Cell transition, Plaque stabilization

MOP1-C-7

Echinochrome A inhibits HMGB1-induced vascular smooth muscle cell migration by suppressing osteopontin expression

Ju Yeon Kim*, Hyun Sung, Chi Dae Kim

Department of Convergence Medical Sciences, Department of Pharmacology, School of Medicine, Pusan National University, Republic of Korea

Objectives: Echinochrome A (Ech A) isolated from marine organisms is a therapeutic effector for various cardiovascular diseases, but its precise mechanisms are unclear. This study identified the role and mechanisms mediating the effects of Ech A on the migration of vascular smooth muscle cells (VSMCs) induced by high-mobility group box 1 (HMGB1).
Methods: Cell culture, Wound-healing assay, RT-PCR, Western Blot, Luciferase assay, Chromatin Immunoprecipitation (ChIP) assay
Results: Compared to the control cells, the migration of VSMCs stimulated with HMGB1 (100 ng/ml) was markedly increased, which was significantly attenuated in cells pretreated with MPⅢB10 (100 ng/ml), a neutralizing monoclonal antibody for osteopontin (OPN). In VSMCs stimulated with HMGB1, the increased expression of OPN mRNA and protein was accompanied by an increased OPN promoter activity. In reporter gene assays using OPN promoter-luciferase constructs, the promoter region 538-234 bp of the transcription start site containing the binding sites for AP-1 was shown to be responsible for the increased transcriptional activity by HMGB1. In addition, the binding activity of AP-1 was increased in HMGB1-stimulated cells, highliting the pivotal role of AP-1 on OPN expression in HMGB1-stimulated VSMCs. An examination of the vascular effects of Ech A showed that the increased AP-1 binding/promoter activities and OPN expression induced by HMGB1 were attenuated in cells pretreated with Ech A (3 or 10 μM). Similarly, Ech A inhibited HMGB1-induced VSMC migration in a concentration-dependent manner.
Conclusions: In conclusion, the increased migration of VSMCs was associated with an increased OPN expression in cells stimulated with HMGB1, which was suppressed by Ech A. The inhibitory effect of Ech A on VSMC migration was mediated by the down-regulated expression of OPN in VSMCs via an attenuated AP-1 binding on the OPN promoter. Considering these characteristics of EchA, we thus suggest Ech A as a potential candidate drug for alleviating vascular remodeling in the injured vasculatures.
Keywords: Activator protein 1, Osteopontin, Vascular smooth muscle cells, Echinochrome A

MOP1-C-8

STAT3 phosphorylation at the specific Y705 site is essential for the endothelial to mesenchymal transition induced by lipopolysaccharide

Yujin Jin*, Kyung-Sun Heo

College of Pharmacy, Chungnam National University, Republic of Korea

Objectives: Endothelial to mesenchymal transition (EndoMT) is a process that involves the loss of EC phenotype and induced plaque instability during the progression of atherosclerosis. This study elucidates the intricate molecular mechanisms underlying lipopolysaccharide (LPS)-induced human umbilical vein EC (HUVEC) and bovine aortic EC (BAEC) on EndMT progression via the STAT3 signaling pathway.
Methods: Western blot and siRNA transfection were employed to evaluating signaling pathway. Immunofluorescence assay was utilized to location of target genes in HUVEC, BAEC, and mouse endothelium. The phenotypic switching of ECs on the endothelium of the mouse aorta after challenging 10 mg/kg LPS was assessed by en face staining. The Alibaba 2.0 and JASPAR 2024 were used for evaluating transcription factor of EndoMT markers.
Results: LPS treatment significantly increased phosphorylation of STAT3 at Tyr (Y) 705 site in SH2 domains. For suppressing STAT3 activation, stattic, inhibitor targeting SH2 domain, was used. Pretreatment with stattic, leading to the deactivation of STAT3, not only LPS-mediated STAT3 phosphorylation, but also suppressed the expression of VCAM-1 and ICAM-1. In addition, EndoMT marker, especially Smad2/3, SM22α, and VE-cadherin were predicted target gene of STAT3 through STAT3 transcriptional activity. Consistent with prediction of transcription factor, stattic reversed LPS-induced expression of mesenchymal markers, including SM22α and vimentin, and restored the expression of the endothelial marker VE-cadherin. We designed STAT3 SH2-targeted siRNA and absence of STAT3 by siRNA transfection suppressed LPS-induced Smad2/3 expression. Mechanistically, LPS-mediated STAT3 activation induces EndMT by facilitating the nuclear translocation of Smad2/3. Consistent with in vitro data, STAT3 deactivation by stattic injection leads to the down-regulation of STAT3 phosphorylation and the EndMT marker, vimentin expression, in the mouse endothelium.
Conclusions: These findings provide novel insights into the molecular mechanisms governing LPS-induced EC inflammation and EndMT progression, highlighting potential therapeutic targets for vascular diseases.
Keywords: Endothelial to mesenchymal transition, Lipopolysaccharide, Atherosclerosis, STAT3

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024
The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 1-D

Sep 27(Fri) 14:40-15:40 | Mini-Oral D (Studio 8, 6F)

MODERATOR : Yun-Hee Lee (Seoul National University, Republic of Korea)

MOP1-D-1

Heparanase deficiency protects against atherosclerotic plaque development in ApoE knockout mice

Tien K. Nguyen[1*], Shane R. Thomas[2], Stephanie Paone[1], Amy A. Baxter[1], Alyce J. Mayfosh[1], Thanh Kha Phan[1], Enoch Chan[2], Karlheinz Peter[3], Ivan K. H. Poon[1], Mark D. Hulett[1]

[1]Department of Biochemistry and Chemistry, La Trobe Institute for Molecular Science, La Trobe University, Melbourne, Victoria 3086, Australia, [2]Department of Pathology, School of Biomedical Sciences, Faculty of Medicine & Health, University of New South Wales, Sydney, New South Wales 2052, Australia, [3]Atherothrombosis and Vascular Biology, Baker Heart and Diabetes Institute, Melbourne, Victoria, 3004, Australia

Objectives: Heparanase (Hpse) is the only mammalian enzyme known to cleave heparan sulfate of heparan sulfate proteoglycans, which is a key component of the extracellular matrix and basement membrane. Importantly, increasing evidence indicates the involvement of Hpse in atherogenesis. Additionally, Hpse has been shown to promote inflammation, central to the development of atherosclerosis. However, to date the precise roles of Hpse in atherosclerosis and its mechanisms of action are not well defined. Therefore, this study aims to provide new insights into the contribution of Hpse in different stages of atherosclerosis in vivo.
Methods: We generated Hpse gene-deficient mice on the atherosclerosis-prone apolipoprotein E gene knockout (ApoE-/-) background and employed this novel mouse model to investigate the impact of Hpse gene deficiency on atherosclerosis. Mice were provided a high-fat diet for 6 and 14 weeks to induce early and mature/advanced atherosclerotic lesions, respectively. Atherosclerotic lesion development, blood serum profiles, lesion composition and aortic immune cell populations were evaluated.
Results: Hpse-deficient mice exhibited a significant reduction in atherosclerotic lesion burden at both time-points, independent of changes in plasma cholesterol levels. Advanced atherosclerotic plaques of Hpse-deficient mice also showed significant decreased necrotic core size and increased smooth muscle cell content. Additionally, Hpse deficiency reduced circulating and aortic levels of VCAM-1 at the initiation and progression stages of atherosclerosis and circulating MCP-1 levels in the initiation but not progression stage. Furthermore, aortic levels of total leukocytes and dendritic cells were significantly decreased in Hpse-deficient mice compared to control ApoE-/-mice at both disease stages.
Conclusions: These findings demonstrate that Hpse deficiency protects against atherosclerotic plaque development and identify Hpse as a key pro-inflammatory enzyme driving the initiation and progression of atherosclerosis. The findings in this study also highlight the use of Hpse inhibitors as potential novel therapeutics for the treatment of atherosclerosis.
Keywords: Heparanase, Atherosclerosis, Inflammation, Extracellular matrix, Immune cells

MOP1-D-2

Soluble uric acid induced trained immunity in monocytes: implications for atherosclerosis

Hyeok Jae Mun*, Myeong Ryeol Choi, Hyeon Ji Mun, Joo Young Kweon, Ji Yoon Park, Yong Joo Ahn

Medical Science and Engineering, School of Convergence Science and Technology, Pohang University of Science and Technology, Republic of Korea

Objectives: Monocytes are one of the most important immune cells in the progression of atherosclerosis, and various epidemiological studies demonstrated an association between atherosclerosis and hyperuricemia. However, the pathogenetic mechanisms between hyperuricemia and atherosclerosis remain poorly understood. Therefore, the goal of this study is to determine the mechanism by which chronic inflammation initiated by hyperuricemia (primary stimulus) induces monocyte-trained immunity, and the excessive inflammatory response of the immune system caused by secondary stimulus promotes the development of atherosclerosis.
Methods: Human monocyte cell line U937 were exposed to primary stimulation with uric acid at concentrations of 0.3 mM, 0.6 mM, and 1.5 mM. After removal of uric acid and a 4-day resting period, the cells were exposed to a 24-hour secondary stimulation. qPCR was used to observe inflammatory responses. Western blot was used to observe innate immune cell memory by epigenetic remodeling. ROS assay was also performed to determine ROS generation by uric acid.
Results: U937 cells exposed to uric acid exhibit a dose-dependent increase in pro-inflammatory cytokine expression. After a resting period and re-stimulation, qPCR analysis revealed an enhanced inflammatory response, indicative of trained immunity. Western blot analysis showed epigenetic reprogramming. ROS assay showed increased ROS production.
Conclusions: The study demonstrates that hyperuricemia induces trained immunity in monocytes, leading to an amplified inflammatory response upon re-exposure to second stimulus. This process involves significant epigenetic reprogramming and increased ROS production. These findings elucidate a potential mechanistic link between high uric acid levels and the acceleration of atherosclerosis, highlighting the role of chronic inflammation and trained immunity in disease progression.
Keywords: Trained immunity, Atherosclerosis, Hyperuricemia, Monocytes, Inflammation

MOP1-D-3

Protective effect of biofabricated curcumin silver nanoparticles against atherosclerosis in rodent model via modulating EGFR/PI3K/Akt/GSK-3β signaling pathway

Ekta Yadav*

Pharmacy, Sam Higginbottom University of Agriculture Technology and Sciences, India

Objectives: Atherosclerosis (AS) is a chronic inflammatory cardiovascular disease pathophysiologically hallmarked by the accumulation of lipid plaques inside the arteries and causing a significant health risk to human being. Curcumin, i. e., diarylheptanoid, is a natural curcuminoid obtained from Curcuma longa rhizomes. Low bioavailability of curcumin restricts its clinical use, therefore, to overcome this problem the silver nanoparticles of curcumin were synthesized, characterized and explored against ApoE-/- mice model of AS.
Methods: Silver nanoparticles of curcumin (CrAgN) were synthesized with silver nitrate solution (0.1N) by co-precipitation method. Synthesis of CrAgN was confirmed with various characterization techniques, i. e., UV, FTIR, FESEM etc. AS was induced in mice with high-fat emulsion supplemented with vitamin D3 and lipopolysaccharide and then administered with biosynthesized CrAgN for consecutive 90 days. The anti-AS effect of CrAgN was evaluated by estimating various parameters including blood lipid regulation, extent of atherosclerotic lesions in the aortas, anti-oxidative stress, anti-inflammatory response, oxidative stress status along with effect on vascular protection.
Results: Characterization techniques results indicated the formation of the aggregated type of nanoparticles with 100-150 nm size range with surface plasmon resonance at 420nm. Pharmacodynamic study exhibited a significantly reduced ($p<0.01$) level of total cholesterol (TC), triglycerides (TG), and LDL-C as well as ALT and AST, while HDL-C ($p<0.01$) level was increased. CrAgNr decreased the coronary artery wall thickness and improved atherosclerotic lesions in the aorta. A statistically significant increase in SOD, GPx enzymatic activity was observed in CrAgN-treated mice. mRNA and protein expression of EGFR, p-PI3K, p-AKT, GSK-3β, Bax, Caspase-3 as well as Bax/Bcl-2 ratio were also regulated ($p<0.01$) by CrAgN.
Conclusions: CrAgN has the potential to mitigate high fat emulsion, vitamin D and LPS-induced AS in ApoE-/- mice by exhibiting hypolipidemic, anti-inflammatory, anti-oxidative, anti-thrombotic and vascular endothelium protective effects via inhibiting EGFR/PI3K/AKT/GSK-3β signaling pathway.
Keywords: Hypolipidemic

MOP1-D-4

Markers of nonspecific systemic inflammation as criteria for destabilization of coronary heart disease

Valentyna Romanova*, Nataliia Kuzminova, Lidiia Romanova, Mykhailo Repetenko

Internal Medicine #1, National Pirogov Memorial Medical University, Vinnytsya, Ukraine

Objectives: To identify markers of nonspecific systemic inflammation in patients with different variants of coronary heart disease and to evaluate the possibility of their use as criteria for atherosclerotic process exacerbation.
Methods: The study included 173 patients with different variants of CHD and 30 healthy people of the control group. Patients distribution in accordance with CHD clinical form was next: 92 patients with stable CHD 2nd-3rd functional classes and 81 patients with acute coronary syndromes (ACS). Activity of nonspecific systemic inflammation was assessed by the concentrations of fibrinogen, high sensitive C-reactive protein (hsCRP), tumor necrosis factor-α (TNF-α) and pregnancy-associated plasma protein A (PAPP-A), which were determined by ELISA.
Results: Levels of all biomarkers of nonspecific systemic inflammation in CHD patients were significantly higher than in the control group ($p<0.001$). Their levels increased with an increase in disease severity ($p<0.05$) and reached the highest values in patients with ACS, especially in acute myocardial infarction patients. Fibrinogen level in ACS patients did not significant differ from the patients with stable CHD ($p>0.05$) that gave no reason to consider it as a criterion of atherosclerotic process destabilization. While for hsCRP, TNF-α and PAPP-A such difference was determine ($p<0.05$). There was no significant relationship between the studied markers and troponins I and T determined in the first hours of myocardial infarction that gives us reason to consider these indicators as criteria for destabilization of CHD, but not as markers of myocardial damage or necrosis.
Conclusions: CHD patients are characterized by nonspecific systemic inflammation activation, as evidenced by increased serum levels of fibrinogen, hsCRP, TNF-a, PAPP-A. The degree of changes in these markers is associated with the disease severity, reaching the highest values in patients with acute myocardial infarction. Elevated production of hsCRP, TNF-a and PAPP-A can be considered as criteria of both atherosclerotic plaque damage and the possibility of ACS development.
Keywords: Coronary heart disease, Nonspecific systemic inflammation, Destabilization of atherosclerosis, Criteria for destabilization, C-reactive protein, Tumor necrosis factor-α, Pregnancy-associated plasma protein A

MOP1-D-5

The association between serum Mannose-Binding Lectin levels and polymorphism in ischemic stroke risk

Anyeasha Dutta*, Ravindra K Saran

Pathology, Govind Ballabh Pant Institute of Postgraduate Medical Education and Research, New Delhi, India

Objectives: Stroke is a medical condition that occurs when there is a sudden disruption of blood flow to the brain, leading to damage or death of brain cells. This interruption can happen due to a blockage (ischemic stroke) or a rupture (hemorrhagic stroke) of blood vessels in the brain. Mannose-Binding Lectin (MBL) is a crucial component of the innate immune system, playing a significant role in the recognition and clearance of pathogens. Upon binding to pathogens, MBL activates the complement cascade, leading to opsonization, inflammation, and the formation of membrane attack complexes that can directly lyse certain microorganisms. The current study was accomplished to establish, the association between serum MBL levels and MBL exon polymorphism in ischemic stroke patients.

Methods: The present study was performed to determine, if any relation exist between serum MBL levels and MBL exon genotype in ischemic stroke patients. The Polymorphism at the promoter at position -221(X/Y) and exon-1 region at position 52, 54, 57 (D, B, C) variant and wild type A of the mbl2 gene was assessed using hetroduplexing. MBL blood serum level was measured in the samples of both patient/control by ELISA.

Results: Distribution of studied genotype and allele frequencies were calculated, and found in agreement with previously reported studies at >95% CI, HWE (alpha=0.05). Serum MBL levels among control/case groups were found non-significantly diffrent ($p>0.85$). Whereas, genotype based analysis was not performed due to relatively lower number of samples. Disease association with mutations. MBL promoter was non-associated ($p>0.02$),while MBL exon was highly associated with AB & AC ($p<0.001$).

Conclusions: We conclude, the haplotypes might influence the risk for the onset of the disease in the Indian patients. However, further study on larger population should be warranted to evaluate the mechanisms of ischemic stroke association.

Keywords: MBL, Atherosclerosis, Ischemic stroke, Polymorphism

MOP1-D-6

Polymeric nanoparticles loaded Myricitrin modulates atherosclerosis in apolipoprotein-E deficient mice via altering gut microbiota and lipid gene metabolism (LXR-α/SREBP1 pathway)

Deepika Singh*

Pharmacy, Faculty of Health Sciences, SHUATS, India

Objectives: The primary independent risk factors for atherosclerosis are thought to be faulty lipid metabolism and obesity-induced visceral fat deposition. Atherosclerosis is regarded as a chronic inflammatory illness. The purpose of this study was to determine can polymeric nanoparticles loaded myricitrin (PY-MYNPs) prevent atherosclerosis in rodent with the disease by modifying their gut flora and lipid metabolism.

Methods: All the apolipoprotein-E deficient mice were received high cholesterol diet for 12 weeks and received varies dosage of PY-MYNPs. After the completion of the study, the serum was used to measure the biochemical parameter and faces were also collected. 16S rRNA gene sequencing was used to detect the gut microbiota. RT-qPCR and western blotting was used to measure the genes which was related to lipid metabolism. Histopathology study were also performed.

Results: Pretreatment with PY-MYNPs modulates the level of TC, TG, LDL-C and HDL-C. It also reduced the level of LPO, ROS, and catalase, SOD, GPx and GSH in HCD mice. Administration of PY-MYNPs altered the composition of the gut microbiota. After the administration of the PY-MYNPs, it enhanced the relative abundance of the Muribaculaceae and Ruminococcaceae and reduced the Erysipelotrichaceae., it significantly impacted the gene metabolism related to the gene. It also reduced the level of gene metabolism (LXR-α and SREBP1) along with intracellular adhesion molecule-1,the chemokine (C-X3-C-motif) ligand 1, E-selectin and the adhesion molecules vascular cell adhesion molecule-1, and; down-regulation of high mobility group box-, tumor necrosis factor-α, interleukin-6, and cathepsin levels in in the aortic sinuses of mice.

Conclusions: Potentially preventing atherosclerosis is demonstrated by PY-MYNPs, and this impact is intimately linked to gut microbiota and lipid metabolism. This research could lead to new understandings of PY-MYNPs effects on atherosclerosis and a foundation for its potentially beneficial clinical application.

Keywords: Atherosclerosis, Polymeric nanoparticles, Gut microbiota

MOP1-D-7

Emerging role of lncRNAs in the development of atherosclerosis and therapeutic potential

Anyeasha Dutta*, Ravindra K Saran

[1]Pathology, Govind Ballabh Pant Institute of Postgraduate Medical Education and Research, New Delhi, India

Objectives: Atherosclerosis stands as a leading global cause of disability and mortality. It is recognized as a chronic inflammatory condition affecting blood vessel walls, characterized by the buildup of immune cells within lesions, formation of foam cells, and eventual rupture of plaques, leading to ischemia in various organs. Non-coding RNAs (ncRNAs) plays pivotal in physiological and pathophysiological cellular processes. Non-coding RNAs (ncRNAs) comprise a group of RNA molecules that typically do not encode proteins but are increasingly recognized for their significant roles in cardiovascular diseases (CVDs), including atherosclerosis. However, the mechanism of the same is yet to be explore.
Methods: In atherosclerosis, miRNAs play crucial roles in controlling endothelial cell, vascular smooth muscle cell, and macrophage functions, as well as lipoprotein metabolism.The process of atherosclerosis begins with lipid retention and oxidation beneath the arterial endothelium, leading to endothelial cell dysfunction characterized by increased permeability and overexpression of adhesion molecules.
Results: The dysfunction of endothelial cell attracts circulating monocytes to the lesion site and differentiate into macrophages which engulf oxidized LDL (ox-LDL), forming foam cells, and accumulate to create necrotic cores within plaques. Concurrently, vascular smooth muscle cells (VSMCs) migrate from the media to the intima, undergo phenotypic changes, and contribute to plaque stability by producing extracellular matrix, forming the fibrous cap. However, the ongoing loss of VSMCs through apoptosis and necrosis ultimately predisposes plaques to rupture and causes atherosclerosis.
Conclusions: We conclude, apart from regulating the pathophysiological development of atherosclerosis, ncRNAs also serves as therapeutic tools for treating this disease. For instance, in vivo antagonists targeting miR-33 have been shown to elevate plasma HDL levels and mitigate atherosclerosis progression in mice and non-human primates. Furthermore, miRNAs regulate signaling pathways that could themselves become potential therapeutic targets. Enhancing our understanding of these processes is crucial for identifying novel genes and molecular pathways that could serve.
Keywords: Brain Injury, Ischemia/Reperfusion, Ischemic Stroke, LncRNA

MOP1-D-8

Machine learning-driven decoding of lipid-modulated lncRNAs in macrophage polarization and atherosclerotic plaque instability

Rifaldy Fajar[1*], Roland Helmizar[2], Andi Nursanti Andi Ureng[3], Prihantini[4], Sahnaz Vivinda Putri[5], Elfiany Syafruddin[6]

[1]Mathematics and Computer Science, Karlstad University, Sweden, [2]Internal Medicine, Baiturrahmah University, Indonesia, [3]Pharmacy, Andini Persada College of Health Sciences, Indonesia, [4]Machine Learning for BioMedicine Laboratory, Bandung Institute of Technology, Indonesia, [5]Health Management Laboratory, International University Semen Indonesia, Indonesia, [6]Computational Science Research Team, Bulukumba Muhammadiyah University, Indonesia

Objectives: Macrophage polarization significantly affects atherosclerotic plaque progression and instability. This study explores how lipid-modulated long non-coding RNAs (lncRNAs) influence macrophage polarization and plaque instability using integrative machine learning techniques to identify mechanisms in atherogenesis and potential therapeutic targets.
Methods: We utilized multi-omic datasets from the Atherosclerosis Risk in Communities (ARIC) Study and the Genotype-Tissue Expression (GTEx) Project, encompassing lipidomics, lncRNA sequencing, and macrophage phenotyping data from over 15,000 participants. Data preprocessing involved normalization, imputation, and integration using canonical correlation analysis (CCA). We developed an advanced machine learning pipeline incorporating deep learning models, random forest classifiers, and graph neural networks to identify key lipid-lncRNA interactions predictive of macrophage polarization states (M1 and M2) and plaque instability. Model performance was evaluated using nested cross-validation with metrics including AUC, F1 score, precision, and recall. Feature importance was assessed using SHapley Additive exPlanations (SHAP) values, and network analysis elucidated regulatory relationships between lipids, lncRNAs, and macrophage polarization. Pathway enrichment analysis identified biological pathways involved in plaque instability.
Results: The integrative machine learning model achieved an AUC of 0.97, F1 score of 0.94, precision of 93.0%, and recall of 92.2% in predicting macrophage polarization and plaque instability. Eighteen key lipid-modulated lncRNAs, including lncRNA-AC010789.1 and lncRNA-MALAT1, were significantly associated with M1 macrophage polarization and plaque instability (β=1.85, p<0.001; β=1.67, p<0.001). Network analysis revealed these lncRNAs regulate lipid metabolic pathways and macrophage polarization via transcription factors such as NF-κB and PPARγ. Pathway enrichment showed significant involvement of TLR signaling and lipid metabolism pathways (p<0.001). Validation in an independent cohort from the Framingham Heart Study confirmed the robustness of the findings.
Conclusions: This study identifies lipid-modulated lncRNAs in macrophage polarization and atherosclerotic plaque instability using machine learning, suggesting new diagnostic and therapeutic strategies for cardiovascular disease.
Keywords: Macrophage polarization, Atherosclerotic plaque instability, Lipid-modulated long non-coding RNAs (lncRNAs), Machine learning

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 1-E

Sep 27(Fri) 14:40-15:40 | Mini-Oral E (Studio 9, 6F)

MODERATOR : Chang-Myung Oh (GIST, Republic of Korea)

MOP1-E-1

Machine learning-driven predictive modeling of foam cell formation and atherosclerosis progression through lipid-responsive enhancer RNAs

Rifaldy Fajar[1*], Rini Winarti[2]

[1]Mathematics and Computer Science, Karlstad University, Sweden,
[2]Computational Biology and Medicine Laboratory, Yogyakarta State University, Indonesia

Objectives: Foam cells, derived from lipid-laden macrophages, are key in atherosclerotic plaque development. The role of enhancer RNAs (eRNAs) in this process is unclear. This study aims to identify lipid-responsive eRNAs involved in foam cell formation and atherosclerosis using scRNA-seq, scATAC-seq, and CRISPR-Cas13 knockdown techniques, revealing potential therapeutic targets.
Methods: We used scRNA-seq and scATAC-seq data from foam cells (n=300) and healthy macrophages (n=300). Quality control was performed with CellRanger and SnapATAC. Data alignment and eRNA quantification were done using STAR and CIRCexplorer2 for scRNA-seq, and SnapATAC for scATAC-seq. Normalization was done with Seurat and DiffBind. Differential expression and accessibility analyses identified key eRNAs and enhancer regions (p1). Data integration was performed with Signac. A CRISPR-Cas13 library targeting top eRNAs was tested in foam cells from iPSCs. Functional assays included lipid uptake and cytokine production. Validation was done with qRT-PCR and Western blotting. A Graph Neural Network model was developed to predict foam cell formation and atherosclerosis, evaluated using ROC-AUC, accuracy, precision, recall, and F1-score.
Results: Our integrative approach identified 20 lipid-responsive eRNAs linked to foam cell formation and atherosclerosis. Notably, eRNA-APOA1, eRNA-ABCA1, and eRNA-CD36 were highly expressed in foam cells ($p<0.001$, log2FC>2) and correlated with lipid metabolism genes. Changes in enhancer region accessibility matched their expression levels ($p<0.001$, log2FC>1.5). CRISPR-Cas13 targeting of these eRNAs reduced foam cell formation by 35-45% ($p<0.01$), decreased IL-6 and TNF-α by 25-35% ($p<0.01$), and promoted plaque stability. The Graph Neural Network model had an ROC-AUC of 0.96, 93.4% accuracy, 92.7% precision, 94.0% recall, and a 93.3% F1-score.
Conclusions: Twenty lipid-responsive eRNAs were identified as key in foam cell formation and atherosclerosis. Knockdown of APOA1, ABCA1, and CD36 reduced foam cell formation and inflammation. These eRNAs are potential biomarkers and therapeutic targets.
Keywords: Lipid-responsive enhancer RNAs, Foam cell formation, Atherosclerosis, CRISPR-Cas13 knockdown

MOP1-E-2

Sesame lignans as the platelet aggregation inhibitor in cardiovascular disease: investigation through computational approach

Reny Rosalina[1,2*], Rian Ka Praja[3], Dwi Hermayantiningsih[1]

[1]Department of Chemistry, Faculty Mathematics and Natural Sciences, University of Palangka Raya, Indonesia, [2]Biomedical Sciences Program, Khon Kaen University, Thailand, [3]Department of microbiology, Faculty of Medicine, University of Palangka Raya, Indonesia

Objectives: During a vascular injury, platelet surface receptors bind to their respective agonists, causing platelets to be recruited and aggregate abnormally causing thromboembolism. ADP plays an essential function among agonists since it not only causes platelet aggregation by activating P2Y1 and P2Y12 receptors but it is also released when platelets degranulate or are triggered by other agonists. Antiplatelet agents control platelet function by inhibiting adhesion, activation, and aggregation. Phytochemicals have inspired medication development and produced diverse bioactive molecule structures. Sesame lignans were reported to possess bioactivities against hyperlipidemia, ischemia, and other cardiovascular diseases. This study sought to investigate the antiplatelet activity of sesame lignan derivative compounds, using a computational approach.
Methods: The 25 sesame lignan derivative compounds' molecular docking was performed using AutoDock Tools. Additionally, the molecular interactions were visualized using Biovia Discovery Studio. The drug-likeness and pharmacological properties were predicted using SwissADME and pkCSM online service.
Results: Among all sesame lignan derivative compounds, sesamolinol exhibited superior inhibitory effects on P2Y12 receptor as evidenced by its lower binding energy to the protein's active site compared to the native antithrombotic drug with a binding affinity of -8.8 and -7.6 kcal/mol respectively. The interactions in the binding pocket were via hydrogen bonding and Pi interaction through aromatic moieties (Figure 1). Sesamolinol was predicted to have drug-likeness properties, good pharmacodynamic characteristics, and low potential for toxicity.
Conclusions: In conclusion, sesamolinol, an active compound in sesame seeds, has shown potential antiplatelet activity. Additional in vitro and in vivo studies are necessary to confirm its therapeutic effects. These results highlight the lignan structure as the potential pharmacophore for antiplatelet lead compounds in drug discovery.
Keywords: Antiplatelet, Cardiovascular disease, Sesame lignan

MOP1-E-3

Enhanced reparative effects by PCSK9-dependent cardiac macrophages post-ischemia

Shin Hye Moon*, Goo Taeg Oh

Life Sciences, Ewha Womans University, Republic of Korea

Objectives: Acute myocardial infarction (AMI) is marked by a severe inflammatory response in the heart that worsens cell death and promotes adverse ventricular remodeling. Despite available treatments, AMI remains a high-risk factor for heart failure, highlighting the need for further research into immune cell mechanisms. Proprotein Convertase Subtilisin/Kexin type 9 (PCSK9) is known for raising LDL cholesterol levels by promoting LDL receptor degradation. However, studies show that PCSK9 inhibition and deletion significantly reduce cardiac dysfunction, indicating a potential role for immune cells in heart repair post-ischemia. Cardiac macrophages are key regulators of healing after AMI. Therefore, understanding PCSK9's impact on macrophages is crucial for improving the diagnosis and treatment of cardiovascular diseases.
Methods: To study the interrelationship and functional significance of PCSK9 and cardiac myeloid cells, analyzed the heterogeneity of macrophages due to PCSK9 deficiency in blood samples from AMI-induced Pcsk9-/-, Lyz2crePcsk9fl/fl mice and PCSK9 Ab-treated CAD patients and demonstrated cardioprotective effects.
Results: Circulating PCSK9 levels correlate with AMI risk. Our study shows that PCSK9 deficiency causes diverse changes in myeloid cells and macrophages, potentially protecting the heart in AMI independent of LDL cholesterol levels. scRNA-seq identifies PCSK9-dependent cardiac macrophages (PDCMs) as reparative, enriched in AP-1 transcription factor pathways. PDCMs enhance VEGF-C secretion and activate Akt signaling in cardiac endothelial cells, improving cardiac remodeling. PCSK9 Ab-treated CAD patients also showed increased VEGF-C levels in plasma. Targeting myeloid-PCSK9 may offer cardio-protective effects through increased AP-1/VEGF-C expression, providing a novel approach to prevent cardiac dysfunction in AMI.
Conclusions: Our results suggest that targeting myeloid-PCSK9 could offer valuable therapeutic benefits due to its cell- and tissue-specific activities. Both myeloid-PCSK9 deficiency in mice AMI hearts and CAD patients treated with PCSK9 inhibitors increased PDCM features, enhancing cardiac remodeling. Our findings demonstrate a potential clinical strategy for myeloid-PCSK9 in protecting against AMI and other vascular diseases beyond lowering LDL-cholesterol.
Keywords: Coronary artery disease, PCSK9, AP-1, VEGF-C

MOP1-E-4

PCSK9 deficiency suppresses cardiac inflammation post-myocardial infarction by elevating atrial natriuretic peptide

Na Hyeon Yoon*, Goo Taeg Oh

Department of Life Science, Ewha Womans University, Heart-Immune-Brain Network Research Center, Republic of Korea

Objectives: Myocardial infarction (MI) triggers cardiomyocyte apoptosis, followed by compensatory left ventricular hypertrophy to compensate for cell loss. The protein convertase subtilisin/kexin type 9 (PCSK9) has been identified as directly impacting cardiomyocyte viability and function by altering tissue structure and reducing cardiac function. Atrial natriuretic peptide (ANP) is indeed primarily produced in the atria of the heart, particularly in cardiomyocytes. During conditions of cardiac expansion, the expression of ANP typically increases. However, no studies have explored the relationship between PCSK9 and ANP. Hence, we aim to investigate whether PCSK9 can modulate ANP production during MI.
Methods: To investigate the effects of PCSK9 deletion on heart function and inflammation following MI, 9-11-week-old PCSK9+/+ and PCSK9-/- male mice were subjected to MI by occluding the LAD branch of the coronary artery. Heart function after MI was analyzed using Echocardiography, Trichrome staining, qPCR, western blot, and immunohistochemistry. Additionally, the level of ANP, which increases after MI, was measured by ELISA, and the effect of ANP on macrophages was evaluated using bone marrow-derived macrophages.
Results: PCSK9-deficient mice exhibited enhanced cardiac function, increased collagen synthesis, and reduced infarct size within the affected region. Furthermore, PCSK9-deficient mice demonstrated a significant survival advantage after acute myocardial infarction. These beneficial effects could potentially be attributed to the preserved contractility of cardiomyocytes in PCSK9-deficient hearts, leading to elevated expression of the cardiac hormone ANP. ANP functions by inhibiting inflammation mediated by macrophages, thereby alleviating macrophage-induced cardiomyocyte cell death. The upregulation of ANP in PCSK9-deficient hearts appears to contribute to the improved cardiac function and reduced inflammation observed after MI.
Conclusions: In conclusion, this investigation provides evidence that elevated cardiac ANP levels in ischemic hearts lacking PCSK9 function serve as a suppressor of inflammatory processes. The anti-inflammatory properties of ANP can contribute to the maintenance of cardiac function in PCSK9-deficient hearts.
Keywords: Myocardial infarction, PCSK9, ANP

MOP1-E-5

Corticosterone alleviates stroke damage by Prdx1 antioxidant expression

Huiju Jo*, Goo Taeg Oh

Department of Life Science, Ewha Womans University, Republic of Korea

Objectives: Stroke triggers significant production of reactive oxygen species (ROS), crucial for inflammation. Microglia, brain immune cells, are susceptible to oxidative damage. Antioxidants like peroxiredoxin (Prdx) protect against ROS; without Prdx, the brain is more vulnerable to stroke and oxidative stress. Corticosterone, a stress-induced glucocorticoid hormone, has anti-inflammatory effects and is regulated by the HPA axis. Changes in this axis increase neuronal disorder risks. We investigated corticosterone's influence on microglia in Prdx-deficient stroke mouse models.

Methods: To investigate how the severity of stroke differs when Prdx1 and Prdx2 are absent, we performed transient middle cerebral artery occlusion surgery on WT, Prdx1KO, and Prdx2KO mice. To investigate what causes these differences, we measured hormone levels of the HPA axis by ELISA. To see how elevated concentrations of corticosterone affect oxidative damage situations like stroke, we treated corticosterone at BV2 mouse microglial and performed an OGD experiment that mimics stroke in vitro.

Results: In the absence of Prdx1, infarct size was increased compared to WT, while in the absence of Prdx2, no significant difference in infarct size was seen by TTC staining. The behavioral deficit was also more defective when Prdx1 was absent. The concentration of corticosterone in Prdx2KO was significantly increased compared to Prdx1KO, and remained high until the subacute phase of stroke when inflammation is activated. Corticosterone reduced the level of inflammation in microglia cells and increased the expression level of Prdx1. Using crystal violet staining, we could visualize that corticosterone also increased cell viability.

Conclusions: During stroke, microglia endure ROS-induced oxidative stress causing cell death and inflammation. Increased corticosterone, notably in Prdx2 absence, reduces inflammation and enhances Prdx1 expression, suggesting it mitigates oxidative damage.

Keywords: Stroke, Antioxidant, prdx1, Stress Hormone, prdx2

MOP1-E-6

Therapeutic mechanisms of the chuanxiong-chishao herbal pair against atherosclerosis: insights from GEO database and network pharmacology

Mankit Leung[2*], Miao Zhang[1]

[1]Department of Health Technology and Informatics, The Hong Kong Polytechnic University, China,
[2]Fanling Chinese Medicine Training and Research Centre, Hong Kong Baptist University, China

Objectives: Atherosclerosis (AS) is a complex and multifactorial cardiovascular disease, and Traditional Chinese medicine (TCM) has long been used to manage AS. The aim of this study is to investigate the therapeutic mechanisms and molecular underpinnings of the Chuanxiong-Chishao herbal pair in the treatment of atherosclerosis.

Methods: Analyzed GSE43292 dataset using limma in R to identify AS-associated differentially expressed genes (DEGs). Used TCMSP to search for chemical components and targets of the Chuanxiong-Chishao herbal pair. Combined herbal targets with atherosclerosis DEGs to obtain key target genes. Constructed regulatory network of active ingredients and target genes using Cytoscape. Built protein-protein interaction (PPI) network of target genes using STRING and Cytoscape. Performed GO, KEGG, and GSEA analyses using R to annotate target gene functions and pathways.

Results: The analysis of the GSE43292 dataset identified 1,245 atherosclerosis-associated differentially expressed genes (DEGs). The Chuanxiong-Chishao herbal pair had 36 bioactive components and targeted genes such as PTGS1, AR, PPARG, KDR, MMP9, CXCL8, IL6, and PIK3CG.GO analysis showed the target genes were involved in processes like DNA regulation, extracellular matrix, cell migration, and angiogenesis. KEGG and GSEA revealed the lipid/atherosclerosis pathway and NF-κB signaling were closely associated with the target genes.These findings suggest the herbal pair may treat atherosclerosis by modulating key genes and pathways related to inflammation, lipid metabolism, and angiogenesis.

Conclusions: The Chuanxiong-Chishao herbal pair was found to act on 16 key target genes that regulate several signaling pathways. This was mediated through 13 potential active ingredients in the herbal pair. The results suggest the Chuanxiong-Chishao herbal pair has an anti-atherosclerosis effect through multiple mechanisms.These findings indicate the herbal pair may be a promising therapeutic option for the management of atherosclerosis by modulating the identified target genes and signaling pathways.

Keywords: AS, TCM, Chuanxiong

MOP1-E-7

Histone deacetylase 8: novel therapeutic target for vascular calcification

Hae Jin Kee[1*], Seong Min Jeong[1], Doo Sun Sim[2], Myung Ho Jeong[2,3]

[1]Heart Research Center, Chonnam National University Hospital, Republic of Korea, [2]Cardiology, Chonnam National University Hospital, Republic of Korea, [3]Cardiology, Gwangju Veterans Hospital, Republic of Korea

Objectives: Vascular calcification is associated with advanced age, atherosclerosis, and metabolic diseases such as diabetes and chronic kidney failure. Even though the treatment of vascular calcification is crucial, there is no effective treatment to prevent or reverse the calcification process. Histone deacetylase (HDAC) enzymes have been reported to be involved in the gene regulation. Class I HDACs (HDAC1, HDAC2, and HDAC3) have been reported to inhibit vascular calcification, but there are no studies on HDAC8.

Methods: Vascular calcification was induced by inorganic phosphate plus ascorbic acid treatment in vascular smooth muscle cells (VSMCs) and subcutaneously injection of vitamin D3 in BL6 mice. Calcification was confirmed by Alizarin Red staining, calcium assay, pro-calcification marker gene expression. Overexpression and knockdown of HDAC8 was performed in VSMCs or A10 cells. In vivo experiments, HDAC8 inhibitor YAK577 (10 mg/kg/day) was intraperitoneally injected to vitamin D3-treated mice for 7 days.

Results: HDAC8 inhibitors (PCI34051 and YAK577) treatment reduced inorganic phosphate plus ascorbic acid-induced calcification. Of the two drugs, YAK577 was more effective than PCI34051 in inhibiting calcification. YAK577 treatment attenuated calcification medium-induced upregulation of HDAC8 and pro-calcification marker genes (Bmp2, Runx2, and Msx2). Small interfering RNA for HDAC8 significantly reduced the calcification medium-induced calcium deposition in VSMCs. HDAC8 overexpression increased the pro-calcification genes and decreased the anti-calcification marker genes (Fgf23 and Mgp). YAK577 administration suppressed the vitamin D3-induced calcium accumulation in aorta tissues. YAK577 treatment mitigated the vitamin D3-induced pro-calcification genes (Bmp2, Runx2, and Msx2) and Opn expression as well as calcium content.

Conclusions: We suggest that HDAC8 could be new therapeutic target for the treatment of vascular calcification.

Keywords: YAK577, Vascular calcification

MOP1-E-8

Atherosclerosis-preventing effects of Weissella cibaria KCTC3746

Ha Yeon Lim[*], Young Mi Park

Basic Science, Ewha Womans University, Republic of Korea

Objectives: Probiotics refer to microorganisms that are beneficial to the human body such as lactic acid bacteria. Most probiotics that are available commercially enhance intestinal, skin, and vaginal health. However, there has been few probiotics beneficial to the cardiovascular system. Weissella cibaria (W. cibaria) is a kimchi-derived lactic acid bacterium that has anti-obesity activity and an effect of promoting immunity. The purpose of this study is to investigate the effect of W. cibaria in atherosclerosis.

Methods: ApoE-/- mice were fed Western diet (WD) to induce atherosclerosis along with oral administration of saline or W. cibaria. A total of 10^9 CFUs of live W. cibaria was given into the oral cavity of each mouse through a feeding tube six times a week for 10 weeks.

Results: Aorta en face analyses showed that the W. cibaria Per Os By Mouth (P.O) group had 54% less atherosclerotic lesions compared with the control group ($p<0.05$).

Conclusions: Oral administration of W. cibaria attenuates development of atherosclerosis and induces significant metabolic changes, including increased serum HDL, reduced hepatic SR-B1 expression, and increased hepatic ABCG1 and ABCA1 expression. Our study suggests beneficial effects of W. cibaria in preventing atherosclerosis.

Keywords: Atherosclerosis, Microbiome

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024
The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 1-F

Sep 27(Fri) 14:40-15:40 | Mini-Oral F (Studio 10, 6F)

MODERATOR : Seonghoon Choi (Hallym University, Republic of Korea)

MOP1-F-1

Virtual screening of Indonesian phytochemicals reveals hinokinin, dihydroguaiaretic acid, and deoxylapachol as novel GPR40 activators for type 2 diabetes mellitus

Dykall Naf'an Dzikri*, Okce Krisnawati, Patria Bayu Murdi, Veronica Bianca, Afrinda Graharani Sandra

Family Medicine, Puskesmas Tasikmadu, Indonesia

Objectives: GPR40 is a class A G-protein coupled receptor (GPCR) found in the pancreas, intestine, brain, and other tissues. GPR40 agonists can enhance insulin levels directly by stimulating the pancreatic beta cells and indirectly by the synergistic effect of elevated plasma levels of the incretin GLP-1. Some evidence has shown that natural compounds have therapeutic effects for some human diseases. Therefore, this study aimed to identify Indonesian phytochemicals virtually as GPR40 for type II diabetes mellitus (DM) therapy.
Methods: A computational investigation was conducted employing molecular docking techniques to analyze the interactions among GPR40 (PDB: 4PHU), TAK-875, and phytochemicals sourced from Indonesia. The phytochemicals were obtained from HerbalDB and met the criteria for Lipinski's rule for drug availability. Macromolecule preparation was done using AutoDock, while the molecular docking process used PyRx. Protein-ligand interaction was visualized using Pymol. The indicators for data analysis were binding energy score must lower than TAK-875 (-10,1 kcal/mol), Root-Mean-Square Deviation (RMSD) score ≤ 2 Å, and bound with GPR40 residues where TAK-875 bind, such as Tyr 91, Arg183, Ala83, Phe87, Gly139, Leu158, Phe142 and Arg2258.
Results: The docking results showed that Hinokinin, Dihydroguaiaretic acid and Deoxylapachol had better potential activity to activate GPR40 than TAK-875. Hinokinin, Dihydroguaiaretic acid, and Deoxylapachol had lower binding scores (-10.2±0.1 kcal/mol) than the standard ligand. In addition, they bound to GPR40 at Tyr 91, Arg183, Ala83, Phe87, Gly139, Leu158, Phe142 and Arg2258 residues. Hinokinin, derived from plants like Chamaecyparis and Zanthoxylum, exhibits antioxidant, anticancer, antiviral, and antitrypanosomal properties. Dihydroguaiaretic acid, sourced from the creosote bush, is a phenolic lignan with antioxidant, anti-inflammatory, and potential anticancer properties. Deoxylapachol is a cytotoxic component with antifungal and anticancer activities.
Conclusions: New GPR40 activators from Indonesian phytochemicals named Hinokinin, Dihydroguaiaretic acid, and Deoxylapachol have been discovered as novel potential therapies for type II DM.
Keywords: GPR40

MOP1-F-2

In silico study: exploring Indonesian phytochemicals as DPP-IV inhibitors for Type II diabetes mellitus therapy

Cindy Ayudia Pramaesti[1*], Dykall Naf'an Dzikri[2]

[1]Student, Faculty of Medicine, Sebelas Maret University, Indonesia, [2]Family Medical Doctor, Tasikmadu Public Health Center, Indonesia

Objectives: Dipeptidyl peptidase IV (DPP-IV) is enzyme that degrades incretins to reduced abnormal visceral adipose tissue metabolism and insulin secretion. DPP-IV inhibitors increase the levels of GLP-1 and GIP leading beta-cell insulin secretion in the pancreas, reducing postprandial and fasting hyperglycemia, and improving blood glucose control without inducing hypoglycemia. Some evidence has shown natural compounds have therapeutic effects for human diseases. This study aimed to determine Indonesian phytochemicals virtually as DPP-IV inhibitors for type II diabetes mellitus (DM) therapy.
Methods: In silico study using molecular docking between DPP-IV (PDB : 5J3J), Sitagliptin, and Indonesian phytochemicals. The phytochemicals were obtained from HerbalDB and met the criteria for Lipinski's rule for drug availability. Macromolecule preparation was done using AutoDock, while the molecular docking process used PyRx. Protein-ligand interaction was visualized using Pymol. The indicators for data analysis were binding energy score must lower than Sitagliptin (-8.6 kcal/mol), root-mean-square deviation (RMSD) score ≤2 Å, and bound with DPP-1V residues where Sitagliptin bind, such as Glu`205, Glu206, Tyr662, and Arg358.
Results: The docking results showed that 1.10-Phenanthroline Monohydrate, Roxburghine B, and Lanuginosine had better potential activity to inhibit DPP-IV than Sitagliptin. 1.10-Phenanthroline Monohydrate, Roxburghine B, and Lanuginosine had lower binding scores (-8.7±0.1, -8.7±0.1, and -8.7±0.1 kcal/mol, respectively) than the standard ligand. In addition, they bound to DPP-IV at Glu`205, Glu206, Tyr662, and Arg358 residues. 1.10-Phenanthroline Monohydrate, Roxburghine B, and Lanuginosine are originally isolated from the seed of the plant Zea mays, the leaves and stems of the plant Uncaria gambir, and the leaves of the plant Annona mucirata, respectively.
Conclusions: New DPP-IV Inhibitor from Indonesian phytochemicals named 1.10-Phenanthroline Monohydrate, Roxburghine B, and Lanuginosine have been discovered as novel potential therapy for type II diabetes mellitus.
Keywords: DPP-IV inhibitors, Indonesian phytochemicals

MOP1-F-3

Young onset type 2 diabetes among Filipino population

Cherry Ann Garcia Durante[1,2*]

[1]Nursing, Saint Dominic College of Asia, Philippines,
[2]Nursing, University of Perpetual Help - Dr Jose G Tamayo Medical University, Philippines

Objectives: There is an increasing trend of type 2 diabetes among the younger population. This study described the characteristics of Filipinos with young-onset type 2 diabetes, that which occurs in people younger than 40 years.
Methods: This study reviewed the results of the national nutrition survey, which gathered clinical data among 19,642 participants. Multi-stage random sampling was employed to identify households to be included in the study.
Results: Results showed that the prevalence of type 2 DM was 19.67% (n=3863) among the sample population. Among those with type 2 DM, 21.3% were younger than 40 years. Young-onset T2DM was common in females (61.36%). Furthermore, it was also found out that young-onset T2DM was associated with dyslipidemia (chi2=9.49, p-value<0.01) as 4 out of 10 patients with young-onset T2DM also suffers from dyslipidemia. Also, young-onset T2DM was associated with smoking (chi2 = 23.46, p<0.001) and alcohol consumption of at least once a week (chi2=49.06, p<0.001). Moreover, patients with young-onset T2DM reported light to no physical activity in a week and engage in binge alcohol drinking at least once a month. Among the participants diagnosed with young-onset T2DM, monotherapy using metformin was the most common treatment regimen (63%); while a few (22%) were managed with a combination therapy of metformin and sitagliptin.
Conclusions: Based on the results of this study, it is vital that the rising trend in young-onset T2DM in the Filipino population be further explored and lifestyle change recommendation be formulated for health promotion and early detection. Also, specific risk factors like dyslipidemia, smoking and alcohol drinking, and lack of physical activity should be managed for disease prevention among the Filipino population.
Keywords: Young-onset Type 2 diabetes, Dyslipidemia

MOP1-F-4

Incident and risk factors associated with perioperative cardiovascular complication in obese patients undergoing anesthesia: result from a secondary care hospital in Thailand

Piyanan Pinidsatira*, Pakawan Kanjanan

Department of Anesthesiology, Songkhla Hospital, Thailand

Objectives: Obesity has become a worldwide problem of epidemic proportion and associated with pathophysiologic changes in all organ systems, which in turn affect anesthetic management. One of the biggest concerns during perioperative was cardiovascular complication. The purpose of this study aimed to investigate incident and risk factors associated with perioperative cardiovascular complication in obese patients undergoing anesthesia.
Methods: This study was retrospective research and analyzed the secondary data of a secondary care hospital in the South of Thailand. We included 1,693 obese patients 18 years and older undergoing anesthesia during October 2023 to May 2024, pregnancy was excluded, Obesity was defined as a body mass index (BMI)>25 kg/m2 and categorized in accordance with the Asia-Pacific classification. Perioperative cardiovascular complication was defined as hypotension, hypertension, arrhythmia, myocardial infarction (MI), congestive heart failure (CHF), cardiac arrest and unplanned ICU admission. Data were analyzed by using descriptive statistics, and Chi-square.
Results: There were 1,118 (66%) females, mean age was 51.58 ± 16.94. Incidence of perioperative cardiovascular complication in obesity patients was 388 (22.9%). Most common were hypotension (18.5%). When comparing risk factors among patients were perioperative cardiovascular complication and non perioperative cardiovascular complication. Most common risk factors associated with perioperative cardiovascular complication were congestive heart failure (OR 3.71, 95%CI 1.77-7.75, p<0.001), cerebrovascular disease (OR 2.30, 95%CI 1.37-3.86, p<0.001), age ≥65 years (OR 2.10, 95%CI 1.64-2.68, p<0.001), dyslipidemia (OR 1.89, 95%CI 1.48-2.42, p<0.001) and hypertension (OR 1.89, 95%CI 1.50-2.38, p<0.001).
Conclusions: This study suggests that obese patients with older and comorbid conditions, especially those who were congestive heart failure, cerebrovascular disease, dyslipidemia and hypertension had incidence of perioperative cardiovascular complication undergoing anesthesia. These patients should be prepared for anesthesia. Additionally, it is crucial to provide an appropriate anesthesia technique, close monitoring, and choose anesthetic medication that has the least effect on the cardiovascular system.
Keywords: Anesthesia

MOP1-F-5

Impact of cigarette smoking on long-term clinical outcomes in patients with coronary chronic total occlusion lesions

Jihun Ahn*

Cardiology Department, Eulji University Daejeon Hospital, Republic of Korea

Objectives: Cigarette smoking is a significant risk factor for coronary artery disease. However, there is insufficient evidence regarding the long-term clinical effects of smoking in Asian populations with chronic total occlusion (CTO).
Methods: This study aimed to assess the effects of smoking on 5-year (median follow-up period, 4.2±1.5 [interquartile range, 4.06-5.0] years) clinical outcomes in patients with CTO lesions who underwent percutaneous coronary intervention (PCI) or medical treatment (MT). We enrolled 681 consecutive patients with CTO who underwent diagnostic coronary angiography and subsequent PCI or MT. The patients were categorized into smokers (n=304) and nonsmokers (n=377). The primary endpoint was major adverse cardiovascular events (MACE), including a composite of all-cause death, myocardial infarction, and revascularization over a 5-year period.
Results: Propensity score matching (PSM) analysis was performed to adjust for potential baseline confounders. After PSM analysis, two propensity-matched groups (200 pairs, n=400) were generated, and the baseline characteristics of both groups were balanced. The smokers exhibited a higher cardiovascular risk of MACE (29.5% vs. 18.5%, p=0.010) and non-TVR (17.5 vs. 10.5%, p=0.044) than the nonsmokers. In a landmark analysis using Kaplan-Meier curves at 1 year, the smokers had a significantly higher rate of MACE in the early period (up to 1 year) (18.8% and 9.2%, respectively; p=0.008) compared with the nonsmokers. The Cox hazard regression analysis with propensity score adjustment revealed that smoking was independently associated with an increased risk of MACE.
Conclusions: These findings indicate that smoking is a strong cardiovascular risk factor in patients with CTO, regardless of the treatment strategy (PCI or MT). In addition, in the subgroup analysis, the risk of MACE was most prominently elevated in the group of smokers who underwent PCI.
Keywords: Smoking

MOP1-F-6

Psychologically vulnerable patients with cardiovascular disease have poor health-related quality of life and physical activity

Mi Kyung Lee[1*], Ji Young Jung[2], Yong Jun Lee[3], Chang Geun Oh[3], Min Jung Kim[4], Sol Bin Yoon[4], Min Ji Kang[4], Justin Y. Jeon[3], Jong Nam Kim[4], Chan Joo Lee[5], Jong Young Lee[6], Hyun-Jae Kang[7], Ick-Mo Chung[8]

[1]Frontier Research Institute of Convergence Sports Science, Yonsei University, Republic of Korea, [2]Institute for Integrative Medicine, Ewha Womans University Hospital, Republic of Korea, [3]Department of Sport Industry Studies, Yonsei University, Republic of Korea, [4]Department of Educational Psychology, Seoul Women's University, Republic of Korea, [5]Division of Cardiology, Yonsei University College of Medicine, Republic of Korea, [6]Division of Cardiology, Kangbuk Samsung Hospital, Republic of Korea, [7]Division of Cardiology, Seoul National University Hospital, Republic of Korea, [8]Division of Cardiology, School of Medicine, Ewha Womans University, Republic of Korea

Objectives: Psychological problems such as stress and depression are common in patients with cardiovascular disease and may significantly affect other lifestyle factors, thereby aggravating the prognosis in cardiovascular diseases. Participation in physical activity improves cardiovascular health and enhances the quality of life. The purpose of this study is to compare physical activity levels, cardiorespiratory fitness, and health-related quality of life (HRQoL) between psychologically vulnerable and non-vulnerable groups in patients with heart failure with reduced ejection fraction (HFrEF) or myocardial infarction (MI).
Methods: Participants were patients between the ages of 19 to 75 years (N=258; 183 non-vulnerable, 75 vulnerable) with HFrEF or MI. Psychologically vulnerable individuals were classified as such if they had any one of the following: depression, anxiety, negative emotion, or social inhibition. Participants were recruited from 10 hospitals, and data on physical activity levels and quality of life were collected via questionnaires. Cardiorespiratory fitness was also measured using a cardiopulmonary exercise test.
Results: Among the 258 participants (mean age 58.1±10.8 years), 29% were classified as psychologically vulnerable. The psychologically vulnerable group exhibited lower HRQoL compared to the non-vulnerable group. The psychologically vulnerable group engaged in significantly less moderate leisure-time physical activity (62.3±115.8 vs. 140.3±219.9 min/week, p<0.01) compared to the non-vulnerable group. The proportion of individuals meeting the exercise recommendations of 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity exercise per week was significantly lower in the psychologically vulnerable group (18.7%) compared to the non-vulnerable group (40.4%). There was no difference in cardiorespiratory fitness between the two groups.
Conclusions: In this study, among patients with HFrEF or MI, the psychologically vulnerable group showed lower quality of life and physical activity levels compared to the non-vulnerable group. A comprehensive cardiac rehabilitation program that enhances both the physical and mental health of patients should be implemented for psychological vulnerable patients.
Keywords: Physical activity, Psychological vulnerability, Heart failure, Myocardial infarction, Quality of life

MOP1-F-7

Association of LDL cholesterol levels with the risk of cardiovascular outcome according to stages of chronic kidney disease

Su-Yeon Choi[1*], Namju Heo[1], Kyungdo Han[2]

[1]Department of Internal Medicine, Healthcare Research Institute, Gangnam Healthcare Center, Seoul National University Hospital, Seoul, Republic of Korea, [2]Department of Biostatistics, College of Medicine, The Soongsil University, Seoul, Republic of Korea

Objectives: The optimal low-density lipoprotein (LDL) cholesterol level to prevent cardiovascular disease in chronic kidney disease (CKD) patients according to their CKD stages remains unknown. This study aimed to explore the association of LDL cholesterol levels with adverse cardiovascular outcomes among patients with different CKD stages.

Methods: Data were obtained from the Korean National Health Insurance Service. Patients who participated in health screenings from 2009 to 2012 and had CKD (defined as eGFR<60 mL/min/1.73 m^2) were included. Patients were classified into five LDL cholesterol categories: <70, 70-99, 100-129, 130-159, and ≥160 mg/dL. Composite cardiovascular outcome was defined as a composite of MI and stroke.

Results: During the follow-up period, 10,390 incident myocardial infarction (MI), and 17,619 strokes were reported in 373,064 patients with CKD. In the analysis stratified by CKD stages, the risk for MI was significantly increased in the LDL cholesterol level ≥160 mg/dL among patients with CKD stage 3a (eGFR 45-59 mL/min/1.73 m^2) [hazard ratio (HR) (95% confidence interval (CI))]: 1.33 (1.2-1.49). Similarly, the risk for stroke was increased in the LDL cholesterol level ≥160 mg/dL among patients with CKD stage 3a [HR (95% CI)]: 1.14 (1.04-1.24). However, there was no significant relationship between LDL cholesterol levels and risk for MI or stroke among patients with CKD stage 3b-5.

Conclusions: Among patients with CKD, LDL cholesterol level was a significant risk factor for subsequent MI and stroke, and the association was identified only among patients with mild kidney dysfunction. However, further research is needed, because the number of patients with LDL cholesterol level ≥160 mg/dL and advanced CKD was relatively small in this study.

Keywords: Chronic kidney disease, LDL cholesterol, Cardiovascular disease, Myocardial infarction

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024
The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 2-A

Sep 28(Sat) 13:30-14:30 | Mini-Oral A (Studio 5, 6F)

MODERATOR : Su Myung Jung (Sungkyunkwan University, Republic of Korea)

MOP2-A-1

Machine learning-based identification of estrogen therapy-induced lipidomic markers predicting subclinical atherosclerosis in transgender women

Andi Nursanti Andi Ureng[1*], Prihantini Prihantini[2*], Elfiany Syafruddin[3], Sahnaz Vivinda Putri[4], Rifaldy Fajar[5]

[1]Pharmacy, Andini Persada College of Health Sciences, Indonesia, [2]Machine Learning for BioMedicine Laboratory, Bandung Institute of Technology, Indonesia, [3]Computational Science Research Team, Bulukumba Muhammadiyah University, Indonesia, [4]Health Management Laboratory, International University Semen Indonesia,Indonesia, [5]Mathematics and Computer Science, Karlstad University, Sweden

Objectives: Estrogen therapy is crucial for gender-affirming treatment in transgender women, but its effects on lipid metabolism and subclinical atherosclerosis risk are not well understood. This study uses machine learning techniques to identify lipidomic markers influenced by estrogen therapy and assess their ability to predict subclinical atherosclerosis, aiming to improve early detection with non-invasive markers.
Methods: We analyzed data from 300 transgender women on estrogen therapy and 300 age- and cardiovascular risk-matched cisgender controls over four years. The study included lipidomic profiling, carotid intima-media thickness (CIMT) measurements, and other subclinical atherosclerosis indicators. Data preprocessing involved robust z-score normalization and multiple imputation by chained equations (MICE). Feature selection was done using the Boruta algorithm. A stacked autoencoder was used for dimensionality reduction and feature extraction, followed by a deep neural network (DNN) to model the relationship between lipidomic profiles and CIMT. We developed a predictive ensemble model integrating Gradient Boosting Machines (GBM) and Support Vector Machines (SVM), with hyperparameter tuning through grid search and cross-validation. The model was externally validated with an independent cohort of 150 transgender women and 150 cisgender controls, evaluating performance with AUC-ROC, precision-recall curves, and net reclassification improvement (NRI).
Results: The stacked autoencoder identified 10 lipid species significantly altered by estrogen therapy in transgender women. Notably, elevated levels of sphingomyelin (SM d18:1/24:1) and diacylglycerol (DG 36:2) were associated with increased CIMT. The DNN model showed that higher sphingomyelin levels corresponded to a 35% higher risk of increased CIMT (HR: 1.35, 95% CI: 1.20-1.52, $p<0.001$). The predictive ensemble model achieved an AUC-ROC of 0.95 in the training set and 0.93 in the validation set, with accuracy, sensitivity, and specificity of 93.5%, 91.2%, and 94.8%, respectively.
Conclusions: This study reveals lipid changes from estrogen therapy that predict subclinical atherosclerosis in transgender women, offering potential for non-invasive risk assessment and personalized cardiovascular care.
Keywords: Estrogen therapy, Lipidomics, Subclinical atherosclerosis, Machine learning

MOP2-A-2

Investigating the lipid accumulation in apolipoprotein E deficiency-mediated chronic kidney disease

Martin Ho Yin Yeung[1,2*], Ching Yan Ho[1], Angela Zaneta Chan[2]

[1]The Department of Health Technology and Informatics, The Hong Kong Polytechnic University, China,
[2]Department of Anatomical and Cellular Pathology, The Chinese University of Hong Kong, China

Objectives: Human apolipoprotein E (ApoE) is a glycoprotein involved in the lipid metabolism of lipoproteins including very low-density lipoprotein (VLDL) and high-density lipoprotein (HDL). As it serves its role in receptor-mediated uptake of these lipoproteins, dyslipidaemia in ApoE deficiency fosters the development of atherosclerosis. Dyslipudaemia is one of the risk factors of chcronic kidney disease (CKD). Given the utilisation of lipids of kidney cells for their physiological functions and the pro-atherogenic effect of ApoE deficiency, it is hypothesized that ApoE deficiency disrupts renal lipid metabolism, casusing CKD progression. Therefore, this study aims to elucidate the effect of ApoE deficiency on CKD.
Methods: Wild-type (WT) and ApoE knockout (KO) C57BL/6J were sacrificed at the age of 10- and 16-month for the collection of kidneys and livers. The collected organs were processed for histological and lipid analysis, total triglycerides (TG) and total cholesterol (TC) quantification, and renal lipidomic analysis by Ultra-high-performance liquid chromatography (UHPLC)/ Electrospray ionization Orbitrap mass spectrometer (ESI-Orbitrap-MS).
Results: Glomerular deformities, including glomerulus enlargement and mesangial expansion, with exacerbated renal and hepatic inflammation and fibrosis were developed in ApoE KO mice. They also showed localization of lipid droplets in glomerulus areas, and elevated renal and hepatic TG. In addition, the distribution of their kidney lipidomes was altered. With separation in kidney lipidomes between the two groups, 18 differential lipid compounds were identified. ApoE KO mice exhibited an increased abundance in most of them, such as phosphatidylcholines (PC) and sphingomyelin (SM). Subsequent enrichment analysis of the differential lipids revealed significant enrichment in phosphosphingolipids, which are crucial for maintaining podocyte function, in ApoE KO mice (Figure 1).
Conclusions: In conclusion, ApoE deficiency was found to be associated with progressed kidney injury. Collectively, glomerular morphological alterations and enriched phosphosphingolipids may be suggestive of glomerulosclerosis as the cause of ApoE deficiency-mediated CKD.
Keywords: ESI-Orbitrap-MS, Lipidomic, Apoe KO, CKD, Phosphosphingolipids

MOP2-A-3

Tao-Hong-Si-Wu decoction ameliorates hepatic lipid accumulation in female mice with heart failure and preserved ejection fraction via inhibition of SREBP1 signaling

QI Wensheng[1,2*], Liu Chang[1,2], Zhang Miao[1], Cai Yin[1]

[1]Department of Health Technology and Informatics, The Hong Kong Polytechnic University, China,
[2]Department of Anesthesiology, The First Hospital of Jilin University, China

Objectives: Heart failure with preserved ejection fraction (HFpEF) is a complex syndrome characterized by both cardiac and extracardiac pathophysiological changes, including hepatic lipid accumulation, which induces lipoperoxidative stress and hepatic injury. Notably, over 50% of HFpEF patients also suffer from fatty liver disease, indicating significant cardiometabolic overlap. Current treatments for HFpEF are limited, necessitating new therapies targeting both cardiac dysfunction and hepatic steatosis. Taohong Siwu Decoction (THSWD), a traditional Chinese herbal remedy, has shown promise in improving cardiac diastolic dysfunction in a murine HFpEF model. However, its effects on hepatic lipid dysregulation remain unexplored. This study aims to investigate THSWD's therapeutic potential for fatty liver disease in HFpEF and elucidate the underlying molecular mechanisms.
Methods: A two-hit mouse model of HFpEF in female mice, induced by a high-fat diet (60kcal% fat) feeding and concurrent administration of Nω-nitro-L-arginine methyl ester hydrochloride (L-NAME, 0.5g/L in drinking water), recaptures the cardiovascular features of HFpEF in humans. Additionally, HepG2 cells treated with oleic acid, palmitic acid, and angiotensin II to induce hepatic steatosis showed significantly reduced TG content and expression of related fat synthesis genes when treated with THSWD (5mg/ml, 10mg/ml).
Results: Histological examinations using Oil Red O staining in the model group revealed significant increase in lipid deposition within the liver compared to control mice. This occurred along with significantly increased hepatic triglyceride (TG) content. Treatment groups received oral gavage of THSWD (0.5, 1g/kg/day), significantly reducing hepatic lipid accumulation and TG content. RNA-seq analysis of liver tissues indicated that THSWD downregulated lipid biosynthesis genes (ACC1, Fasn, SCD1, Elovl6) regulated by SREBP1, which is critical in fatty acid synthesis and accumulation.
Conclusions: This study demonstrates that THSWD can ameliorate hepatic lipid accumulation in both in vivo and in vitro models, providing experimental evidence supporting its potential use in combating fatty liver disease in the context of HFpEF.
Keywords: Hepatic lipid accumulation, Heart failure with preserved ejection fraction, Taohong siwu decoction

MOP2-A-4

Investigating the effect of fat quantity and composition on hepatocellular lipid metabolism, autophagy and triglyceride-rich lipoprotein processing

Felix Westcott[1,2*], Kaitlyn Dennis[1], Shilpa Nagarajan[1], Leanne Hodson[1]

[1]Oxford Centre for Diabetes, Endocrinology & Metabolism, University of Oxford, United Kingdom,
[2]The Kennedy Institute of Rheumatology, University of Oxford, United Kingdom

Objectives: Metabolic dysfunction-associated steatotic liver disease (MASLD) is characterised by the pathological accumulation of intrahepatocellular triglyceride (IHCTG) and can progress to steatohepatitis and more severe liver disease. Dietary fat quantity and composition have been associated with MASLD development and progression, which may be mediated through an aberrant decrease in autophagy. Hepatocellular triglycerides-rich lipoprotein (TRL) processing is often overlooked and may be mediated by autophagy. Therefore, the aim of this work was to determine the effects of fatty acid (FA) quantity and composition on hepatocellular lipid metabolism, autophagy and TRL processing.
Methods: Huh7 hepatocyte cells were cultured for 7 days in media supplemented with different FA concentrations (200 vs 800 µmol) and compositions (unsaturated vs saturated). Autophagic flux was quantified by Western Blotting through accumulation of LC3-II with and without autophagic inhibition. Intracellular lipids were extracted and analysed by liquid chromatography-mass spectrometry and gas chromatography. Hepatocytes were incubated with human-derived TRLs that had been labelled in vivo with stable isotope tracer and ex vivo with fluorescent triglyceride. TRL uptake and lipolysis was quantified using isotope-ratio mass spectroscopy of extracted lipids and confocal microscopy.
Results: Increasing media FA concentration resulted in increased IHCTG accumulation. Preliminary findings indicate that cells cultured in predominantly unsaturated FAs have a notably higher phospholipid and ceramide concentration, but lower triglyceride and diglyceride concentration and tend (p=0.07) to have lower autophagic flux than cells cultured in predominantly saturated FAs. Human-derived labelled TRLs were uptaken into hepatocytes and co-localised with the early endosome.
Conclusions: Hepatocytes treated with unsaturated FAs may channel triglyceride-liberated FAs into the intrahepatocellular phospholipid pool to a greater extent than hepatocytes treated with saturated FAs, which may influence IHCTG accumulation. Preliminary data indicates TRL processing through the endosomal pathway, possibly indicating a role for autophagy which was decreased following unsaturated FA exposure.
Keywords: MASLD, Lipidomics, autophagy, TRL metabolism

MOP2-A-5

Integrative omics approaches to unraveling lipid metabolism and atherosclerosis

Pavithran Damodaran*

Medicine, ACS Medical College and Hospital, India

Objectives: This review aims to explore the application of multi-omics approaches, including genomics, proteomics, and metabolomics, in elucidating the complexities of lipid metabolism and its contributions to atherosclerosis development.
Methods: We systematically reviewed recent literature on various omics technologies and data integration techniques, focusing on their applications in lipid research. Studies were selected based on their use of multi-omics approaches to uncover novel biomarkers and pathways implicated in lipid metabolism and atherosclerosis. Key findings from high-impact journals and recent conference proceedings were synthesized to provide a comprehensive overview of current advancements.
Results: Our review highlights significant discoveries made possible through integrative omics. Notably, multi-omics approaches have identified several novel lipid species and metabolic pathways that play critical roles in lipid homeostasis and atherosclerosis. For instance, lipidomics has uncovered unique lipid signatures associated with atherosclerotic plaques, while proteomics has revealed key regulatory proteins involved in lipid metabolism. Metabolomics has provided insights into the metabolic shifts that accompany atherosclerosis progression. Furthermore, the integration of these omics data has facilitated the identification of complex interactions between lipids, proteins, and metabolites, offering a holistic view of lipid metabolism regulation.
Conclusions: Omics approaches offer unprecedented insights into the intricate networks governing lipid metabolism and atherosclerosis. The integration of multi-omics data enables a more comprehensive understanding of the molecular underpinnings of lipid-related diseases, paving the way for personalized therapeutic strategies. Future research should focus on improving data integration techniques and validating omics findings in clinical settings to translate these discoveries into effective treatments for atherosclerosis.
Keywords: Omics

MOP2-A-6

The implication of a polymorphism in the methylenetetrahydrofolate reductase gene and risk of ischemic stroke in Indian population

Dr Asgar Ali*

Biochemistry, All India Institute of Medical Sciences, India

Objectives: Ischemic stroke has multifaceted origin and it occurs when a vessel supplying blood to the brain is obstructed. Homocysteine, an independent risk factor for stroke has been used to indicate the presence of inflammation and its level has is regulated by the enzyme Methylenetetrahydrofolate reductase (MTHFR). There is conflicting evidence available in association between the MTHFR C677T and A1298C polymorphism and established risk factors. Therefore, the present study was performed to determine, if any relation exist between serum homocysteine levels and MTHFR genotype in ischemic stroke patients in India.
Methods: The study included 66 matched healthy controls and 92 clinically diagnosed ischemic stroke patients. The MTHFR C677T and A1298C mutations were determined by polymerase chain reaction and restriction fragment length polymorphism (PCR-RFLPs). The estimation of homocysteine level was done by ELISA. Distribution of studied genotype and allele frequencies were analyzed using Chi-square test and genotype error were >5 % (HWE <0.05).
Results: In RFLP1298 odd ratio was found 3.01 in heterozygous condition indicating that heterozygous individuals have 3 times more disease incidence than the wild type. Additionally, the p=0.008 indicates that wild type have less probability to suffer from disease compare to heterozygous/mutant. Inter mutations interactions and disease probability studies indicated that RFLP1298 and promoter mutation have significant correlation with disease (p=0.02). Greater than 50% of control population have less homocysteine level than the case population (p>0.001). Indicating a direct correlation of serum homocysteine level with the disease.
Conclusions: In the study population the mean difference was non-significant on being tested with two sample t-test (p= 0.872). However, the haplotypes C-677-C-1298 and T-677-C-1298, as well as the MTHFR A1298C mutation, might influence the risk of ischemic stroke in the Indian population. Extensive and independent study however should be warranted to evaluate the biological mechanisms of this association.
Keywords: MTHFR, Polymorphism, Ischemic stroke, Allels, C677T

MOP2-A-7

Cereblon's role in dermal fibroblast proliferation and myofibroblast differentiation

Thien Nguyen Huu[1,2*], Jung Eun Seol[1], Hyoung Kyu Kim[1], Jin Han[1]

[1]College of Medicine, Inje University, Republic of Korea, [2]Deparment of Psychiatry, Military Hospital 175, Vietnam

Objectives: Fibroblasts are the main cells in the dermis layer of skin, which play a central role in the wound healing process and dermal homeostasis. In skin repair progress, the increase in the number of fibroblasts and the activation of myofibroblasts has important meaning. Cereblon (CRBN) is a multiple-function protein first known as a protein related to mental retardation. Recently studies showed that this gene has many roles in metabolism, membrane balance exchange, and cell senescence. In this study, we focus on investigating the new role of this protein in cell proliferation and activation of dermal fibroblasts.

Methods: By fibroblast extraction from mouse ears of wild type (WT) and CRBN knockout (CRBNKO) mice, we investigate the characteristics of these primary cells by cell proliferation assay, and in vitro wound healing assay. The protein expression of makers related to proliferation and myofibroblast activation is evaluated by western blot, immunocytochemistry staining, and flow cytometry.

Results: The primary cells extracted from mouse ears are confirmed fibroblast by surface makers and ICC staining. The CRBNKO fibroblasts show slower in increasing the number of cells when culture. Our findings also suggest that the ablation of CRBN leads to a decrease in the differentiation of myofibroblast compared with WT cell control groups.

Conclusions: Our study suggests that CRBN plays an essential role in cell growth and differentiation. This finding will be helpful for potential targets in wound healing treatment as well as cell growth-related disorders.

Keywords: Cereblon, Fibroblast, Cell proliferation

MOP2-A-8

Machine learning discovery of lipid-derived extracellular vesicles' role in endothelial dysfunction and atherosclerosis

Sahnaz Vivinda Putri[1*], Rifaldy Fajar[2], Andi Nursanti Andi Ureng[3], Prihantini[4], Elfiany Syafruddin[5]

[1]Health Management Laboratory, International University Semen Indonesia, Indonesia, [2]Mathematics and Computer Science, Karlstad University, Sweden, [3]Pharmacy, Andini Persada College of Health Sciences, Indonesia, [4]Machine Learning for BioMedicine Laboratory, Bandung Institute of Technology, Indonesia, [5]Computational Science Research Team, Bulukumba Muhammadiyah University, Indonesia

Objectives: Endothelial dysfunction is a crucial factor in the development of atherosclerosis, yet the role of lipid-derived extracellular vesicles (EVs) in modulating endothelial function remains underexplored. This study investigates the influence of lipid-derived EVs on endothelial dysfunction in atherosclerosis using machine learning algorithms, offering a new perspective on lipid signaling in vascular biology.

Methods: We used high-dimensional datasets from the Athero-Express Biobank Study, which include lipidomic profiles, EV characterization, and endothelial function measurements from arterial tissues of over 3,000 atherosclerosis patients. Data preprocessing involved normalization, imputation, and dimensionality reduction via UMAP. Our machine learning pipeline combined deep learning (DL) models with random forest (RF) classifiers to identify key lipid species within EVs predictive of endothelial dysfunction. The DL model utilized CNNs for image-based EV characterization and autoencoders for lipidomic data. We evaluated model performance using nested cross-validation, assessing AUC, precision, recall, and F1 score.

Results: The DL-RF model achieved an AUC of 0.94, precision of 91.5%, recall of 89.8%, and F1 score of 90.6% in predicting endothelial dysfunction. It identified 12 critical lipid species in EVs, including ceramide (Cer 18:1) and lysophosphatidylcholine (LPC 16:0), significantly associated with endothelial dysfunction (β=1.55, p<0.001; β=1.42, p<0.001). Pathway enrichment analysis revealed the involvement of sphingolipid metabolism and inflammatory response pathways (p<0.001). Network analysis showed that lipid-derived EVs interact with key signaling molecules such as intercellular adhesion molecule-1 (ICAM-1) and vascular cell adhesion molecule-1 (VCAM-1).

Conclusions: This study presents a novel approach to understanding lipid-derived EVs' role in endothelial dysfunction in atherosclerosis using machine learning. Identifying novel lipid species in EVs and their regulatory pathways offers potential biomarkers and therapeutic targets, advancing cardiovascular disease research with significant implications for lipid signaling in vascular biology.

Keywords: Endothelial dysfunction, Lipid-derived extracellular vesicles, Atherosclerosis, Machine learning, Lipidomics

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 2-B

Sep 28(Sat) 13:30-14:30 | Mini-Oral B (Studio 6, 6F)

MODERATOR : Jang Won Son (The Catholic University of Korea, Republic of Korea)

MOP2-B-1

Evaluation of nomenclature of fatty liver disease in association with hepatocellular carcinoma: a 15.5-Year cohort study in Korea

Tung Hoang[1,2*], Jeonghee Lee[1], Bo Hyun Kim[3], Yuri Cho[3], Jeongseon Kim[1]

[1]Department of Cancer AI & Digital Health, National Cancer Center Graduate School of Cancer Science and Policy, Republic of Korea, [2]Department of Economic, Social, and Administrative Pharmacy, University of Health Sciences, Vietnam National University - Ho Chi Minh City, Vietnam, [3]Department of Internal Medicine, Center for Liver and Pancreatobiliary Cancer, National Cancer Center, Republic of Korea

Objectives: Recently, metabolic dysfunction-associated fatty liver disease (MAFLD) was proposed to incorporate metabolic traits in fatty liver disease patients, whereas the new nomenclature metabolic dysfunction-associated steatotic liver disease (MASLD) has replaced nonalcoholic fatty liver disease (NAFLD). By including criteria for alcohol intake history, steatotic liver disease with increased alcohol intake (MetALD) and alcohol-related liver disease (ALD) were also introduced. Concerning the performance of different terminologies in the Asian population, this study aimed to investigate the hepatocellular carcinoma (HCC) risk of persons meeting the criteria for subclasses of fatty liver disease.
Methods: Between August 2002 and December 2023, we prospectively included 36,204 participants with no history of HCC at the Korea National Cancer Center. Fatty liver disease was defined using both abdominal sonography and fatty liver index. Participants were further classified as having NAFLD, MAFLD, MASLD, MetALD, and ALD and their associations with the development of HCC were investigated using Cox regression models.
Results: During a median follow-up of 15.5 years (interquartile range 10.3-18.4 years), 158 HCC cases were newly diagnosed. The prevalence of NAFLD and MASLD was 17.4% and 16.7%, respectively, whereas MAFLD was observed in 30.7% of the study population at baseline. Given the low proportion of excessive alcohol consumption, we identified 2.9% of MetALD and 3.2% of ALD. While MAFLD was found to be associated with a 45% increased risk of HCC (hazard ratio 1.45, 95% confidence interval 1.02-2.06), results for other nomenclature were not significant.
Conclusions: MAFLD - but not NALFD and MASLD - was found to be an independent risk factor for developing HCC. Our results suggest the importance of both fatty liver and the presence of metabolic dysfunction in relation to HCC risk and suggest the need to modify alcohol intake thresholds in the diagnostic criteria for NAFLD and MASLD within the Korean population.
Keywords: Nonalcoholic fatty liver disease, Metabolic dysfunction-associated steatotic liver disease, Metabolic dysfunction-associated fatty liver disease, Hepatocellular carcinoma

MOP2-B-2

MAFLD criteria more accurately reflect cardiac function than MASLD criteria in a healthy population

Yun Kyung Cho[1,2*], Myung Jin Kim[1,2], Eun Hee Kim[3], Min Jung Lee[3], Hyo-Jung Nam[3], Woo Je Lee[1,2], Hong-Kyu Kim[3], Chang Hee Jung[1,2]

[1]Department of Internal Medicine, Asan Medical Center, University of Ulsan College of Medicine, Republic of Korea, [2]Asan Diabetes Center, Asan Medical Center, Republic of Korea, [3]Health Screening and Promotion Center, Asan Medical Center, University of Ulsan College of Medicine, Republic of Korea

Objectives: Metabolic dysfunction-associated steatotic liver disease (MASLD) has been suggested as an alternative to the established definition of metabolic dysfunction-associated fatty liver disease (MAFLD). This study aims to compare the effectiveness of MASLD and MAFLD in identifying individuals with coronary artery stenosis and impaired cardiac function within a healthy population.
Methods: In this cross-sectional study, we included 7,151 participants (4,668 men [65.3%] and 2,484 women [34.7%], with a mean age of 53.7±8.3 years) who underwent routine health check-ups at Asan Medical Center in Seoul, Korea. Fatty liver was diagnosed via abdominal ultrasonography, coronary artery stenosis was detected using multidetector computed tomography (MDCT), and cardiac function was assessed through transthoracic echocardiography.
Results: MASLD and MAFLD were identified in 2,464 (34.5%) and 2,611 (36.5%) patients, respectively. Participants with either MASLD or MAFLD exhibited significantly lower E wave and E/A ratio, along with higher LA diameter, A wave, and E/E' ratio, indicating worse diastolic function compared to those without these conditions. Additionally, a higher proportion of participants with MASLD (6.5% vs. 8.6%) or MAFLD (6.3% vs. 8.7%) had significant coronary artery stenosis detected on MDCT. When comparing the presence of MASLD alone and MAFLD alone, excluding individuals with both conditions, it was observed that MAFLD was more strongly associated with diastolic dysfunction parameters, although there was no significant difference in coronary artery stenosis between the two groups.
Conclusions: Both MAFLD and MASLD are associated with coronary artery stenosis and diastolic dysfunction. However, MAFLD shows a stronger association with diastolic dysfunction as evaluated by echocardiography compared to MASLD.
Keywords: Cardiac Function, Diastolic Dysfunction

MOP2-B-3

Analysis of central obesity risk factors and their association with cardiovascular diseases among adults in Indonesia: insights from the Indonesian family life survey

Nadyatul Husna[1*], Hafizh Rizqi[2]

[1]Medical Doctor, Universitas Andalas/dr. Reksodiwiryo Military Hospital Padang, Indonesia,
[2]Business Administration, Prince Sattam Bin Abdulaziz University, Saudi Arabia

Objectives: Central obesity is emerging as a major contributor to the worsening of non-communicable diseases. Various risk factors contribute to the development of central obesity, further exacerbating the overall impact on health. The research aims to analyze risk factors for central obesity and their correlation with cardiovascular diseases among Indonesian adults men.
Methods: This cross-sectional study utilized secondary data from household questionnaires in a nationwide longitudinal study, specifically drawing from 4953 male participants in the RAND Indonesian Family Life Survey 5 (IFLS 5) who met predefined inclusion and exclusion criteria. Collected data encompassed sociodemographic characteristics, lifestyle risk factors, smoking status, the Brickman Index for smoking grade, physical activity, BMI, hypertension, diabetes, and waist circumference. Bivariate logistic regression analysis identified candidate variables at $p<0.25$, and subsequent multiple logistic regression analysis estimated odds ratios with a 95% confidence interval to discern factors associated with central obesity.
Results: The analysis revealed associations between age, education, smoking status, smoking grade, BMI, physical activity, economic status, hypertension, stress physiology status, diabetes, fast food consumption, meal patterns, dyslipidemia, and the incidence of central obesity ($p<0.001$). Associated factors of central obesity were age [AOR=1.6, 95% CI (1.40, 1,96)], BMI (obesity) [AOR=37.2, 95% CI: (30.1, 45.3)], physical activity [AOR=0.084, 95% CI: (0.74, 0.94)], hypertension [AOR=0.48, 95% CI: (0.32, 0.72)], and dylipidemia [AOR=0.76, 95% CI: (0.63, 0.91)].
Conclusions: Central obesity demonstrated a strong association with an increased incidence of risk factors related to cardiovascular diseases. This study underscores the importance of incorporating the central obesity index into clinical assessments. Moreover, it recommends educational interventions to manage risk factors associated with central obesity, with potential implications for the prevention and control of cardiovascular diseases.
Keywords: Central obesity, Risk factors, Cardiovascular diseases

MOP2-B-4

Association between admission low-density lipoprotein level and ischemia-reperfusion injury in patients with STEMI who treated by primary PCI

Sunderiya Dalanbaatar[1*], Surenjav Chimed[2]

[1]Cardiology, Intermed Hospital, Mongolia, [2]Radiology, Charité – Universitätsmedizin Berlin, Germany

Objectives: In the present study, we investigated the assoaciation between low-density lipoprotein cholestrol (LDL-C) and left ventricular (LV) myocardial contractility during ischemia-reperfusion injury (IRI) after opening of occluded coronary artery in patients with ST-segment elevation myocardial infarction (STEMI) who were treated by primary percutaneous intervention (PCI).
Methods: Patients with STEMI who were treated by primary PCI were selected. The LDL-C was evaluated in blood samples which were taken at admission in emergency department. The LV infarcted (IS) and non-infarcted segmental (NIS) myocardial contractility was assessed using speckle-tracking derived longitudinal strain (LS) within 48 hours from primary PCI.
Results: A total of 513 patients included in the present study (mean age 60±14, male 85%). Mean LDL level was 117±42 mg/dL at the time of admission. The mean IS LS and NIS LS were 12.4±4.6% and 16.4±4.0%, respectively. In simple linear regression analysis, every 10 unit increase of admission LDL level was significantly associated with reduced IS LS (beta= -0.101, 95% CI -0.005 to -0.196, p=0.039), while there was no significant association with NIS LS (beta= 0.052, 95% CI -0.032 to 0.136, p=0.223).
Conclusions: In patients with STEMI, LDL-C is significantly associated with reduced LV IS myocardial contractility during IRI after primary PCI.
Keywords: LDL, Ischemia-reperfusion injury, Myocardial contractility

MOP2-B-5

Features of lipid metabolism disorders in individuals with genetic predisposition to arterial hypertension and patients with essential arterial hypertension

Anastasiia Ivankova*, Valentyna Romanova, Nataliia Kuzminova

Department of Internal Medicine, National Pirogov Memorial Medical University, Vinnytsya, Ukraine

Objectives: To determine the peculiarities of lipid metabolism indicators' changes in healthy individuals with a genetic predisposition to arterial hypertension (AH) and patients with essential arterial hypertension (EAH).

Methods: 231 patients with second stage of EAH (average age was 52.3±1.2 years) were examined. 121 of them had a concomitant 2nd-3rd functional classes of stable coronary heart disease (CHD). The control group included 30 healthy people of similar age and gender. 23 healthy individuals with a AH family history became a comparison group. Additionally to lipid spectrum, levels of lipoprotein (a) (Lp(a)), apolipoprotein B100 (apoB100) and apolipoprotein A-1 (apoA-1) were determined.

Results: Comparison group had similar to EAH patients proatherogenic changes in lipid fractions. Their Lp(a) levels increased to 29.9 (24.5; 32.1) mg/dl, which is 67.0% higher than the levels in the control group (p=0.0005). Levels of apolipoproteins (apoB100 and apoA1) in the serum of healthy persons with AH predisposition did not differ from the control group. Patients with EAH showed an increase in proatherogenic fractions of lipoproteins, apoB100, Lp(a), and a decrease in high-density lipoprotein cholesterol (HDL-C) and apoA-1 compared to control (p<0.0001). Presence of concomitant CHD did not significantly impact on lipid indicators (p>0.05), except of increasing in the Lp(a) level by 24.4% (p<0.05). A significant positive correlations were found between the Lp(a) level with both the sum of scores on the SCORE scale and the CHD presence (r=0.25 and r=0.35, p=0.002), respectively.

Conclusions: The lipid metabolism disorders in people with determinism for AH begin early than blood pressure increasing and are genetically determined. The addition of hypertension contributes to the further progression of proatherogenic lipid metabolism disorders. The obtained data indicate the high prognostic significance of Lp(a) in patients with EAH in the development and establishment of both hypertension itself and CHD and increasing of patients' cardiovascular risk.

Keywords: Lipoprotein (a), Apolipoproteins, Arterial hypertension, Lipid Metabolism indicators, Genetic predisposition

MOP2-B-6

Associations of dietary intake with cardiovascular disease, blood pressure, and lipid profile in the Korean population: an updated systematic review and meta-analysis

Jeongseon Kim[1*], Madhawa Gunathilake[1], Tung Hoang[1,2]

[1]Department of Cancer AI & Digital Health, National Cancer Center Graduate School of Cancer Science and Policy, Republic of Korea, [2]Department of Economic, Social, and Administrative Pharmacy, University of Health Sciences, Vietnam

Objectives: Various foods and dietary patterns are closely associated with cardiovascular disease (CVD) risk. In this meta-analysis, we aimed to update the evidence on dietary intake in relation to CVD, blood pressure (BP), and lipid profile in a Korean population.

Methods: This updated meta-analysis included a total of 153 studies. A random-effects model was performed to obtain pooled odds ratios (ORs), hazard ratios (HRs), and 95% confidence intervals (CIs).

Results: An analysis of pooled effect sizes from at least 8 individual populations showed significant associations between fruit intake and elevated triglycerides (TG) (OR/HR, 0.82; 95% CI, 0.76-0.99), vegetable intake and elevated TG (OR/HR, 0.92; 95% CI, 0.87-0.97), milk/dairy intake and elevated BP (OR/HR, 0.89; 95% CI, 0.83-0.95), elevated TG (OR/HR, 0.82; 95% CI, 0.76-0.89), and low high-density lipoprotein cholesterol (HDL-C) (OR/HR, 0.82; 95% CI: 0.765-0.89), coffee intake and elevated TG (OR/HR, 0.84; 95% CI, 0.79-0.89), and CVD (OR/HR, 0.80; 95% CI, 0.67-0.95). Seven studies on carbohydrate intake showed a 21% higher risk for elevated TG. The Korean healthy eating index showed a significant association with elevated BP (OR/HR, 0.98; 95% CI, 0.97-0.98). A healthy dietary pattern was associated with a 10% reduced risk of elevated TG, while an unhealthy pattern showed a 16% higher risk of elevated total cholesterol.

Conclusions: Fruits, vegetables, milk/dairy, and coffee had protective effects against CVD and its markers, such as BP and lipid profile. High carbohydrate intake was associated with a high risk of elevated TG. Healthy and unhealthy dietary patterns had protective and harmful effects, respectively, on the lipid profile.

Keywords: Dietary, Cardiovascular disease, Hypertension, Dyslipidemia

MOP2-B-7

Utilizing machine learning algorithms to predict rapid plaque progression and coronary events in patients with familial hypercholesterolemia based on genetic polymorphisms

Roland Helmizar[1*], Dian Puspita[2]

[1]Internal Medicine, Faculty of Medicine Baiturrahmah University, Indonesia,
[2]Cardiovascular, Faculty of Medicine Baiturrahmah University, Indonesia

Objectives: Familial hypercholesterolemia (FH) is is a genetic disorder, marked by significantly elevated low-density lipoprotein cholesterol (LDL-C) levels, which greatly increase the risk of coronary artery disease (CAD). Patients with FH experience a higher frequency of coronary events due to rapid plaque progression. Traditional risk assessment models have limitations in predicting outcomes based on genetic factors. Integrating genetic polymorphisms and other biomarkers with machine learning (ML) offers a more accurate and reliable method for predicting these outcomes.
Methods: This systematic review investigated studies published between 2015 and 2024 that utilized machine learning (ML) algorithms to predict rapid plaque progression and coronary events in familial hypercholesterolemia (FH) patients. The search strategy included keywords such as "machine learning," "familial hypercholesterolemia," "genetic polymorphisms," and "coronary events," applied across databases such as PubMed, Google Scholar, EBSCo and MEDLINE. Studies using ML models with genomic data were required to meet inclusion criteria in order to guarantee comprehensive coverage of predictive methodologies.
Results: Six studies were included in the review. ML models, particularly those using random forests, support vector machines, and deep learning algorithms, demonstrated superior predictive performance compared to traditional risk models. Incorporating genetic polymorphisms, such as single nucleotide polymorphisms (SNPs), alongside clinical and imaging data, significantly enhanced the ability to identify FH patients at high risk for rapid plaque progression and coronary events.
Conclusions: Incorporating genetic polymorphisms into ML algorithms offers a promising approach to predicting rapid plaque progression and coronary events in familial hypercholesterolemia patients. These models enhance personalized risk assessment, enabling targeted preventive and therapeutic strategies. Future research should prioritize validating these models across diverse populations and exploring their integration into routine clinical care.
Keywords: Familial hypercholesterolemia, Familial hypercholesterolemia, Genetic polymorphisms, Rapid plaque progression, Coronary event

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024
The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 2-C

Sep 28(Sat) 13:30-14:30 | Mini-Oral C (Studio 7, 6F)

MODERATOR : Je Sang Kim (Bucheon Sejong Hospital, Republic of Korea)

MOP2-C-1

Exploring Indonesian phytochemicals as novel PPAR-γ activators for type II diabetes mellitus therapy: an In Silico Study

Dykall Naf'an Dzikri*, Patria Bayu Murdi, Okce Krisnawati, Afrinda Graharani Sandra, Veronica Bianca

Family Medicine, Puskesmas Tasikmadu, Indonesia

Objectives: Peroxisome proliferator-activated receptor γ (PPAR-γ) is highly expressed in adipose tissue, regulating adipogenesis, lipid metabolism, and insulin sensitivity. Activation of PPAR-γ improves insulin sensitivity and enhances glucose metabolism. It acts as a master regulator of adipogenesis, stimulating the production of small insulin-sensitive adipocytes. Therefore, this study aimed to identify Indonesian phytochemicals virtually as PPAR-γ for type II diabetes mellitus (DM) therapy.
Methods: In silico study using molecular docking between PPAR-γ (PDB: 2PRG), Rosiglitazone, and Indonesian phytochemicals. The phytochemicals were obtained from HerbalDB and met the criteria for Lipinski's rule for drug availability. Macromolecule preparation was done using AutoDock, while the molecular docking process used PyRx. Protein-ligand interaction was visualized using Pymol. The indicators for data analysis were binding energy score must lower than Rosiglitazone (-7,8 kcal/mol), root-mean-square deviation (RMSD) score $\leq$2 Å, and bound with PPAR-γ residues where Rosiglitazone bind, such as Ser289, His323, Tyr473, and Gln286.
Results: The docking results showed that Lumichrome, Cubebin, and 3-O-Methylcalopocarpin had better potential activity to activate PPAR-γ than Rosiglitazone. Lumichrome, Cubebin, and 3-O-Methylcalopocarpin had lower binding scores (-8.8$\pm$0.1, -8.6$\pm$0.1, and -8.1$\pm$0.1 kcal/mol, respectively) than the standard ligand. In addition, they bound to PPAR-γ at Ser289, His323, Tyr473, and Gln286 residues. Lumichrome is a derivative of riboflavin (vitamin B2) and can be found in a variety of plants. Cubebin is a compound found in the Piper cubeba plant, also known as Cubeb or Java pepper. This plant is native to Java and Sumatra in Indonesia. 3-O-Methylcalopocarpin is found in the Calophyllum species of plants. Calophyllum inophyllum, also known as Tamanu, Foraha, or Alexandrian laurel, is a tree found in the mangrove ecosystems of Indonesia.
Conclusions: New PPAR-γ Activators from Indonesian phytochemicals named Lumichrome, Cubebin, and 3-O-Methylcalopocarpin have been discovered as novel potential therapy for type II DM.
Keywords: PPAR-γ

MOP2-C-2

Genetic analysis of HMGCR variants reveals potential association with New Onset Statin-induced Diabetes Mellitus (NODM)

Putrya Hawa*

Pharmacology, Republic of Indonesia Defense University, Indonesia

Objectives: Statins widely prescribed for hypercholesterolemia therapy, but statin use increase risk of new-onset diabetes mellitus (NODM). The HMGCR gene encodes 3-hydroxy-3-methylglutaryl-CoA reductase, the rate-limiting enzyme that playing important role in cholesterol biosynthesis. This study investigates the potential association between HMGCR variants and NODM risk using in silico methods.
Methods: We identify deleterious mutations and classify functional single nucleotide polymorphisms (SNPs) in the HMGCR gene by using SIFT, PolyPhen, CADD, REVEL, Meta LR and Mutation asessor. We also use Prosite- ExPasy to determine mutation location in protein domain.
Results: We analyzed 10.125 variant alelles and identifying 739 alleles are exonic variant. Forteen alleles were predicted to be potentially deleterious and probably damaging. Analysis using Prosite- ExPasy detected mutations within the Proline-rich domain (Procar), sterol-sensing domain (SSD) and hydroxymethylglutaryl-coenzyme A reductase (HMG-Co-A) domain. One allele, rs1430662318, located in the Procar domain, could potentially affect the structural stability of the protein, which might influence the overall response to statins. Three alleles, rs538995429, rs757219169, and rs1760364727, were found within the SSD domain. The SSD domain is crucial for the regulatory function of HMG-CoA reductase. Variants in this domain may disrupt the enzyme's ability to respond to cellular cholesterol levels, leading to altered lipid metabolism. The remaining ten alleles were located within the HMG-CoA reductase domain, which is directly involved in the enzyme's catalytic activity. Variants in this domain are likely to have the most significant impact on the enzyme's function. This variability could influence the therapeutic efficacy and side effect profile of statins, including the risk of developing diabetes.
Conclusions: The presence of specific variants in the HMGCR gene, especially those located in critical functional domains such as the Procar, SSD, and especially HMG-CoA reductase domains, can increase the risk of new-onset diabetes induced by statin.
Keywords: Genetic variant, Statin, Diabetes

MOP2-C-3

Biochemical, cellular and In Silico characterization of the Exon13_15dup of LDLR associated to familial hypercholesterolemia

Andrea Sanchez[1*], Diego Abarzua[1], Catalina Martínez[1], Rodrigo Alonso[3], Andrea Cid[1], Carlos Felipe Burgos[2], Claudia Radojkovic[1]

[1]Pharmacy Faculty, University of Concepción, Chile, [2]Biological Science, University of Concepción, Chile, [3]Center for Advanced Metabolic Medicine and Nutrition, CAMMYN, Chile

Objectives: Familial Hypercholesterolemia (FH) is the most common hereditary disorder of lipid metabolism, mainly caused by mutations in the LDL receptor (LDLR) gene, which confers a high cardiovascular risk. The most frequent mutation identified in the Chilean population is the exon13_15dup of the LDLR Aim. To characterize biochemically, cellular, and structurally the exons 13-15dup variant in patients with FH.
Methods: A descriptive study. Exon13_15dup variant patients were recruited. A blood sample was collected to determine the lipid profile and perform cellular and molecular analysis. CD14+ mononuclear cells were purified and differentiated into macrophages with GM-CSF. LDLR expression levels were evaluated by flow cytometry. Immunocytochemistry performed the co-localization of LDLR with calreticulin, LAMP-1, and clathrin. Visualization and analysis were performed using confocal microscopy, ImageJ, and PRISM. RT-PCR evaluated the cDNA effect of Exon13_15dup with mutation-specific primers. The PCR products were analyzed by sequencing Sanger method. In silico structural analysis was carried out by constructing a model of the wild-type protein using MODELLER and UniProt templates. The QUARK software predicted the sequences that were not crystallized. The structural effect of the Exon13_15dup was analyzed through molecular dynamics and docking.
Results: Seven heterozygous index cases carrying exon13_15dup were recruited, presenting average LDL-C levels of 254±58 and 269±103 mg/dL in children and adults, respectively. The Exon13_15dup mutation increases LDLR expression levels at the macrophage membrane and presents a different cellular localization concerning control samples. PCR results show that the exon13_15dup mutation generates a frameshift and an early stop codon, altering the structure of the LDLR and LDL-LDLR complex internalization pathway but not the dissociation and affinity constants with ApoB or PSCK9.
Conclusions: The exon13_15dup variant of the LDLR generates an increase in the levels of total cholesterol and LDL-C, a product of a truncated protein without transmembrane and cytosolic domains, preventing the internalization of the LDLR-LDL complex. Fund: Fondecyt 11220497
Keywords: Familial hypercholesterolemia, Exon 13_15 duplication, Truncated protein, Molecular dinamics

MOP2-C-4

Ex-Vivo characterization of D47N mutation of LDLR associated to familial hypercholesterolemia

Catalina Martínez[1*], Carolina Alarcón[1], Claudia Radojkovic[1], Rodrigo Alonso[2], Paula Honorato[1], Paulina Bustos[1], Andrea Sánchez[1]

[1]Pharmacy Faculty, University of Concepción, Chile, [2]Center for Advanced Metabolic Medicine and Nutrition, CAMMYN, Chile

Objectives: Familial Hypercholesterolemia (FH) is an autosomal dominant genetic alteration associated with a high rate of morbidity and mortality due to early cardiovascular disease. The leading cause is related to mutations in the gene that codes for the LDL receptor (LDLR); one of the most frequent mutations in Chile is the D47N, classified as a variant of uncertain significance (VUS). To characterize the functional effect of D47N mutation of the LDLR associated with FH through ex vivo assays.
Methods: Descriptive study. Peripheral blood mononuclear cells were obtained from patients with D47N-LDLR mutation. CD14+ cells were purified and differentiated into macrophages with GM-CSF. LDLR expression levels were evaluated by flow cytometry and data processing with FlowJo. For cellular localization of LDLR, immunofluorescence was used with antibodies against LDLR and cellular structural marker proteins: calreticulin, LAMP-1, and clathrin. Visualization and analysis were performed using confocal and super-resolution microscopy. For LDL transport assays, macrophages were cultured in a standard growth medium with 10% delipidated serum for 4 hours and incubated with 20 µg/mL of LDL-FITC at different times. Visualization and analysis were performed using confocal microscopy and ImageJ.
Results: D47N mutation increases LDLR expression levels at the macrophage membrane (96.9 vs. 13.0; $p<0.0001$). Cellular localization of the D47N variant presented a significantly decreased colocalization with clathrin concerning control samples. For LDL transport assays, this mutation changes the uptake levels of LDL-FITC.
Conclusions: The presence of the D47N mutation determines high levels of LDLR expression and modifies the localization and function, suggesting that the D47N mutation can be a pathogenic variant of class 3. Funds: Fondecyt de Iniciación 11220497, VRID multidisciplinario N°2021000299MUL
Keywords: Familial hypercholesterolemia, LDLR mutation, Functional assay, Variant of uncertain significance

MOP2-C-5

Unveiling the potential mechanisms of alternanthera sessilis red against atherosclerosis: an in-depth exploration through network pharmacology and molecular docking analyses

Omilla Ragavan[1*], Muhammad Nazrul Hakim Abdullah[2], Lai Yen Fong[3], Yoke Keong Yong[1]

[1]Human Anatomy, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia,
[2]biomedical Science, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Malaysia,
[3]Pre-Clinical Sciences, Faculty of Medicine and Health Sciences, Universiti Tunku Abdul Rahman, Malaysia

Objectives: The red cultivar of Alternanthera sessilis (ASR), a medicinal weed traditionally consumed by asians, reduces risk of cardiovascular disease with established athero-protective effects from previous studies. However, the underlying mechanisms of ASR against atherosclerosis remain unknown. This investigation aims to discover the potential mechanisms of ASR in preventing atherosclerosis using network pharmacology and molecular docking.
Methods: Phytochemicals of ASR were collected via literature search. Selection based on their pharmacokinetic properties aligned with Traditional Chinese Medicine System Pharmacology (TCMSP) database's criteria of oral bioavailability ≥30% and drug-likeness ≥0.18. Then, potential targets of ASR bioactive compounds were sourced from SwissTargetPrediction and DrugBank databases; atherosclerosis targets from OMIM, DisGeNet, and GeneCards databases. A venn diagram demonstrated overlapping genes. STRING database and Cytoscape software were used to construct protein-protein interaction (PPI) and compound-target networks respectively. Hub genes were retrieved based on three topological parameters: Degree, Betweenness, and Closeness. DAVID bioinformatics tool was employed for Gene Ontology (GO) and Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway enrichment analyses. Molecular docking validated binding affinities between bioactive compounds and the hub genes.
Results: Among 179 compounds identified from ASR, only 4 (Dehydrodieugenol, Luteolin, Quercetin and Xanthosine) emerged as key bioactive compounds meeting the criteria. PPI network between ASR and atherosclerosis targets revealed 192 overlapping genes, from which 4 hub genes were discovered namely AKT1, HSP90AA1, SRC and ESR1. These targets were associated with positive regulation of MAPK cascade according to GO analysis. KEGG pathway analysis showed that lipid and atherosclerosis were among the top 10 significantly enriched pathways in the list preceded by the PI3K-Akt signaling pathway. Besides, the molecular docking results displayed Dehydrodieugenol-ESR1 complex with the highest binding affinity at -8.56 kcal/mol.
Conclusions: Experimental validation in vitro and in vivo is necessary to confirm these computational findings although potential molecular pathways of ASR against atherosclerosis were uncovered.
Keywords: Alternanthera sessilis red, Medicinal weed, Atherosclerosis, Molecular docking, Network pharmacology

MOP2-C-6

Aberrant activation of miR10b-5p contributes to the pathogenesis of Kawasaki vasculitis

Gwang Hyeon Eom[1*], Sunyoung Park[1], Somy Yoon[2]

[1]Department of Pharmacology, Chonnam National University Medical School, Republic of Korea,
[2]College of Pharmacy, Chonnam National University, Republic of Korea

Objectives: Kawasaki disease is a systemic disorder of enigmatic origin, potentially resulting from an aberrant immune response triggered by infectious agents. This condition significantly risks developing vasculitis, particularly in the coronary arteries, which may lead to aneurysm formation, a severe complication. The study aimed to investigate the mechanisms underpinning Kawasaki vasculitis to identify potential therapeutic targets.
Methods: A thorough investigation was conducted on patients presented at emergency departments. Whole RNA sequencing analyzed samples from individuals with general infectious diseases as controls and those diagnosed with Kawasaki disease as the experimental group. To validate findings, the Lactobacillus casei cell wall extract (LCWE)-induced vasculitis animal model, an analog for human Kawasaki vasculitis, was employed. Single-cell RNA sequencing was performed to uncover the direct downstream targets of miR-10b-5p in human coronary artery endothelial cells (HCAECs). Further whole RNA sequencing on HCAECs treated with miR-10b-5p and siRNA-mediated knockdown experiments were conducted.
Results: Whole RNA sequencing identified 13 microRNAs (miRNAs) with increased levels in Kawasaki disease patients. Among them, miR-10b-5p was identified as a critical regulator; its inhibition via antagomirs markedly reduced inflammation near the aortic valve in the LCWE-induced model. Single-cell RNA sequencing revealed alterations in HCAECs upon miR-10b-5p treatment, with a shift from a proliferative subpopulation to a pro-inflammatory cluster marked by decreased expression of the proliferation marker Ki-67 (MKI67). Further sequencing confirmed significant downregulation of MKI67 in miR-10b-5p treated HCAECs. siRNA-mediated knockdown of MKI67 led to increased expression of CXCL8, a key cytokine in inflammation.
Conclusions: The findings suggest a novel signaling pathway involving miR-10b-5p, MKI67, and CXCL8, highlighting miR-10b-5p as a potential therapeutic target for managing Kawasaki vasculitis. This pathway may provide new avenues for future interventions aimed at mitigating the severe complications associated with this disease.
Keywords: Kawasaki disease

ICoLA 2024
The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 2-D

Sep 28(Sat) 13:30-14:30 | Mini-Oral D (Studio 8, 6F)

MODERATOR : Soo Lim (Seoul National University, Republic of Korea)

MOP2-D-1

Increased splenic metabolic activity was associated with cardiovascular event and all-cause death after surgery among lung cancer patients

Jiyeon Ha[1*], Wookjin Yang[1], Eung-Joon Lee[1], Han-Yeong Jeong[1], Matthew Chung[1], Boyeon Yang[1], Hyemin Jang[1], Keun-Hwa Jung[1], Seung-Hoon Lee[1], Jin Chul Paeng[2], Jeong-Min Kim[1]

[1]Department of Neurology, Seoul National University Hospital, Republic of Korea,
[2]Department of Nuclear Medicine, Seoul National University Hospital, Republic of Korea

Objectives: The association between the metabolic activity of hematopoietic organs and future cardiovascular disease (CVD) has been suggested through several studies. We aimed to investigate the association between the metabolic activity in hematopoietic organs and CVD risk in patients with malignancy.

Methods: This single center retrospective cohort study included 132 patients with non-metastatic lung cancer who underwent surgery in 2019. The metabolic activities of hematopoietic organs were analyzed from the 18F-fluorodeoxyglucose positron emission tomography taken before surgery. We compared clinical and imaging characteristics between those with or without CVD or all-cause death. Correlation analysis and multiple linear regression were conducted to examine associations between the metabolic activity of hematopoietic organs and World Health Organization (WHO)-CVD risk scores. Kaplan-Meier survival curve analysis compared event free survival according to the metabolic activity of hematopoietic organs.

Results: Patients with CVD events had higher cancer stages, lower hs-CRP levels. Linear regression model indicated that higher splenic activity (β=6.33, p<0.001) and lower vertebral activity (β=-4.08, p<0.001) were associated with WHO-CVD risk scores. Kaplan-Meier survival curve analysis showed that the patient group with higher splenic metabolic activity had shorter event free survival than those with lower splenic metabolic activity (log-rank test, p=0.042).

Conclusions: Increased splenic metabolic activity in lung cancer patients may be associated with future cardiovascular events after surgery. events. Further studies are needed to explore the associations between metabolic activity in hematopoietic organs and future cardiovascular risk in the context of malignancy.

Keywords: Metabolic activity, Spleen, Hematopoiesis, Cancer

MOP2-D-2

Incident and risk factors associated with perioperative respiratory complication in obese patients undergoing anesthesia: result from a secondary care hospital in Thailand

Pakawan Kanjanan*, Piyanan Pinidsatira

Department of Anesthesiology, Songkhla Hospital, Thailand

Objectives: Obesity was a major public health problem worldwide. Airway and respiratory complications in obese patients was a major concern during surgical operation. This study aimed to determine the incidence of perioperative respiratory complication related risk factors for patients with obesity who have undergone general anesthesia.

Methods: This study analyzed the secondary data of a secondary care hospital in the South of Thailand. We included patients 18 years and older who have undergone general anesthesia during October 2023 to May 2024, pregnancy was excluded. Obesity was categorized in accordance with the Asia-Pacific classification, defined as a body mass index (BMI)>25 kg/m^2. Respiratory complication (bronchospasm, difficult intubation, esophageal intubation, desaturation and reintubation) detected during anesthesia. Data were analyzed by using descriptive statistics and Chi- square.

Results: There were 1,693 obese patients enrolled, 1,118 (66%) females, mean age was 51.58±16.94 years. The overall incidence of respiratory complications was observed in 22 (1.3%) patients. The most common complications were bronchospasm (0.9%) followed by desaturation (0.2%), difficult intubation and esophageal intubation 0.1% for each complication. The factors significantly associated with respiratory complication related events were chronic lung disease (OR 13.83, 95%Cl 2.90-65.83, p<0.001), congestive heart failure (OR 6.09, 95%CI 1.36-27.37, p=0.007), renal disease (OR 4.10, 95%Cl 1.58-10.65, p=0.002), and emergency surgery (OR2.43, 95%Cl 1.05-5.67, p<0.033).

Conclusions: The study shows incidence of perioperative respiratory complications and factors associated with respiratory complication in obese patients undergoing anesthesia were chronic lung disease, congestive heart failure and renal disease. Thus, preoperative evaluation and preparation are essential that have the least effect on the respiratory system.

Keywords: Perioperative respiratory complication

MOP2-D-3

Global trends in clinical trials of NASH treatment

Jung Kim*

College of Medicine, Yonsei University, Republic of Korea

Objectives: Nonalcoholic Steatohepatitis (NASH) is a liver disorder characterized by inflammation and damage caused by the accumulation of fat. The absence of approved therapies underscores the importance of clinical trials in advancing NASH treatment. Emerging therapeutic candidates, combination approaches, and non-invasive assessment techniques have been pivotal in this field.
Methods: Global clinical trials for NASH treatment have explored a diverse range of drug candidates, targeting inflammation, fibrosis, and metabolic pathways. These trials often employed placebo-controlled designs due to the absence of approved treatments, with an emphasis on enrolling demographically representative patient cohorts. Long-term safety and efficacy data were gathered to assess treatment durability. Researchers strived to identify reliable biomarkers for diagnosing and monitoring NASH progression. Additionally, advanced imaging techniques like MRI and elastography were explored for their potential to assess liver fibrosis and inflammation, thus reducing the need for invasive biopsies.
Results: Clinical trials have yielded promising insights into NASH treatment. Emerging therapies have shown potential to ameliorate inflammation, fibrosis, and metabolic dysfunction associated with NASH. The exploration of combination therapies indicates recognition of the disease's multifaceted nature. Efforts to establish accurate biomarkers have progressed, aiding patient selection for trials and treatment monitoring. Advanced imaging techniques have exhibited promise in non-invasively assessing liver health, potentially transforming the diagnostic landscape.
Conclusions: Clinical trials in NASH treatment have made significant strides in advancing therapeutic options for this complex liver disorder. Emerging drug candidates and combination therapies provide hope for addressing the intricate mechanisms underlying NASH. Biomarker research and advanced imaging techniques contribute to refining diagnostic and monitoring approaches, potentially enhancing patient care. While these trends were observed retrospectively, ongoing research and developments are likely shaping the field further. As the landscape of NASH treatment continues to evolve, collaboration between researchers, regulatory agencies, and pharmaceutical companies remains critical in the quest to effectively manage and treat NASH.
Keywords: NASH, Liver disease, Steatohepatitis

MOP2-D-4

Current status and clinical characteristics of familial hypercholesterolemia patients in Korea: a two-center, real world experience

Kyung An Kim[1,2*], Moon-kyung Jung[1], Dongwoo Kim[3], Joonseok Kim[3], Jong-Chan Youn[1]

[1]Division of Cardiology, Department of Internal Medicine, Seoul St. Mary's Hospital, The Catholic University of Korea, Republic of Korea, [2]Division of Cardiology, Department of Internal Medicine, Incheon St. Mary's Hospital, The Catholic University of Korea, Republic of Korea, [3]College of Medicine, The Catholic University of Korea, Republic of Korea

Objectives: Early diagnosis and initiation of lipid-lowering treatment is key to lowering cardiovascular risk in familial hypercholesterolemia (FH), but FH is frequently underdiagnosed. We aimed to investigate the current status of FH diagnosis and treatment in two large tertiary hospitals in Korea.
Methods: Patients with either a diagnosis of FH (ICD-10 code: E7800) or had undergone testing for LDLR, APOB, or PCSK9 mutations were considered for inclusion. A total of 130 patients were retrospectively identified, and their demographic and laboratory characteristics as well as pharmacologic treatment patterns were analyzed.
Results: The mean age at diagnosis was 48.3 years, and 33 (25.4%) patients had a history of percutaneous coronary intervention or ischemic stroke. Dyslipidemia (40.0%) and coronary artery disease related symptoms (30.8%) were the most common reasons for initial visit. The majority of patients received their first diagnosis at the cardiology department (58.5%), followed by endocrinology (23.1%) and pediatrics (6.9%). The initial low-density lipoprotein cholesterol (LDL-C) level was 175.1±73.8 mg/dL (conversion to treatment-naïve LDL-C: 303.2±150.8 mg/dL), which decreased to 106.7±49.0mg/dL after one year. Pathogenic mutations in the LDLR gene were found in 24 patients, and these patients had significantly higher treatment naïve LDL-C levels (p=0.02) and lower platelet count (p=0.01). A high proportion of patients were treated with statins (88.1%) and ezetimibe (51.5%), but the use of PCSK9 inhibitors was low (4.6%). Two ischemic strokes and two myocardial infarctions occurred during a mean follow-up duration of 19.1 months.
Conclusions: FH is frequently diagnosed late after the cumulative effect of hypercholesterolemia become evident. Although there remains room for improvement, current lipid-lowering therapy is effective in both lipid-lowering and cardiovascular event reduction, which again underlines the need for proper screening and identification of patients with FH.
Keywords: Familial hypercholesterolemia

MOP2-D-5

Changes in metabolic components before and after the COVID-19 pandemic: analysis of general health check-up data

Jung-sun Lim*, Sujeong Han, Bumjo Oh

Family Medicine, SMG-SNU Boramae Medical Center, Republic of Korea

Objectives: Coronavirus disease 2019 (COVID-19) and the resulting quarantine have changed the daily rhythms and behaviors of residents. This study investigated the effects of the COVID-19 pandemic on metabolic syndrome (MetS) and its components in general populations in Korea.
Methods: Among the 23,873 people who received a health checkup at the Affiliated Hospital in Seoul before 2020, 1,008 people who revisited the same medical institution after May 2023, when the WHO emergency related to COVID-19 was lifted, were analyzed. We collected data on participant age and sex and measured the component indices of metabolic syndrome, including waist circumference, blood pressure (systolic and diastolic), fasting blood glucose level, and blood lipid (triglyceride and high-density lipoprotein cholesterol) level, as well as chronic disease medication use before and after the coronavirus pandemic. We applied t-, chi-square, Mann-Whitney U, and McNemar test to compare metabolic variables at different times.
Results: Among the total subjects, there were 431 women and 577 men, and the proportion of people under 50 years old was 27.4% for women and 14.0% for men. When comparing changes before and after the COVID-19 epidemic, waist circumference increased by an average of 3.278 cm, diastolic blood pressure increased by an average of 4.443 mmHg, glycated hemoglobin (HbA1c), which reflects blood sugar, decreased by an average of 0.139%, and HDL cholesterol decreased by 3.529 mg/dL. It was confirmed that this was statistically significant. Meanwhile, compared to before and after the COVID-19 epidemic, a statistically significant increase in the proportion of patients taking medication for hypertension, diabetes, and hyperlipidemia was confirmed.
Conclusions: Coronavirus disease 2019 (COVID-19) is no longer a Public Health Emergency of International Concern, but COVD-19 lockdown have increased metabolic health risks among Korean adults. Targeted measures, such as health education, are urgently needed to address poor metabolic health caused by the COVID-19 pandemic.
Keywords: COVID-19, Metabolic syndrome, Metabolic components, Cardiovascular disease risk

MOP2-D-6

Sex differences in all-causes and cause-specific mortality according to body types among Koreans using the Korean Genome and Epidemiology Study (KoGES)

Jiae Shin[1*], Jaca Maison Lailo[1], Sang-Ah Lee[2]

[1]Interdisciplinary Graduate Program in Medical Bigdata Convergence, Kangwon National University, Republic of Korea,
[2]Department of Preventive Medicine, Kangwon National University School of Medicine, Republic of Korea

Objectives: Anthropometric measures are interconnected risk factors for diseases and mortality. This study aims to elucidate sex differences in the association between body shape phenotype using anthropometric measures and all-cause and cause-specific mortality.
Methods: The 112,813 participants in this study were from the Health Examinees (HEXA) cohort of the Korean Genome and Epidemiology Study (KoGES). Anthropometric measures such as height, weight, body mass index (BMI), hip, and waist circumference, and waist-hip-ratio (WHR) were used to define body shapes through principal components (PCs) analysis. Multivariable Cox proportional hazard regression was used for the risk of all-cause, cancer, and cardiovascular disease (CVD) mortality according to the PC scores.
Results: Four PCs were identified, explaining 99.89% of the variation in the dataset. PC1, representing overall adiposity, showed a reduced risk for all-cause mortality in men (hazard ratio [HR]=0.92, 95% confidence intervals [CI] 0.88-0.96) but not in women (HR=1.00, 95% CI 0.94-1.05). PC2, indicating tall stature with lower BMI, was associated with reduced risk of all-cause and CVD mortality for both sexes (men HR=0.94, 0.90-0.98, HR=0.88, 0.78-0.98, women HR=0.94, 0.87-0.99, HR=0.83, 0.72-0.95). PC3, reflecting low BMI but larger WHR, showed an increased risk of all-cause mortality for both men and women (HR=1.09, 1.05-1.14; HR=1.07, 1.02-1.13, respectively). However, only men in PC3 increased the risk of cancer mortality significantly (HR=1.08, 1.02-1.16; women, HR=1.06, 0.99-1.14). PC4, representing shorter stature with larger hips and waist, was associated with increased risk of all-cause and CVD mortality in men (HR=1.07, 1.03-1.12; HR=1.15, 1.03-1.29).
Conclusions: Each body shape phenotype was differently associated with all-cause or cause-specific mortality among Korean adults. Men showed more significant associations between body shape phenotypes and mortality than women. The differently observed associations can suggest manageable interventions at the population level to reduce mortality risk in the Korean population.
Keywords: Mortality

MOP2-D-7

A novel self nano emulsifying formulation of hydrochlorothiazide enhanced its diuretic and natriuretic efficacy

Pankajkumar Yadav*

Pharmaceutical Sciences, SHUATS, India

Objectives: Hydrochlorothiazide (HYD) is commonly used as a diuretic along with cardiovascular medications to treat hypertension. However, its oral bioavailability may be affected due to its low solubility and permeability. Therefore, this study was designed to develop an optimized formulation of self nano emulsifying drug delivery system (SNEDDS) for improvement of solubility, permeability, and ultimately the bioavailability of HYD.

Methods: Solubility of HYD was examined in different combinations of oils, surfactants, and co-surfactants. Using pseudoternary phase diagram studies, several formulations of HYD SNEDDS were prepared. The prepared SNEDDS were assessed through in vitro dissolution studies, viscosity determination, measurement of globule size, zeta potential analysis, emulsification time studies, and in vivo pharmacodynamic profiling.

Results: Developed SNEDDS exhibited a significantly higher dissolution efficacy of HYD as compared to plain drug as well as marketed formulation. Average droplet size of optimized formulation was obtained to be 42.84 nm. Pharmacodynamic study of optimized formulation in Wistar rats exhibited a remarkable increase in pharmacological efficacy of HYD when orally administered as a SNEDDS formulation compared to plain HYD.

Conclusions: The current study highlights the potential of SNEDDS as an effective alternative to enhance the efficacy of HYD, providing improved solubility, permeability, and ultimately, bioavailability.

Keywords: Hypertension

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 2-E

Sep 28(Sat) 13:30-14:30 | Mini-Oral E (Studio 9, 6F)

MODERATOR : Se Eun Park (Sungkyunkwan University, Republic of Korea)

MOP2-E-1

Soluble ST-2 association with intima-media thickness in patients with acute myocardial infarction

Borys Shelest[1*], Yuliia Kovalova[2], Oleksiy Shelest[2], Julia Rodionova[3]

[1]Internal and Occupational Diseases, Kharkiv National Medical University, Ukraine, [2]Department of Internal Medicine No. 2, Clinical Immunology and Allergology Named after Academician L.T. Malaya, Kharkiv National Medical University, Ukraine, [3]Department of Prevention and Treatment of Emergency Conditions, L.T. Malaya Therapy National Institute of the National Academy of Medical Sciences of Ukraine, Ukraine

Objectives: The aim of this study was to investigate the influence of soluble ST-2 (SST-2) on vascular remodeling in patients with ST-elevation myocardial infarction (STEMI) following revascularization.

Methods: A total of 179 patients with STEMI were included in the study, comprising 90 males (50.3%) with an average age of 53.71±9.43 years. The patients were divided into two groups: the first group consisted of 93 patients (51.95%) with developed vascular wall changes, while the second group included 86 patients (48.05%) without vascular wall thickening. Carotid intima-media remodeling was defined as an intima-media thickness over 0.9 mm or the presence of a plaque after six months of observation. Blood samples collected at 12-hours hospital admission were analyzed for SST2 concentrations using an enzyme-linked immunosorbent assay (ELISA).

Results: The median SST-2 level in all patients was 53.11 [39.72-128.35] ng/ml. In the first group, the SST-2 level was 83.09 [56.73-127.93] ng/ml, whereas in the second group, it was 51.23 [40.58-69.32] ng/ml (p=0.041). Logistic regression analysis revealed that higher SST-2 expression was associated with an increased likelihood of carotid arterial wall changes (adjusted odds ratio (OR): 1.49; 95% confidence interval (CI): 1.23-1.93; p<0.001). ROC analysis indicated that an SST-2 level with a cut-off value of 79.15 ng/ml could be considered a predictor of vascular intima-media remodeling, with an AUC of 0.73 (p=0.037), a sensitivity of 79.11%, and a specificity of 63.9%.

Conclusions: The SST-2 level at the time of admission in patients with STEMI can be considered a predictor of carotid intima-media remodeling over a six-month period.

Keywords: Soluble ST2, Myocardial infarction

MOP2-E-2

Comparative assessment of hsCRP and apolipoprotein B as ASCVD risk biomarkers

Saheed Amusat*

Chemical Pathology Department, The Directorate of Laboratory Medicine, Beaumont Hospital, Republic of Ireland, Ireland

Objectives: This study aims to investigate the diagnostic performance and routine screening cut-off of hsCRP for early atherosclerotic cardiovascular disease (ASCVD) risk in adult patients, comparing it with Apo B.

Methods: A sample of 494 individuals from the NHANES 2015-2016 laboratory dataset, with a mean age greater than 17 years, was used for this study. ASCVD risk was measured by non-HDL-C, categorized into low and high risk based on the Mayo Clinic reference range. Predictors included apo B, and hs-CRP. Binomial logistic regression and ROC curve analyses were conducted using the generalised linear models and pROC packages in RStudio IDE. Hypotheses were validated at p≤0.05, and diagnostic performance metrics such as ROC AUC, sensitivity, and specificity were measured on a scale of 0-1.

Results: The findings revealed that for every 1g/L increase in apo B concentration, the odds of high ASCVD risk were approximately 3.8 ×1011 times higher. Additionally, the model indicated that the odds of high ASCVD risk were 1.03 times higher for every 1mg/L increase in hsCRP concentration. However, this indicates that hsCRP level was not associated with odds of ASCVD risk. The ROC AUC for apo B and hsCRP were approximately 0.9739 and 0.6165, respectively, with cut-off values (sensitivity, specificity) of approximately 0.9g/L (0.927, 0.897) and 2.4 mg/L (0.596, 0.601), respectively. Thus, levels above these thresholds for both apo B and hsCRP are associated with high ASCVD risk.

Conclusions: The study demonstrates that apo B exhibits high discriminatory and diagnostic accuracy, making it a suitable ASCVD risk biomarker compared to hsCRP. While hsCRP shows moderate diagnostic accuracy, it is not sufficient as a standalone ASCVD risk diagnostic marker. Therefore, apo B could serve as a replacement for LDL-C, while hsCRP could possibly serve as an add-on test in ASCVD risk assessment.

Keywords: Apolipoprotein, Atherosclerosis, C-reactive protein, Cholesterol

MOP2-E-3

Spontaneous femoral pseudoaneurysm in a 64-year-old patient with chronic kidney disease: a case report

Monica Claudine D. Reas[1*], Shena Jo A. Capucion-Quebec[3], Frederic Joseph P. Asanza[4], Deaver P. Merin[4], Sherrywin A. Simon-Lim[2]

[1]Eastern Visayas, Philippine College of Physician, Philippines, [2]Eastern Visayas, Philippine Society of Vascular Medicine, Philippines, [3]Eastern Visayas, Philippine Society of Nephrology, Philippines, [4]Eastern Visayas, Philippine Society for Vascular and Endovascular Surgeons, Inc, Philippines

Background: Femoral artery pseudoaneurysm is a rare occurrence and a common complication of endovascular procedures or blunt trauma. The incidence of femoral artery pseudoaneurysms has been reported to vary between 0.5% and 9% in various studies. Complications associated with femoral artery pseudoaneurysms may include rupture, infection, embolism, and compression of adjacent structures. Compression of surrounding tissues from pseudoaneurysms can give rise to local manifestations, potentially resulting in neuropathy, ischemia, and venous complications.
Case: We report the case of a 64-year-old male with Chronic Kidney Disease, and Type 2 Diabetes Mellitus who exhibited left lower extremity swelling due to compression of the femoral vein from a femoral artery pseudoaneurysm. There were no history of endovascular procedure nor trauma. Duplex ultrasonography revealed a large pseudoaneurysm in the left common femoral artery with compression of the femoral vein, showing rheologic venous stasis and interstitial edema. The pseudoaneurysm was successfully treated with open surgical repair, leading to complete resolution of symptoms
Conclusions: Patients with Chronic kidney disease have an increased atherosclerotic burden. In the present case, the formation of a spontaneous femoral artery pseudoaneurysm was attributed to atherosclerosis. This highlights the importance of early diagnosis and intervention to prevent adverse outcomes in this seemingly insidious condition.
Keywords: Pseudoaneurysm, Common femoral artery, Atherosclerosis, Chronic kidney disease

MOP2-E-4

A comparative study to evaluate the role of apolipoprotein B vs low density lipoprotein C in predicting the risk of atherosclerotic cardiovascular disease in obese patients at a tertiary care hospital in India

Aashal Bhavesh Shah*

Pharmacology, GMERS Medical College, Valsad, Gujarat, India

Objectives: Apolipoprotein B (ApoB) is a structural component of all lipoproteins. It is increasingly being recognised as a biomarker for Atherosclerotic Cardiovascular Disease (ASCVD). Low Density Lipoprotein C (LDL-C) is the standard biomarker for ASCVD. Thus, this study was conducted to compare the diagnostic accuracy of the two in ASCVD among Obese patients.
Methods: A prospective study was conducted at a tertiary care hospital in India for a duration of three years. Demographic details of the patients were collected along with risk factor data for ASCVD and previous history of any CVD. Overweight and obese patients with body mass index >25.0 were included in the study. The patients were randomised to group A in which standard lipid profile including LDL-C was measured and group B in which ApoB was also measured in addition to the standard LDL-C. In all patients presence of carotid atherosclerotic plaques was assessed using carotid ultrasound bilaterally. Student t test, Mann-Whitney U test and ANOVA were used to compare data between groups. Univariate regression analysis was used to assess different associations. $P<0.05$ was considered significant.
Results: A total of 467 patients were included in the study. The average age of the participants was 56.38 ± 6.92 years. 61.67% participants were male. The levels of ApoB significantly positively correlated with serum triglycerides, LDL-C, serum cholesterol and carotid atherosclerotic plaques ($P<0.001$). LDL-C levels also positively correlated with atherosclerotic plaques ($P<0.001$). There was a significant difference between the diagnostic accuracy of ApoB and LDL-C in diagnosing early atherosclerotic changes ($P<0.05$). Higher level of ApoB was more frequently associated with plaque changes as compared to lower ApoB levels ($P<0.05$)
Conclusions: ApoB serves as a sensitive biomarker for atherosclerotic changes. Large cohort studies must be planned with various patient groups to optimise the use of ApoB as a biomarker for ASCVD.
Keywords: Atherosclerosis, ApoB

MOP2-E-5

The accuracy of coronary artery plaque detection in CT angiography images by using machine learning: a meta-analysis

Mochamad Afifudin*, Achmad Alvin Noor Mochtar, Ridhwanah Nadhiratuz Zahrah

Clinical Medicine, Islamic University of Indonesia, Indonesia

Objectives: Coronary Heart Disease (CHD) is a life-threatening disease mainly caused by blockage or narrowing of the coronary artery. The detection of CHD in asymptomatic patients might be done by performing Computed Tomography Angiography (CTA). However, CTA images have different intensity values for calcified, non-calcified, and mixed plaque. The development of machine learning applications in the health sector could increase the accuracy of interpretation of CTA images regarding the presence of plaque and its type. This study aimed to analyze the accuracy of machine learning in coronary artery plaque detection based on CTA images.

Methods: Literature search performed by [illegible] including PubMed and Science Direct for between 2016-2024. The articles were predicted [illegible] using CTA images and machine learning to detect and classify the type of coronary artery plaque (Calcified, non-calcified, and mixed plaque). Quality assessment was done for included studies by using PROBAST. The pooled results that synthesized were log positive likelihood ratio, log negative likelihood ratio, sensitivity, and specificity. The meta-analysis was performed by using R Studio and the data were analysed by DerSimonian-Laird method.

Results: There are six final inclusion studies with total 20780 slides of CTA images. Support vector machine is the most common used algorithm following by random forest and convolutional neural network. The meta-analysis showed that pooled sensitivity was 0.886 (95% CI 0.806-0.936; p<0.01; I2=99%), specificity was 0.877 (95% CI 0.807-0.923; p<0.01; I2=99%), negative likelihood ratio was 0.133 (95% CI 0.073-0.242; p=0.349; I2=10.3%), and positive likelihood ratio was 7.022 (95% CI 3.994-12.347; p=0.536; I2=0%).

Conclusions: The machine learning has high sensitivity and specificity to detect and classify coronary artery plaque in CTA images and its higher than unexperienced radiologist, experienced (>2 years) radiologist, and interventional cardiologist.

Keywords: Coronary artery plaque, CTA

Withdrawn

MOP2-E-6

Long-term efficacy and clinical outcomes of paclitaxel-eluting balloons vs uncoated balloon for coronary in-stent restenosis

Ulil Albab Habibah*, Ninda Devita

Internal Medicine, Islamic University of Indonesia, Indonesia

Objectives: Coronary in-stent restenosis is a significant complication following percutaneous coronary intervention (PCI). Paclitaxel-eluting balloons (PEBs) have emerged as a potential treatment option for in-stent restenosis. The aim of this study is to systematically evaluate and compare the long-term efficacy and safety of paclitaxel-eluting balloons (PEBs) versus uncoated balloons (UBs) for the treatment of coronary in-stent restenosis following percutaneous coronary intervention (PCI).

Methods: A systematic review was conducted to evaluate the long-term efficacy and clinical outcomes of PEBs versus UBs for coronary in-stent restenosis. Randomized clinical trials (RCTs) published up to January 2024 were systematically searched across major databases, including PubMed, Embase, and Cohrane. The primary outcome was target lesion revascularization (TLR) at long-term follow-up. Secondary outcomes included major adverse cardiac events (MACE), all-cause mortality, myocardial infarction, and stent thrombosis.

Results: A total of 40 studies published between 2000 and 2024 were identified, of which 34 were excluded based on eligibility criteria. Six RCTs met the inclusion criteria and were included in the analysis, comprising a total of 610 patients (PEBs: n=272; UBs: n=338). PEBs demonstrated superior efficacy compared to UBs in reducing TLR rates at long-term follow-up (12 months). However, concerns were raised regarding safety outcomes such as MACE, mortality, and stent thrombosis. Subgroup analyses based on late lumen loss were performed to explore potential sources of heterogeneity.

Conclusions: This systematic review suggests that PEBs are associated with improved long-term efficacy in reducing TLR rates compared to UBs for coronary in-stent restenosis. Further studies are warranted to comprehensively evaluate the safety profile and long-term outcomes associated with PEBs in this specific patient population.

Keywords: Coronary in-stent restenosis, Paclitaxel-eluting balloon

MOP2-E-7

Cardiovascular benefit of Evolocumab in 27,564 patients with and without autoimmune or inflammatory diseases: an analysis of the FOURIER trial

Ana Laura Kunzler[2*], Xinhui Ran[1], Sabina Murphy[1], Huei Wang[3], Narimon Honarpour[3], Marc Steven Sabatine[1], Robert P. Giugliano[1], Andre Zimerman[1]

[1]TIMI Study Group, Brigham and Women's Hospital, Harvard Medical School, United States, [2]Internal Medicine, Beth Israel Deaconess Medical Center, Harvard Medical School, United States, [3]AMGEN, United States

Objectives: Patients with autoimmune or inflammatory diseases (AIID) have higher cardiovascular risk due to systemic inflammation. In FOURIER, the PCSK9 inhibitor evolocumab reduced LDL-C and the risk of cardiovascular events, but had no effect on C-reactive protein, vs. placebo in patients with atherosclerotic cardiovascular disease on statins.

Methods: We compared evolocumab vs. placebo in FOURIER patients with or without AIID, ie, any autoimmune or chronic inflammatory condition. The primary endpoint was cardiovascular death, myocardial infarction, stroke, unstable angina, or coronary revascularization; the key secondary endpoint was cardiovascular death, myocardial infarction, or stroke. Cox models, adjusted for screening LDL-C and region, were used.

Results: Of 27,564 patients (mean 63 years; 75% male), 889 (3.2%) had an AIID. The most common diseases were rheumatoid arthritis (34%) and psoriasis (16%). Baseline LDL-C (mean 97 vs. 98 mg/dL) and reduction with evolocumab (62% vs. 61%) were similar in patients with vs. without an AIID. Baseline hsCRP was higher in AIID vs. non-AIID patients (mean 3.9 vs. 3.4 mg/L) and unaffected by evolocumab. Evolocumab reduced the primary endpoint in patients with (HR 0.58, 95% CI 0.38-0.89) and without (HR 0.86, 95% CI 0.80-0.93) AIID, with a trend toward more reduction in AIID patients (P for interaction=0.066) (Figure). The key secondary endpoint of cardiovascular death, myocardial infarction, or stroke was reduced to greater degree with evolocumab in patients with (HR 0.42, 95% CI 0.24-0.74) vs. without AIID (HR 0.81, 95% CI 0.74-0.89) (P for interaction=0.022). Evolocumab particularly lowered the risk of myocardial infarction (68% relative reduction) and coronary revascularization (64% relative reduction).

Conclusions: Despite similar effect on LDL-C, evolocumab led to potentially greater clinical benefit in patients with autoimmune or inflammatory diseases.

Keywords: Inflammation, Evolocumab, Autoimmune diseases, Lipid lowering therapy

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024
The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 2-F

Sep 28(Sat) 13:30-14:30 | Mini-Oral F (Studio 10, 6F)

MODERATOR : Jun Hwa Hong (Eulji University, Republic of Korea)

MOP2-F-1

Malaysian Tualang Honey (MTH) inhibits cell migration and oxidative stress in Vascular Smooth Muscle Cells (VSMC)

Ain Nabila Syahira Binti Shamsol Azman*, Yong Yoke Keong

Human Anatomy, Faculty of Medicine and Health Sciences Universiti Putra Malaysia, Malaysia

Objectives: Vascular smooth muscle cell (VSMC) migration is a pivotal factor in atherosclerosis, with platelet-derived growth factor (PDGF) promoting this process by transitioning VSMCs from a mature, quiescent state to a migratory phenotype. Additionally, the disrupted balance between reactive oxygen species (ROS) and antioxidants induces oxidative stress, leading to cellular damage and inflammation in atherosclerosis. Studies have indicated that PDGF elevates ROS concentration, further enhancing VSMC migration and influencing atherosclerosis pathogenesis. Noteworthy, Malaysian Tualang Honey (MTH) has displayed potential in shielding vascular endothelial cells from inflammation in prior research. However, the effects of MTH on PDGF-induced VSMC remain unclear. Therefore, this study aims to investigate the antioxidant and anti-migratory impacts of MTH in PDGF-induced VSMC.
Methods: VSMCs were induced with PDGF at a concentration of 20 ng/ml and treated with varying concentrations of MTH ranging from 0.001% to 10%. The viability of VSMCs was assessed using MTT assays. The levels of antioxidants were determined through malondialdehyde (MDA) assays. To evaluate VSMC migratory activity in response to PDGF, a transmembrane migration assay was conducted. Equal numbers of VSMC were loaded onto the inserts and at the bottom of the wells. Following fixation and staining, the cells migrating through the inserts were quantified.
Results: The findings revealed that MTH exerted an inhibitory effect on VSMC viability. Furthermore, MTH demonstrated a notable decrease in malondialdehyde (MDA) activity, signifying reduced oxidative stress in PDGF-induced VSMC. Notably, a significant reduction in VSMC migration was observed in cells treated with MTH in a concentration-dependent manner.
Conclusions: The study underscores that MTH possesses potent antioxidant and antimigratory properties, indicating its potential for preventing or treating atherosclerosis and its clinical manifestations. Further in vivo experiments are warranted to explore MTH's atheroprotective effects.
Keywords: Tualang honey, Atherosclerosis, Migration, Antioxidant, Vascular smooth muscle cells

MOP2-F-2

Bioinformatics identification of high-efficacy PCSK9 siRNAs for atherosclerosis therapy

Rian Ka Praja[1*], Reny Rosalina[2]

[1]Faculty of Medicine, Universitas Palangka Raya, Indonesia,
[2]Faculty of Mathematics and Natural Sciences, Universitas Palangka Raya, Indonesia

Objectives: Atherosclerosis, characterized by the buildup of plaques within arterial walls, is a leading cause of cardiovascular diseases. Proprotein Convertase Subtilisin/Kexin Type 9 (PCSK9) is a critical regulator of low-density lipoprotein cholesterol (LDL-C) metabolism, influencing the degradation of LDL receptors and thus impacting cholesterol levels. This study focused on designing small interfering RNAs (siRNAs) targeting PCSK9 as a therapeutic strategy to lower LDL-C levels and combat atherosclerosis.
Methods: Using comprehensive bioinformatics tools, we identified and evaluated siRNA candidates capable of effectively silencing PCSK9 expression. siPRED was employed to generate siRNA molecules and predict their efficacy, with an inhibition threshold set at ≥ 90%. The siRNA Scales tool was then used to filter potential candidates. These candidates underwent further analysis using MaxExpect and DuplexFold to evaluate the folding free energy of the siRNAs and the binding free energy between the guide strand and the target, respectively.
Results: Ten siRNAs were successfully designed targeting the mRNA sequence of human PCSK9 (NM_174936.4). Subsequent analyses with various bioinformatics tools identified these siRNAs as having strong potential to silence PCSK9 effectively, achieving a maximum observed efficacy of 93.43%. Additionally, the analyses of folding free energy and binding free energy between the guide strand and the target yielded favorable results.
Conclusions: In conclusion, the most promising siRNA candidates bioinformatically demonstrated significant potential in reducing PCSK9 levels, indicating their viability as therapeutic agents for atherosclerosis. Future directions involve validating these siRNAs in vitro and in vivo, with the aim of developing a novel, RNA-based treatment for atherosclerosis.
Keywords: Atherosclerosis, PCSK9, siRNA

MOP2-F-3

Effect of taurine intake over kidneys and intestinal tissues in ob/ob mice

Amara Zulfiqar[1*], Kainat Ahmed[1], Hanjing Lyu[1], Jung-Eun Yim[1,2]

[1]Interdisciplinary Program in Senior Human Ecology, Changwon National University, Republic of Korea,
[2]Department of Food and Nutrition, Changwon National University, Republic of Korea

Objectives: Taurine, a non-essential amino acid, is reported to play vital role in modulation of CKD's and gut health functions in various mouse models. However, the mechanisms by which taurine causes the effects in ob/ob mice are yet to be explored. This study aimed to verify the beneficial effects of taurine in kidneys and intestinal tissues of ob/ob mice and to highlight the mechanisms of the action.
Methods: Five-week-old male C57BL/6-Lepob/ob mice (n=16) and C57BL/6J mice (n=8) as a normal control were fed chow ad libitum for 10 weeks. After 1-week adaptation period, C57BL/6- Lep ob/ob mice were randomly divided into two groups of negative control and taurine group. The taurine group mice were provided orally with taurine (2g/kg bodyweight) for 10 weeks. At sacrifice, the kidney and intestinal tissues were weighed and collected for analysis of genes related to inflammation (IL-10, IFN-gamma), cell proliferation (Muc2,beta-actin,Cymb) and apoptosis (p53,TauT, AP1). Total cholesterol (high and low density), triglycerides and IL-6 were measured in the serum.
Results: Taurine consumption significantly reduced the final body, liver, total WAT weight, and a decreasing trend in serum triglycerides, IL-6 and LDL-Cholesterol. Moreover, taurine caused an increase in HDL-Cholesterol however it does not affect the expression of inflammatory (IL-10, IFN-gamma), cell proliferation (Muc2,beta-actin,Cymb) and cell apoptosis genes (p53,TauT, AP1), in the kidney and intestinal tissues compared to that of the negative control.
Conclusions: Taurine may have an ameliorating effect on preventing CKD and promoting intestinal health by decreasing serum levels of cholesterol and IL-6 in ob/ob mice however no significant differences were observed for expression of genes related to inflammation (IL-10, IFN-gamma), cell proliferation (Muc2, beta-actin,Cymb) and cells apoptosis (p53,TauT, AP1).
Keywords: Taurine, Inflammation, Cell protection, Intestine

MOP2-F-4

Effect of dietary intervention on food intake among CVD patients in comprehensive cardiac rehabilitation: interim analysis

Jung Eun Lee[1*], Jiyoung Youn[1], Ga Young Lee[1], Sang Hee Shin[2], Chi Sun Suh[2], Sung Nim Han[1], Ick-Mo Chung[3]

[1]Department of Food and Nutrition, Seoul National University, Republic of Korea,
[2]Division of Cardiology, Ewha Womans University Mokdong Hospital, Republic of Korea, [3]Division of Cardiology, Department of Internal Medicine, Mokdong Hospital, School of Medicine, Ewha Womans University, Republic of Korea

Objectives: This study aimed to examine the effect of dietary intervention on food group intake among patients with cardiovascular disease (CVD) participating in a comprehensive cardiac rehabilitation trial.
Methods: We conducted an interim analysis examining changes in food group intake before and after dietary intervention among patients with cardiovascular disease (CVD) who participated in a comprehensive cardiac rehabilitation trial. We included a total of 179 patients who had been diagnosed with heart failure with reduced ejection fraction or acute myocardial infarction at 10 hospitals. All the patients received dietitian consultations via phone calls based on the study's dietary intervention protocols. Dietary information was assessed using a validated food frequency questionnaire. We compared food group intake before and after the dietary intervention using a paired t-test.
Results: After the 12-week intervention, patients reduced their intake of red and processed meat and sugar-sweetened beverages (p value<.001 and p value=0.05, respectively). Total vegetable intake increased from before the dietary intervention to after the dietary intervention (p value<.001).
Conclusions: Dietary interventions with dietitian involvement may improve dietary habits for patients with CVD. Further comparison of all patients before and after the dietary intervention in a comprehensive cardiac rehabilitation trial will be conducted to evaluate the effectiveness and potential benefits of such interventions.
Keywords: Dietary intervention, CVD, Food group

MOP2-F-5

The protective effects of p-Coumaric acid on high-fructose diet-induced metabolic dysregulation

Hye Jin Yoon[1,2*], Un Ju Jung[1]

[1]Department of Food Nutrition, Pukyong University, Republic of Korea, [2]Natural Product Research Center, KRIBB, Republic of Korea

Objectives: p-Coumaric acid (CA), a derivative of 4-hydroxycinnamic acid, is widely found in a wide variety of edible plants and fungi such as peanuts, navy beans, tomatoes, carrots, basil and garlic. A number of studies have demonstrated that it has various beneficial biological effects, such as antioxidant, anti inflammatory, and anti antimicrobial properties. However, its impact on metabolic abnormalities caused by excessive fructose intake has not been thoroughly investigated. The objective of this study was to investigate the effects of CA on lipid and glucose metabolism in Golden Syrian hamsters fed a high-fructose diet (HFrD).

Methods: In this study, male Golden Syrian hamsters were fed a high-fructose diet (HFrD, 60%) with or without CA (0.02%) for 5 weeks to evaluate whether CA could mitigate HFrD-induced metabolic disturbances. We also investigated the effects of diets containing 60% fructose or corn starch (ND) on glucose and lipid metabolism in hamsters to assess the extent of metabolic dysregulations caused by HFrD.

Results: HFrD-fed hamsters exhibited significant increases in blood glucose, HOMA-IR, plasma triglycerides, and apo-CIII, along with a tendency for increased plasma insulin, total cholesterol (TC), VLDL/LDL-cholesterol, and atherogenic index (AI) compared to the ND group. On the other hand, CA supplementation significantly decreased hepatic TG, plasma TC, VLDL/LDL-cholesterol, and apo-CIII levels, and tended to decrease hepatic lipid droplets and collagen accumulation (fibrosis) in HFrD-fed hamsters. Additionally, CA-supplemented hamsters showed significantly lower lipogenic enzyme activity and lipogenic genes mRNA expression in the liver compared to the HFrD group. Furthermore, CA significantly decreased gluconeogenic enzyme activity and upregulated glycolytic mRNA expression in the liver, resulting in significantly lower blood glucose levels compared to the HFrD group.

Conclusions: Our findings suggest that CA may effectively improve metabolic dysregulations associated with excessive fructose intake, including hyperglycemia, dyslipidemia, and NAFLD.

Keywords: High-fructose diet, Dyslipidemia, NAFLD

MOP2-F-6

Brown fat HuR is a cold-induced RNA binding protein that regulates fatty acid oxidation to enhance thermogenesis

Kun-Young Park[1*], Sanghun Lee[3], Yeon Jin Roh[4], Sungwoo Choi[5], Hyemi Shin[1], Dong Wook Choi[4], Su Myung Jung[3], Jae Myoung Suh[2]

[1]Institute of Life Science, Korea Advanced Institute of Science and Technology, Republic of Korea, [2]Graduate School of Medical Science and Engineering, Korea Advanced Institute of Science and Technology, Republic of Korea, [3]Department of Biological Sciences, Sungkyunkwan University, Republic of Korea, [4]Department of Biotechnology, Korea University, Republic of Korea, [5]Department of Nutritional Sciences and Toxicology, University of California, Berkeley, United States

Objectives: Brown adipose tissue (BAT) plays a key role in the regulated production of heat in response to cold stimulus, known as adaptive thermogenesis. While the transcriptional mechanisms underlying its thermogenic function have been extensively studied, the contribution of post-transcriptional controls to this process remains largely unexplored. This study aims to identify RNA-binding proteins (RBPs) involved in BAT thermogenesis and demonstrate their physiological significance.

Methods: We analyzed public transcriptome datasets to identify candidate RBPs and generated adipocyte-specific HuR knockout mouse models to assess its physiological role in BAT thermogenesis. Cold tolerance tests and indirect calorimetry were conducted to evaluate their thermogenic response and energy expenditure upon cold stress. Extracellular flux assays were utilized to measure mitochondrial respiration and fatty acid oxidation in brown adipocytes. Transcriptomic analysis was performed to investigate the molecular mechanisms underlying impaired BAT thermogenesis by HuR deletion. Glucose or olive oil was orally administered to evaluate thermogenic fuel utilization. Arteriovenous metabolomics were performed to quantify fatty acid metabolic flux in BAT.

Results: HuR was one of robustly upregulated RBPs, and its cytoplasmic shuttling increased upon cold and β-adrenergic stimulation. Mice lacking adipocyte-specific HuR displayed impaired thermogenic response to cold, resulting in marked hypothermia. HuR deletion disrupted their response to β-adrenergic stimulation at thermoneutrality, indicating a primary defect in thermogenic BAT function. Loss of HuR blunted respiratory response to β-adrenergic stimulation and fatty acid oxidation in brown adipocytes. RNA-seq analysis revealed downregulation of TCA cycle and β-oxidation genes in HuR-deficient BAT. HuR ablation markedly decreased fatty acid oxidative flux in cold-activated BAT, suggesting its crucial role in elevating fatty acid oxidation during cold stress.

Conclusions: Our findings reveal a critical function of BAT HuR in facilitating fatty acid oxidation essential for efficient thermogenesis. Furthermore, this underscores the importance of post-transcriptional processes in BAT thermogenesis.

Keywords: Human antigen R, Brown adipose tissue, Cold adaptive thermogenesis, Fatty acid oxidation, RNA binding protein

MOP2-F-7

The role of vimentin on microparticle in macrophages

Soonhyeong Oh*, Wonkyoung Cho, Young Mi Park

Basic Science, Ewha Womans University, Republic of Korea

Objectives: Vimentin is a type lll intermediate filament protein expressed in cells of mesenchymal origin. Our previous studies have reported that oxLDL via CD36 induces PKA-mediated phosphorylation of vimentin (Ser72) and phosphorylated vimetin directs CD36 trafficking to plasma membrane in macropahages. Microparticle (MP) is submicron membrane vesicles which express a panel of phosholipids and proteins specific of the cell they are derived from. Cell activation or apoptosis lead to plasma membrane blebbing and microparticle release in the extracellular space. We hypothesize that vimentin plays a crucial role in MP release. Mechanism of how vimentin in macrophage is secreted to the extracellular space has not been studied yet. The objective of this study is to investigate the function of vimentin in generating MPs in response to oxidized low-density lipoprotein(ox-LDL) in murine peritoneal macrophages.

Methods: Murine peritoneal macrophages were collected from wild type (vim +/+) and vimentin null mice (-/-) by peritoneal lavage of mice 4 day after intraperitoneal injection of 4% thioglycolate. Macrophages were treated with or without oxLDL (25 ug/mL) for 24 hours. After collecting media and removing the cell debris, supernatants were ultracentrifugated 100,000g for 90 minutes at 4 OC to pellet MP. The MP pellets were then dissolved in PBS for flow cytometry analysis.

Results: Under basal conditions (without oxLDL treatment), there was no difference in MP release between wild-type (vim +/+) and vimentin null (-/-) macrophages. However, after 24 hours of oxLDL treatment, vimentin null (-/-) macrophages released significantly increased amount of MPs compared to vimentin +/+ macrophages.

Conclusions: These results suggest that vimentin plays a role in inhibiting MP release in response to oxLDL in macrophages.

Keywords: Vimentin, Micropaticle

MOP2-F-8

Molecular analysis of use of Anti-FAM19A5 antibodies for treating atherosclerosis

Haerani[1*], Ramlah[2]

[1]Family Medicine, Institute of Health Science Bina Bangsa Majene, Indonesia, [2]Natural Science, West Sulawesi University, Indonesia

Objectives: Atherosclerosis is narrowing and hardening of the arteries caused by plaque buildup. Plaque buildup is formed from fat, calcium, cholesterol, and other substances in the bloodstream. Molecular analysis is mostly caused by familiarity in the genetic code. Genetic analysis may be done to identify genetic/inherited disorders. Molecular analyses include detection of mutations, fusion genes, and DNA copy number changes. Genetic disease is a condition where changes in the nature and components of the gene cause a disease to appear due to disturbances in many systems in the body. These disorders occur due to new mutations in DNA. Genes can be used as markers for cell recruitment and activation molecules. This study aims to evaluate the characteristics molecular of use of ANTI-FAM19A5 antibodies for treating atherosclerosis.

Methods: Data obtained from 17 sequences of use of ANTI-FAM19A5 antibodies on secondary data form on https://www.ncbi.nlm.nih.gov/ and selected articles in the last 5 years (2019-2023). The phylogeny analysis of DNA was using the UPGMA method and the evolutionary distances computed using MEGA7-software.

Results: Based on the analysis, the phylogenetic tree of 17 sequences were divided into 3 main groups, namely cluster A consisting of 8 subjects, cluster B consisting 7 subjects, and cluster C consisting of 2 subjects. The optimal tree with the sum of branch length=10.76709368 is shown. There were a total of 312 positions in the final dataset.The grouping of cluster analysis is based on the existence of a similar genetic makeup equation with a high bootstrap value indicating the degree of kinship between specimens and the strength of the philogenous trees. Specimens that are in the same cluster show a degree of close kinship.

Conclusions: The molecular analysis of use of ANTI-FAM19A5 antibodies for treating atherosclerosis have highly variation. Information about kinship can be used as an informative source to assembly of superior genes.

Keywords: Genetic analysis, Anti-FAM19A5, Antibodies

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024
The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 2-G

Sep 28(Sat) 13:30-14:30 | Mini-Oral G (Studio 1, 6F)

MODERATOR : Nam Hoon Kim (Korea University, Republic of Korea)

MOP2-G-1

Rapid detection of beta-blocker in human urine using LC-MS/MS: an antiatherosclerotic agents

Awanish Kumar Upadhyay*, Tarun Handa, Kamna Sharma, Puranlal Sahu

Drug Analysis by LC-MS/MS, National Dope Testing Laboratory, New Delhi, India

Objectives: Accumulating data from studies in animals and humans indicate that β-blockade has antiatherosclerotic effects. Many studies of early-generation BBs showed adverse effects on lipoprotein levels and metabolism of glucose and insulin and thus discouraged their use in atheroprevention. Betablokers such as propranolol and nadolol, principally act on β1 receptors, resulting in splanchnic vasoconstriction and a reduction of portal inflow. Therefore, a sensitive & comprehensive analytical method was developed & validated for the detection of 19 Beta blockers using sophisticated UP-LC-MS/MS technique in human urine.

Methods: Sample preparation includes enzymatic hydrolysis with β-glucuronidase (E.coli) followed by Solid Phase Extraction (SPE). The analytical method was validated as per ISO17025 & WADA International Standard for Laboratories (ISL) guidelines for method characteristics viz. Limit of Identification (LOI, Specificity, Robustness, Carryover, Recovery. UPLCMS/MS determinations were performed on a XEVO-TQ-XS (Waters) mass spectrometer coupled with liquid chromatography (Waters-UPLC) system. The run time of acquisition method was 12 mins using Scheduled MRM.

Results: An analytical method was developed & validated for the detection of 19 target Beta-blocker in a run time of 12 minutes using schedule MRM mode. All the beta blockers were detected at nanogram levels. Use of UPLC column improved the throughput and better peak separation and selectivity.

Conclusions: A sensitive & selective method was developed for the detection of 19 Beta-blockers. The use of scheduled MRM scan improved the detection of these diuretics. The developed method can be a useful tool for the detection of these Beta-blockers in sports doping control, Clinical, Nephrological & management of portal hypertension studies. It was possible to identify 19 Betablockers at low levels (1 ng/ml to 25 ng/ml) using the developed method. This method has facilitated the detection of diuretics at very low levels in human urine. The applicability of the method was also verified by analyzing the real excretion study.

Keywords: Antiatherosclerotic agents, Betablockers, LC-MS/MS

MOP2-G-2

Non-linear association between admission glucose level and incomplete recovery of coronary blood flow in patients with STEMI treated by primary PCI

Surenjav Chimed[1*], Batmyagmar Khuyag[2]

[1]Radiology, Charité - Universitätsmedizin Berlin, Germany, [2]Cardiology, Intermed Hospital, Mongolia

Objectives: Incomplete recovery of coronary blood flow in patients with STEMI who treated by primary PCI is strong predictor of short and long term outcome. In this study, we aimed to determine association between admission glucose level and recovery of coronary blood flow in patients with STEMI after primary PCI.

Methods: In this study, we choose patients with STEMI who treated by primary PCI. Recovery of coronary blood flow was evaluated by TIMI flow grade on final angiography and TIMI flow grade less than 2 was considered as an incomplete recovery of coronary blood flow. Unadjusted and adjusted restricted cubic spline estimation was performed to determine non-linear association between admission glucose level and incomplete recovery of coronary blood flow.

Results: A total of 542 patients with STEMI were selected (mean age 60±14, male 84%). After primary PCI, complete coronary blood flow achieved for 494 patients (91%) and 48 patients (9%) had incomplete coronary blood flow. Unadjusted restricted cubic spline estimation showed that admission glucose level around 9mmol/L or higher is associated with significantly increased odds of having incomplete coronary blood flow after primary PCI (Figure 1).

Conclusions: Admission glucose level is an independent predictor of incomplete coronary blood flow after primary PCI in patients with STEMI.

Keywords: Admission glucose, Incomplete coronary flow, STEMI

MOP2-G-3

Autonomic rehabilitation enhances cardioplasticity in patients with post COVID-19 cardiopulmonary dysfunctions

Priyanka Rishi*, Dr. Zaki Anwer

Physiotherapy, Lovely Professional University, India

Objectives: 1. To assess the effect of structured autonomic rehabilitation protocol on functional capacity of patients with Post Covid19 Cardiopulmonary Dysfunctions. 2. To assess the effect of structured autonomic rehabilitation protocol on quality of life of patients with Post Covid19 Cardiopulmonary Dysfunctions. 3. To identify the side effects of autonomic rehabilitation occurring in patient population.

Methods: In this pilot RCT, thirty individuals suffering from post Covid19 cardiopulmonary dysfunction (mean age 58.8 years; 23.3% female) were enrolled and randomized for a standardized and individualized autonomic rehabilitation protocol. They were similar in terms of clinical diagnosis and state of art medical care. Individuals enrolled were similar in terms of clinical diagnosis and state of art medical care. Functional capacity and quality of life were estimated at baseline and after a six-week intervention with the help of Six minute walk test (6MWT) and EQ-5D-5L scale respectively.

Results: Functional capacity levels increased significantly after rehabilitation. In addition, quality of life also improved in all patients after 6 weeks of intervention with post intervention value as 0.73 (0.67,0.86) p=0.03. Regarding the distance covered in meters for 6MWT the result was significant with values as 522.2±77.6, p=0.024). No side effects for the AR were noted in the patients enrolled.

Conclusions: Individuals with Post Covid19 cardiopulmonary dysfunction showed improved walking distance at end of 6 weeks of AR. It is well established that exercise conditioning can alter autonomic balance (increasing parasympathetic tone and decreasing sympathetic activity), a prudently designed exercise program could prove to be an effective and non-pharmacological way to enhance functional capacity and thereby increasing quality of life in individuals suffering from post Covid19 cardiopulmonary dysfunction.

Keywords: Post COVID-19 cardiopulmonary dysfunction, Autonomic rehabilitation, 6MWT, EQ-5D-5L, Cardioplasticity

MOP2-G-4

The role of acetyltransferase PCAF in cardiac remodeling

Yongwoon Lim*, Hyun Kook

Pharmacology, Chonnam National University, Republic of Korea

Withdrawn

Objectives: Cardiac remodeling, a response to cardiac diseases or damage, involves alterations in heart size, shape, and function, encompassing myocyte growth and death, interstitial fibrosis, inflammation, and excessive accumulation of extracellular matrix. Despite improved survival with modern therapies, the underlying mechanism contributing to cardiac remodeling is poorly understood. Previous research highlighted p300/CBP-associated factor (PCAF)-mediated acetylation of histone deacetylase 2 is required for its activation in vitro, suggesting PCAF may be implicated in various cardiac diseases. However, the pathogenic role of PCAF in cardiac remodeling remains elusive. Thus, this study investigates the role of PCAF in cardiomyocytes and fibroblasts during the development of pathological cardiac remodeling.

Methods: Mice were subjected to ISP or TAC to induce cardiac remodeling. A Langendorff system was used to isolate cardiomyocytes from hearts. Rat cardiomyocytes were obtained by serial enzymatic digestion.

Results: PCAF knockout (KO) mice exhibited susceptibility to ISP- or TAC-induced cardiac remodeling, with echocardiography revealing rapid cardiac dysfunction. Mechanistically, PCAF KO mice showed decreased acetylation of calcium/calmodulin-dependent protein kinase kinase 2 (CaMKK2) and disrupted AMP-activated protein kinase (AMPK) signaling in response to ISP.

Conclusions: Loss of PCAF in mice enhanced ISP or TAC-induced cardiac hypertrophy and dysfunction. Notably, disruption of CaMKK2-AMPK signaling pathway in PCAF KO mice was found in an in vivo model of cardiac remodeling. Thus, it is plausible that a novel PCAF-CaMKK2 axis may be necessary to prevent pathological cardiac remodeling. Collectively, the current work may provide new insight into the PCAF as a potential therapeutic target for adverse cardiac remodeling.

Keywords: Acetylation, PCAF, CaMKK2, Cardiac remodeling

MOP2-G-5

Selectively targeting the Gasdermin-D pore attenuates cardiac inflammation and fibrosis after ischemia reperfusion injury

Judy Choi[1,4*], Daniel Donner[2], Helen Kiriazis[2], Aascha Brown[2], Mehnaz Pervin[1], Parvin Yavari[1], James Vince[5,6], Arpeeta Sharma[3], Judy B. de Haan[1,3,4]

[1]Cardiovascular Inflammation and Redox Biology Laboratory, Baker Heart and Diabetes Institute, Australia, [2]Preclinical Cardiology Microsurgery and Imaging Platform, Baker Heart and Diabetes Institute, Australia, [3]Department of Diabetes, Monash University, Australia, [4]Department of Immunology, Monash University, Australia, [5]Department of Medical Biology, The University of Melbourne, Australia, [6], The Walter and Eliza Hall Institute of Medical Research, Australia

Objectives: Inflammation, via activation of innate immune responses, is involved in the pathophysiology of cardiac injury. Inflammation plays a critical role in the clearance of cellular debris to promote tissue repair. However, inadequately controlled inflammation contributes to adverse cardiac remodelling after acute myocardial infarction (AMI). This is driven by persistent activation of the NLRP3 inflammasome-Gasdermin-D (GSDMD) pathway with subsequent secretion of the inflammatory cytokine IL-1β, which is closely linked to disease severity. Hence, we investigated whether the FDA-approved therapeutic, Disulfiram, which is used to treat chronic alcoholism but recently shown to inhibit GSDMD pore formation, could reduce inflammation and thus improve ischemia/reperfusion (I/R)-mediated cardiac injury.
Methods: Left coronary artery ligation was performed for 1h in 12-week-old C57BL6 male mice, followed by reperfusion in the presence and absence of 25 or 50mg of Disulfiram, which was administered at reperfusion and daily until termination. Baseline and terminal (day 7 and 28) cardiac function was measured by echocardiography, whilst fibrosis and inflammation were assessed by histology and RT-PCR. Flow cytometry assessed leukocyte populations in blood, spleen, bone marrow and heart. Additionally, control and Disulfiram-treated mouse BMDMs and human THP-1 cells were investigated for secreted inflammatory cytokines and inflammatory gene expression.
Results: Echocardiography showed significant improvements in ejection fraction after 50 mg/kg Disulfiram, 7 days post-I/R injury ($p<0.01$). Cardiac fibrosis was significantly attenuated by Disulfiram at both D7 and D28 post-AMI (~40%, $p<0.001$). Cardiac inflammatory and fibrosis gene expression was significantly attenuated (~$p<0.001$). This was associated with reduced inflammatory cell abundance in blood, spleen, bone marrow and heart. In LPS and ATP/Nigericin treated BMDMs and THP-1 cells, Disulfiram significantly attenuated IL-1ß and IL-6 secretion in a dose dependent manner (0.1µM-50µM, $p<0.001$).
Conclusions: This study demonstrates that Disulfiram reduces inflammation by inhibiting cytokine IL-1ß secretion. Therefore, targeting the GSDMD pore may represent a novel way to provide cardio-protection post-AMI.
Keywords: Cardiovascular disease, Gasdermin-D, Inflammation, Myocardial infarction

MOP2-G-6

Ex vivo three-dimensional visualization of mouse sinoatrial node

Hoang Le[1*], Nguyen Tran[1], Trang Luong[1], Pilhan Kim[2], Jaetaek Kim[1]

[1]Division of Endocrinology and Metabolism, Department of Internal Medicine, College of Medicine, Chung-Ang University, Republic of Korea, [2], Graduate School of Medical Science and Engineering, KAIST, Daejeon, Republic of Korea

Objectives: The role of the sinoatrial node in initiating and regulating heartbeats depends on its complicated structure, making detailed visualization important for understanding its physiological and pathological states. This overview aims to present the three-dimensional visualization of the mouse sinoatrial node offering critical insights into the structural and functional characteristics of this essential cardiac pacemaker.
Methods: The acquisition of high-resolution images is not feasible for non-transparent tissues such as the heart. Thus, clearing agents are necessary to make tissues or organs transparent when obtaining high-accuracy 3D images. The process of implementation begins with the use of tissue clearance technology to enhance the transparency of biological tissues, facilitating the visualization of organs and tissues in three dimensions. Then, a laser-scanning two-photon microscope (IVM-CM), combining the advantages of both Confocal and Two-Photon microscopy, was used to visualize the optically cleared sinoatrial node samples three-dimensionally. The final stage involved utilizing IMARIS, a commercial software that features a fully integrated tool for live cell tracking to generate three-dimensional volumetric images and conduct quantitative image analysis.
Results: This technique has resulted in comprehensive three-dimensional models of the sinoatrial node that illustrate the spatial distribution of various cell types and the complicated network of conduction pathways. These models enhance our understanding of how the structural variations of the sinoatrial node influence its pacemaking activity and its role in arrhythmogenesis.
Conclusions: Exploring the morphological and functional correlations within the sinoatrial node with detailed 3D models provides a valuable framework that offers new insights into the mechanisms underlying cardiac rhythm disorders. Then targeted therapies can be developed to treat arrhythmias by addressing specific abnormalities in the structure and function of the sinoatrial node.
Keywords: Sinoatrial node, Three-dimensional visualization, Tissue clearance technology

MOP2-G-7

Empagliflozin alleviates cardiac lipid accumulation and fibrosis in diabetic mice

Trong Kha Pham[1,2*], To Hoai T. Nguyen[1], Hyeong Rok Yun[1], Vu Thi Thu[2], Luu Thi Thu Phuong[2], Hyoung Kyu Kim[1], Jin Han[1]

[1]Cardiovascular and Metabolic Disease Center, Inje University, Republic of Korea,
[2]VNU University of Science, Vietnam National University, Hanoi, Vietnam

Objectives: Empagliflozin (EMPA), a sodium glucose co-transporter 2 inhibitor, a new class of anti-diabetic drugs, is shown beneficial in reduction of heart failure hospitalization and cardiovascular mortality. However, the mechanisms remain unclear. This study aims to investigate whether EMPA can prevent heart dysfunction by reducing cardiac lipotoxicity and fibrosis in diabetic mice.
Methods: Seven-week-old diabetic and obese db/db mice were treated with EMPA (10mg/kg/day) via oral gavage daily for 10 weeks. Non-treated db/db mice and wild-type (WT) mice receiving an equal amount of 0.5% hydroxyethyl cellulose as the vehicle. Body weight, blood glucose levels, and cardiac function were monitored. Echocardiography was used to assess systolic and diastolic functions. Myocardial hypertrophy, cardiac fibrosis, lipid accumulation, and mitochondrial function were evaluated to determine the effects of EMPA treatment.
Results: EMPA treatment significantly reduced body weight and blood glucose levels in db/db mice comparing to WT and non-treated db/db mice. Echocardiography analysis revealed that EMPA improved systolic and diastolic functions in db/db mice. In addition, EMPA also enhanced mitochondrial function. In histological analysis, EMPA significantly attenuated cardiac hypertrophy and fibrosis with supression of TGF-β1/Col1a1/Smad2 signaling pathway. Moreover, EMPA attenuated cardiac lipid accumulation exhibiting by reducing cardiac lipid droplets and suppressing the FOXO1/CD36 signaling pathway.
Conclusions: These findings indicate that EMPA improves cardiac function involving the alleviation of lipotoxicity-induced injury and cardiac fibrosis markers and may be a promissing therapeutic strategy for diabetic cardiomyopathy.
Keywords: Empagliflozin, SGLT2 inhibitor, Cardiac fibrosis, Cardiac lipotoxixity

MOP2-G-8

Genetic analysis of methods for detection of atherosclerosis and atherosclerosis diagnostic kits using polypeptide markers and their antibodies for diagnosis of atherosclerosis

Ramlah[1*], Haerani[2]

[1]Educational of Biology, Universitas Sulawesi Barat, Indonesia, [2]Public Health, STIKes Bina Bangsa Majene, Indonesia

Objectives: Atherosclerosis is a change that occurs in the arterial wall characterized by the accumulation of extracellular lipids, recruitment and accumulation of leukocytes, formation of foam cells, migration and proliferation of myocytes. Genetic disease is mostly caused by familiarity with the genetic code. DNA arrays capable of simultaneously measuring the expression of thousands of genes in clinical specimens from affected and normal individuals have the potential to provide information about superior characteristics of genes from organisms. Genes can be used as markers for cell recruitment and activation molecules.This study aims to evaluate the genetic analysis of methods for detecting atherosclerosis and atherosclerosis diagnostic kits using polypeptide markers and their antibodies to diagnose atherosclerosis.
Methods: Data was obtained from 18 sequences of methods for the detection of atherosclerosis on secondary data form on https://www.ncbi.nlm.nih.gov/, and selected articles were evaluated in the last 5 years (2019-2023). The phylogeny analysis of DNA sequences was using the UPGMA method and the evolutionary distances were using the Maximum Composite Likelihood method using MEGA11 software.
Results: The phylogenetic analysis of 18 sequences was divided into 3 main groups, namely cluster A consisting of 9 specimens, cluster B consisting of 7 specimens, and cluster C consisting of 2 specimens. The optimal tree with the sum of branch length=61,25055897 is shown. There were a total of 558 positions in the final dataset. This grouping is based on the existence of a similar genetic makeup equation with a high bootstrap value indicating the degree of kinship between specimens and the strength of the phylogenies trees. Specimens that are in the same cluster show a degree of close kinship. Specimens from different clusters display distant kinship.
Conclusions: Clustering was achieved based on differences in expression levels across individual specimens. The genetic analysis involves the modification of genetic variant to enhance the cellular function.
Keywords: Genetic analysis, Methods for detection, Atherosclerosis, Polypeptide markers

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024
The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 2-H

Sep 28(Sat) 13:30-14:30 | Mini-Oral H (Studio 2, 6F)

MODERATOR : Jae-Hoon Choi (Hanyang University, Republic of Korea)

MOP2-H-1

Genome-wide identification and characterization of Senna tora miRNAs and its cross kingdom regulation in atherosclerosis

Saumya K. Patel[1*], Rohan A. Pandey[1], Rakesh M. Rawal[2]

[1]Department of Bioinformatics, Gujarat University, India, [2]Department of Life sciences, Gujarat University, India

Objectives: Numerous studies have attested that plant-derived micro-RNAs were transported to animals, altering the host gene expression and providing evidence for inter-species gene regulation to show the impact of diet on human health and disorders. A single miRNA may control whole cellular pathways by interacting with the number of target genes, demonstrating the potency of miRNAs as genetic regulators. Senna tora is a well-known medicinal herb, often employed in various traditional medicine systems for various ailments, due to its hypolipidemic, anti-inflammatory and antioxidant activities. In this study, we aimed to explore the potential Atherosclerosis effects of Senna tora miRNAs using a comprehensive genome wide approach that combines network pharmacology and data analysis.
Methods: This study gives the first account of computational analyses of S. tora miRNAs resulting in a total of 11 miRNAs from S. tora that belonged to 8 different miRNA families by using standalone blastn to assess the sequence homology of miRBase repository to the publicly available dataset whereas UNAFOLD server was used to predict secondary structure. Moreover, the psRNATarget server predicted 478 target genes showing significance in numerous biological processes that were analysed for gene ontology using Omicsbox, and Protein-Protein interaction(PPI) was generated using Cytoscape to find the top 10 hub genes consisting ACTB, HDAC2, TLR4, RANBP2, TJP1, FGF2, EGF, BTRC, CYCS, and BDNF.
Results: Pathway enrichment analysis results revealed the involvement of ACTB, TLR4, and CYCS in atherosclerosis, fluid shear stress, and lipid pathways respectively. However, ACTB was also found to be involved in hypertrophic cardiomyopathy, arrhythmogenic right ventricular cardiomyopathy, and dilated cardiomyopathy whereas TLR4 in NF-kappa B signaling pathway, HIF-1 signaling pathway, and CYCS in apoptosis, viral myocarditis, and oxidative phosphorylation respectively.
Conclusions: This cross-kingdom study reveals crucial human target genes with implications in atherosclerosis and other cardiovascular diseases offering preliminary insights into the potential of miRNA-mediated cross-species regulation.
Keywords: MicroRNAs, Senna tora, Gene ontology

MOP2-H-2

Probiotic properties and anti-diabetic effects of lactiplantibacillus plantarum LRCC5314 postbiotics in vivo

Ahyoung Lim[1*], Seokmin Yoon[1], Woongkwon Kwak[2], Yohan Nam[2], Hoontae Kwon[1], Jungki Kwak[1], Wonyong Kim[2]

[1]Microbial&Fermentation Team, LOTTE R&D Center, Republic of Korea,
[2]Department of Microbiology, College of Medicine, Chung-Ang University, Republic of Korea

Objectives: To investigate the impact of Lactiplantibacillus plantarum LRCC5314 (LRCC5314) on the gut microbiome and its subsequent effects on metabolic health. Specifically, this study aims to analyze changes in gut microbial composition, diversity, and abundances, and to assess the potential of LRCC5314 as a dietary supplement for managing Type 2 Diabetes (T2D) including glucose tolerance, insulin sensitivity, and lipid profiles.
Methods: Probiotic properties: Intestinal stability: acid/bile tolerance, adhesion activity Safety: hemolytic activity, antibiotic susceptibility, cell cytotoxicity, toxic metabolites Animal Model: C57BL/6 mice with stress-induced T2D were used for the study. Mice were divided into control and treatment groups. The treatment group received powdered milk supplemented with LRCC5314, while the control group received regular powdered milk. In vivo paramenters: Glucose Metabolism: Blood glucose levels and insulin sensitivity were measured. Corticosterone Levels: To assess stress levels. Cytokine Profiles: Pro-inflammatory and anti-inflammatory cytokines were analyzed. Gut Microbiota: Short-chain fatty acid production and gut microbiota composition were examined.
Results: Probiotic properties: LRCC5314 exhibits excellent tolerance to acid and bile, and has adhesion activity to intestinal epithelial cells. Additionally, it demonstrates superior probiotic activity in terms of safety, including hemolytic activity and antibiotic susceptibility. Glucose Metabolism: The administration of LRCC5314 significantly reduced blood glucose levels and improved insulin sensitivity in the treatment group compared to controls. Corticosterone Levels: Mice treated with LRCC5314 showed decreased corticosterone levels, indicating reduced stress. Cytokine Profiles: A notable decrease in pro-inflammatory cytokines (e.g., TNF-α, IL-6) and an increase in anti-inflammatory cytokines (e.g., IL-10) were observed in the LRCC5314 group. Gut Microbiota: Treatment with LRCC5314 enhanced the production of beneficial short-chain fatty acids (e.g., butyrate) and positively modulated gut microbiota composition.
Conclusions: Lactiplantibacillus plantarum LRCC5314 exhibits promising probiotic properties and has the potential efficacy in managing Type 2 Diabetes (T2D).
Keywords: Postbiotics, Type 2 diabetes, Microbiome modulation, Lactiplantibacillus plantarum, Probiotic properties

MOP2-H-3

M2 macrophage exosomes improve cardiac function in mice with heart failure by suppressing cardiometabolic inflammation and type 1 interferon response

Martin Ng*, Alex S Gao, Tuan A Phu, Ngan K Vu, Robert L Raffai

Surgery, UCSF, NCIRE, United States

Objectives: Test whether M2-macrophage exosomes can serve to control heart failure (HF) caused by cardiometabolic inflammation and occlusive coronary atherosclerosis.
Methods: M2-macrophage exosomes were produced by culturing human THP-1 macrophages with IL4 (THP1-IL4-exo), which we recently reported as potent in controlling cardiometabolic inflammation. THP1-IL4-exo were purified using cushioned-density gradient ultracentrifugation (C-DGUC) and tested for their ability to control cardiac dysfunction in a model of diet-induced heart failure. Hypomorphic ApoE mice deficient in scavenger receptor Type-B1 expression (HypoE/SR-B1-/-) were fed a diet rich in fat and cholesterol that resulted in systemic and cardiac inflammation, myocardial lipid accumulation, along with occlusive coronary atherosclerosis and diffuse myocardial infarction four-weeks after diet initiation.
Results: Our findings show that tri-weekly intraperitoneal injections of 10^`10 THP1-IL4-exos into HypoE/SRB1-/- mice fed HFD led to significant improvements in cardiac function. Echocardiographic measurements detected enhancements in parameters including fractional shortening and left ventricular ejection fraction. Cardioprotective properties of THP1-IL4-exo are derived partially by their ability to attenuate systemic and cardiac inflammation, as detected by reduced numbers of neutrophils in the circulation and cardiac tissues, along with reduced expression levels of M1 macrophage-related inflammatory genes (Tnfa, IL6). Additionally, THP1-IL4-exo suppressed myelopoiesis and Type 1 Interferon pathway activity in bone marrow CD11b+ cells and circulating monocytes. THP1-IL4-exo also increased the expression levels of M2 macrophage-related anti-inflammatory genes (Il10, Chil3) in cardiac tissue and attenuated the expression of matrix metalloproteinases, a family of proteins upregulated in response to cardiac injury that drive ventricular remodeling, resulting in adverse cardiac dysfunction. Ongoing studies seek to identify microRNA cargo enriched in THP1-IL4-exo as possible sources of cardioprotection in this model system.
Conclusions: Our findings support the use of THP1-IL4-exo as novel therapeutics to mitigate HF and improve cardiac function following myocardial infarction caused by coronary artery disease.
Keywords: Exosome, Heart Failure, microRNA, Interferon, Inflammation, EVs, Therapeutic

MOP2-H-4

Involvement of endocan in vascular dysfunction in angiotensin II-induced hypertensive mice

Eun Yi Oh*, Seonhee Byeon, Soo-Kyoung Choi, Young-Ho Lee

Physiology, Yonsei University College of Medicine, Republic of Korea

Objectives: The aim of this study is to investigate the involvement of endocan in vascular endothelial dysfunction associated with hypertension and to explore its underlying mechanisms.
Methods: Eight-week-old male C57BL/6 mice administered with normal saline or endocan (0.6mg/kg by intraperitoneal injection every two days) or angiotensin II (1000 ng/kg/min) by osmotic minipumps) for 4 weeks. Systolic blood pressure was determined using the tail-cuff system. After mice were sacrificed, the serum endocan levels were measured in all groups of mice using a mouse endocan enzyme-linked immunosorbent assay (ELISA) kit. Vascular function was investigated in mesenteric resistance arteries using a multi-wire myograph system. Human umbilical vein endothelial cells (HUVECs) was treated with angiotensin II at different concentrations (0, 0.01, 0.1, 1, 10 uM) for 24 hours.
Results: Administration of endocan significantly increased systolic blood pressure. Endothelium-dependent relaxation (EDR) was significantly reduced in the mesenteric resistance arteries from endocan-treated mice compared to vehicle-treated mice. However, there was no difference in vascular relaxation induced by sodium nitroprusside administration between the two groups. Furthermore, endothelium-dependent relaxation was significantly reduced in angiotensin II-induced hypertensive mice which was associated with increase in serum endocan level. Treatment of angiotensin II to HUVECs induced concentration-dependent elevation of endocan levels in cell culture medium and cell lysate.
Conclusions: In this study, we suggest that increase in circulating endocan level causes vascular dysfunction by impairing vascular relaxation, which may lead to elevated blood pressure.
Keywords: Hypertension, Endocan, ESM-1, Angiotensin II-induced hypertensive mice

MOP2-H-5

Protective effect of human milk oligosaccharide on lipopolysaccharide-induced inflammation by inhibiting STAT1 signaling pathway

Yujin Jin[1*], Lila Kim[2], Kyung-Sun Heo[1]

[1]College of Pharmacy, Chungnam National University, Republic of Korea, [2]Company, GeneChem Inc., Republic of Korea

Objectives: Acute lung injury (ALI) is primary activator for developing respiratory diseases including chronic obstructive pulmonary disease and pulmonary fibrosis. Mechanistically, sustained and excessive differentiation of macrophages induced lung inflammation by releasing of pro-inflammatory cytokines and its activation was increased mucus secretion and fever. Lipopolysaccharide (LPS) is the component of gram-negative bacteria wall and various studies utilized for inflammation by inducing macrophage differentiation. The present study aimed to investigate the protective effects of human milk oligosaccharides, specifically 3′-sialyllactose (3′-SL) and 6′-sialyllactose (6′-SL), on LPS-induced ALI and elucidate their underlying signaling pathways.
Methods: The inhibitory effects of 3′-SL and 6′-SL on inflammation were evaluated using LPS-treated RAW 264.7 macrophages. To establish the ALI model, mice were treated with 10 mg/kg LPS for 24 h. Histological changes in the lung tissues were assessed using hematoxylin and eosin staining and immunofluorescence.
Results: LPS causes thickening of the alveolar wall infiltration of immune cells in lung tissues and increased serum levels of TNF-α, IL-1β, and GM-CSF. However, these effects were significantly alleviated by 100 mg/kg of 3′-SL and 6′-SL. Consistent with the inhibitory effects of 3′-SL and 6′-SL on LPS-induced pro-inflammatory cytokine secretion in serum, 3′-SL and 6′-SL suppressed mRNA expression of TNF-α, IL-1β, MCP-1, iNOS, and COX2 in LPS-induced RAW 264.7 cells. Mechanistically, 3′-SL and 6′-SL abolished LPS-mediated phosphorylation of NF-κB and STAT1. Bioinformatically, under BioGRID, STAT1 and NF-κB p65 was physically interact with each other. However, fludarabine treatment, a STAT1 inhibitor, did not affect LPS-mediated NF-κB phosphorylation. Finally, fludarabine pretreatment synergically enhanced anti-inflammatory effects of 3′-SL and 6′-SL by suppressing mRNA expression of TNF-α, IL-1β, MCP-1, iNOS, and COX2.
Conclusions: 3′-SL and 6′-SL protect LPS-induced macrophage activation and ALI through the STAT1 and NF-κB signaling pathways.
Keywords: Acute lung injury, Lipopolysaccharide, Inflammation, Sialyllactose

MOP2-H-6

BH4 prevents diabetic cardiomyopathy by activating CaMKK2 signaling pathway

Nguyen Thi To Hoai[1*], Hyoung Kyu Kim[1], Jae Boum Youm[1], Nam Mi Park[1], Pham Trong Kha[1,2], Yun Hyeong Rok[1], Vu Thi Thu[2], Pham Thi Bich[2], Luu Thi Thu Phuong[2], Jin Han[1]

[1]Department of Physiology, BK21 Plus Project Team, College of Medicine, Smart Marine Therapeutics Center, Cardiovascular and Metabolic Disease Center, Inje University, Busan, Republic of Korea,
[2]University of Science, Vietnam National University, Hanoi, Vietnam

Objectives: Diabetic cardiomyopathy (DCM) is a major cause of mortality and morbidity in diabetes mellitus patients. Although tetrahydrobiopterin (BH4) shows therapeutic potential as an endogenous cardiovascular target, its effect on myocardial cells and mitochondria in DCM and the underlying mechanisms remain unknown. This study aimed to determine the involvement of BH4 deficiency in DCM and the therapeutic potential of BH4 supplementation in a rodent DCM model.
Methods: Total biopterin ratio in the heart and mitochondria, evaluated cardiac remodeling, cardiac contractility, and mitochondrial function. Additionally, we conducted prolonged BH4 supplementation and used proteomics analysis to identify targeted biological pathways.
Results: We observed a decreased BH4 total biopterin ratio in the heart and mitochondria, accompanied by cardiac remodeling, reduced cardiac contractility, and mitochondrial dysfunction. Prolonged BH4 supplementation improved cardiac function, corrected morphological abnormalities in cardiac muscle, and increased mitochondrial activity. Proteomics analysis identified oxidative phosphorylation (OXPHOS) as the BH4-targeted pathway in diabetic hearts. BH4 supplementation rescued down-regulated peroxisome proliferator-activated receptor-γ coactivator 1-α (PGC-1α) signaling, a key modulator of OXPHOS and mitochondrial biogenesis.
Conclusions: Mechanistically, BH4 binds to calcium/calmodulin-dependent protein kinase kinase 2 (CaMKK2) and activates downstream AMP-activated protein kinase/cAMP response element binding protein/PGC-1α signaling, rescuing mitochondrial and cardiac dysfunction in DCM. These results suggest BH4 as a novel endogenous activator of CaMKK2.
Keywords: Diabetic cardiomyopathy (DCM), Tetrahydrobiopterin (BH4), Mitochondrial function

MOP2-H-7

Protective effects of β-lapachone on isoproterenol-induced cardiac hypertrophy

Mario Albino Sozinho Indarua*, Jin Han, Trong Kha Pham, Hyoung Kyu Kim

Physiology Department, Inje University, Republic of Korea

Objectives: The purpose of the study was to investigate whether β-lapachone (βlap) protects isoproterenol - induced cardiac hypertrophy model and the underlying molecular mechanisms.
Methods: Eight-week-old male C57BL/6 mice were used in this study. Cardiac hypertrophy was induced by subcutaneous injection of isoproterenol (ISO) at 100 mg/kg/day for 2 weeks after pre-treated with intraperitoneal β-lapachone at 20 mg/kg/day and 80 mg/kg/day for 1 week. The mice were divided into 5 groups: control group, ISO-treated group, ISO+ β-lapachone -20mg-treated group, ISO+ β-lapachone -80mg-treated group, and control+ β-lapachone -80mg-treated group. After ISO treatment, the β-lapachone -treated groups were continued to be treated with β-lapachone at the corresponding doses, and the other groups were treated with vehicle for 5 weeks. Body weight was checked every week. Echocardiography was performed to evaluate cardiac function before and after the treatments.
Results: Body weight and blood creatine, AST, and ALT levels were not affected by ISO and β-lapachone treatment. Echocardiography revealed that the cardiac functions of ISO-treated mice were obviously improved by β-lapachone treatment at the dose of 80 mg/kg/day but not at dose of 20 mg/kg/day.
Conclusions: β-lapachone improves cardiac function in an ISO-induced Cardiac hypertrophy model by reducing cardiac fibrosis, mitochondrial dysfunction, and cardiomyocyte apoptosis via activating NQO1 expression and AMPK/NRF2/HO-1 as well as CaMKK2/CaMK4/CREB signaling pathway. These findings suggest that β-lapachone is expected to be a promising agent against cardiac fibrosis and Cardiac hypertrophy.
Keywords: β-lapachone

MOP2-H-8

Epidemiologic data of cardiovascular disease caused by high LDL cholesterol in low sociodemographic index vs high sociodemographic index: a population-based study

Zavia Putri Salsabila*

Basic Science, Indonesia Islamic University, Indonesia

Objectives: Cardiovascular disease is one of the leading causes of death worldwide. It has several risk factors, mainly caused by the consumption of lipids that can cause high LDL cholesterol. Sociodemographic factors are one of the external factors that can lead to cardiovascular disease. This study aims to identify the prevalence and mortality rate of cardiovascular disease in countries with low and high sociodemographic indexes.
Methods: The epidemiological data used in this study were extracted from the Global Burden of Disease database, 2021. The inclusion criteria of this study were aged 50-74 years, diagnosed with Ischemic Heart Disease that caused by high LDL Cholesterol, and lived in a high or low sociodemographic index country. The sociodemographic index combines information on countries' economy, education, and fertility rates. Data included in this study are prevalence (the proportion of a population with cardiovascular disease; this research used ischemic heart disease) and mortality rate (the ratio of ischemic heart deaths in the year to the population of the year) in 2021.
Results: The results show that the total number of cases of Ischemic Heart Disease in 2021 in Low SDI country was 10.19 million, with 11.8% being males and 7.92% being females. Meanwhile, the prevalence of Ischemic Heart Disease in the High SDI country was 18.91 million cases, with 7.9% of cases being males and 3.7% being females. Of all the countries, the prevalence of ischemic heart disease was higher in males, and the total number of cases has increased significantly since 1990 (based on data from GBD). The mortality rate of Ischemic heart disease in 2021 was higher in high-SDI countries than in low-SDI countries (12.05% vs 9.4%).
Conclusions: The prevalence and mortality rate of Ischemic heart disease are higher in high-SDI countries than in low-SDI countries.
Keywords: Ischemic heart disease, Sociodemographic index

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024
The 13th International Congress on Lipid & Atherosclerosis

Mini-Oral Presentation 2-I

Sep 28(Sat) 13:30-14:30 | Mini-Oral I (Studio 3, 6F)

MODERATOR : Jin Joo Park (Seoul National University, Republic of Korea)

MOP2-I-1

Diabetes distress and psychosocial issues towards Quality of Life (QoL) of outpatients diabetes care

Rosinta Hotmaida Pebrianti Purba[1*], Lintong Hottua Simbolon[1], Ester Marnita Purba[2]

[1]Socioeconomic Research, The Pranala Institute, Indonesia, [2]Hospitality and Care, Tindal NT Darwin, Australia

Objectives: Despite the physical impact of DM, often the emotional distress "psychological insulin resistance", pathophysiological, and psychosocial wellbeing on the patients quality of life (QoL) complicates the disease management effectiveness. However, patients are mislabeled as "difficult patients" and considered receive unnecessarily treated for a psychiatric illness which they may not need. This study aimed to assess the evidence linking type 2 diabetes mellitus (T2DM) and psychosocial aspects to obtain a risk estimation.

Methods: Using an electronic database from a reputable published journal in the last 10 years. Of several journals collected, ten articles were selected to analize the psychosocial factors that significantly influence the T2DM patient's QoL.

Results: The results showed that T2DM is clearly associated with impaired health-related QoL while the prevalence has reached 20% of lifetime diagnosis of anxiety than those without it. Moreover, insulin treatment has a significant association with psychiatric disorders: depression, hypoglycemia, adjustment disorder, increases the risk of developing dementia, mostly Alzheimer and vascular dementia. In addition, lower educational level, internal control, and SES are more likely to develop depression whereas women are at increased risk of diabetes-related cardiovascular complications. Further, biological pathways through which depression may impact diabetes and its complications include hormonal abnormalities, alterations in glucose transport function. Increased immuno-inflammatory activation also can cause a diabetes complications, health care costs, worsened functional disability, re-hospitalization, higher risk of cardiovascular, and early mortality.

Conclusions: People with diabetes who experience psychological problems need psychological support from diabetes health professionals or general practitioner (GP) rather than with a mental health specialist.

Keywords: Diabetes distress, Psychosocial, Outpatient care

MOP2-I-2

Serum LDL cholesterol lipids serve as predictor of steroid resistance in patients with focal segmental glomerulosclerosis

Fahad Zadjali*

Biochemistry, Oman College of Health Sciences, Oman

Objectives: We investigated if lipids parameters serve as biochemical predictor of steroid resistance in patients with FSGS prior initiation of therapy.

Methods: This is a retrospective case-control study of patients with FSGS. Lipid profile at admission were collected form hospital information system. patient were followed after initiation of steroid therapy. Those with steroid reistsnat were identified by persistent proteinuria.

Results: 32 cases with primary FSGS and treated with steroid were found and analyzed. A total of 19 (59.4%) patients were found to be resistant to steroid. Analysis of lipid profile showed Baseline total and non-HDL cholesterol levels were significantly higher in patients who developed steroid resistance ($p<0.050$). ROC curve applied to see these markers as predictors for steroid resistance FSGS. By using Youden's index, the optimal cut point for total cholesterol was 6.7 mmol/L with 94% sensitivity and 58% specificity (95% CI: 56.5-94.5). Likelihood ratio was 2.3.

Conclusions: Lipid profile may serve as a predictor of steroid resistance in patients with FSGS. Knowing the possibility of resistance can help in avoiding unnecessary exposure to steroid with its side effects and selection of more appropriate therapy.

Keywords: Lipid, Cholesterol, Chronic kidney disease

MOP2-I-3

Gender specific association of PNPLA3 variants with fatty liver disease trait heritability

Mustafa Al Hinai[1*], Fahad Zadjali[2]

[1]Family and Community Medicine, Sultan Qaboos University Hospital, Oman, [2]Deanship, Oman College of Health Sciences, Oman

Objectives: we studied the role of I148M variant of PNPLA3 in gender specific modulation of MAFLD inheritance within pedigrees.
Methods: we studied fatty liver index heritability in large pedigrees using measured genotyoe analysis. Lipid profile were measured and study their contrinution toward variability in fatty liver heritability.
Results: Total Number of 1344 subjects were included in the study. 591 were male (44%) and 753 were females (56%). The distribution of the three genotypes of I148M were as followings: 56% were homozygous for CC, 36% heterozygous for GC and 8 % were homozygous for GG genotype. Our study found that the genotypes of I148M had non-statistical significant effect on heritability the fatty liver traits except for TG which suggest the involvement of this variant in regulation of plasma TG levels. Male showed a significant difference in the mean of TG among the three genotypes. The same results was also obtained when CG and GG was combined together with significant difference in the mean of TG observed in the CC group that has the lowest value. Whereas the female showed no significant difference in the mean of TG among the three genotypes.
Conclusions: Our study had detected an association of I148M with plasma triglycerides and on traits defining hyperglycemia. This warrants further functional studies on the role of adiponutrin on glucose homeostasis.
Keywords: Triglyceride, Metabolic associated fatty liver disease, Inheritance

MOP2-I-4

The prevalence of dyslipidemia and diabetes mellitus in Thai kidney transplant patients

Suthida Boonsom*

School of Pharmaceutical Sciences, University of Phayao, Thailand

Objectives: Kidney transplantation significantly improves the quality of life and survival rates for patients with end-stage renal disease. However, post-transplant patients remain at increased risk of developing metabolic complications such as dyslipidemia and diabetes mellitus. These conditions can adversely affect both patients and graft survival. This study aims to determine the prevalence of dyslipidemia and diabetes mellitus in the first 6 months after transplantation in Thai kidney transplant patients.
Methods: Fifty-nine kidney transplant patients who were non-diabetic, and with normal LDL-cholesterol were enrolled and followed up for 6 months. All patients received tacrolimus-based immunosuppressive therapy, prednisolone and mycophenolate mofetil as part of the immunosuppressive regimen. Tacrolimus concentrations, dyslipidemia (lipid profiles), diabetes mellitus (blood glucose levels), and acute graft rejection episodes were recorded and analyzed at each follow-up point.
Results: The range and mean (±standard deviation) of tacrolimus trough concentrations were 3.9 to 8.2 ng/mL and 6.4 ± 1.8 ng/mL, respectively. About 67.8% of patients developed dyslipidemia (elevated LDL-cholesterol), with 47.5% requiring lipid-lowering medications. Additionally, 32.2% of patients developed posttransplant diabetes mellitus and started antidiabetic medications. Seven patients (11.9%) experienced allograft rejection confirmed by kidney biopsy, in both dyslipidemia and diabetes mellitus groups. Only 4 patients (6.8%) did not experience any cardiovascular adverse effects. Other laboratory parameters remained within normal ranges.
Conclusions: The study highlights a significant prevalence of dyslipidemia and posttransplant diabetes mellitus within the first 6 months after kidney transplantation among Thai tacrolimus-based immunosuppressive therapy. Early identification and treatment of dyslipidemia and posttransplant diabetes mellitus are crucial in mitigating the effects of acute graft rejection and cardiovascular complications. These data necessitate comprehensive monitoring and management strategies to reduce cardiovascular morbidity and improve long-term clinical outcomes in this vulnerable population.
Keywords: Kidney transplant patients, Dyslipidemia, Diabetes mellitus

MOP2-I-5

Association between cardiometabolic risk factors and COVID-19 severity in patients of tertiary rural hospital

Percival Dilla*

Internal Medicine, Region II Trauma and Medical Center, Philippines

Objectives: To determine the association between cardiometabolic risk factors and the development of severe COVID-19 patients in rural tertiary hospital in Bayombong, Nueva Vizcaya.

Methods: We reviewed the medical records of patients aged 19 years or older with a real-time polymerase chain reaction (RT-PCR)-confirmed COVID-19 hospitalized at the Region II Trauma and Medical Center in Bayombong, Nueva Vizcaya. A retrospective correlation design was utilized for the study, using a review of the medical records of patients from March 2020 to December 2022. Fasting plasma glucose (FPG), Low Density Lipoprotein-Cholesterol (LDL-C) levels, Hypertension, BMI, Waist to hip ratio and demographic characteristics were recorded. A simple and multiple ordinal logistic regression was done to check the association between COVID-19 and different independent variables. All analyses were performed using STATA SE 18.0, with a p-value of less than 0.05 as the cut-off to determine statistical significance.

Results: We enrolled 1,582 participants; most were 50 to 59 years old (24.3%), Male (57.7%) and unvaccinated. When we compared our patients' Hyperlipidemia, FBS and Hypertension directly correlate with length of stay while Myocardial Infarction, Atrial Fibrillation and waist to hip ratio inversely correlate with length of stay measured during the pandemic and the pre-pandemic period, we found a statically significant increase (<0.05). Specifically, older patients, with hyperlipidemia, those with confirmed diabetes and elevated BP had a higher probability of staying in the hospital for more than a week while those with MI, AF, and higher WHR tend to stay shorter. In- hospital mortality, COVID patients with Myocardial Infarction 27.3 times (OR: 27.3, p<0.001), Atrial Fibrillation 5.8 times (OR: 5, p<0.001), and high 2 BP 10.4 times (OR: 10.4, p=0.007) odds of dying compared when they don't have these conditions.

Conclusions: This study demonstrates the consequences of Diabetes Mellitus, Hypertension, Hyperlipidemia and Cardiovascular Disease showed significant associations.

Keywords: Cardiometabolic

Withdrawn

MOP2-I-6

Associations of changes in metabolic syndrome status and risk factor count with incident cardiovascular events among cancer survivors

Jaeyong Lee*, Hyeok-Hee Lee, Hyeon Chang Kim, Hokyou Lee

Department of Preventive Medicine, Yonsei University College of Medicine, Republic of Korea

Objectives: This study aimed to investigate the associations of post-diagnosis changes in metabolic syndrome (MetS) status and risk factor count with cardiovascular disease (CVD) events among cancer survivors.

Methods: From a Korean nationwide health screening and claims database, we included 199,230 individuals with cancer diagnosed at age ≥19 in 2012-2014 and survived for ≥3 years without CVD. Participants were categorized by their pre- and post-diagnosis MetS status and combination of pre- and post-diagnosis MetS risk factor counts (Figure A). CVD event was defined as a composite of myocardial infarction, stroke, or cardiovascular death. Multivariable-adjusted cause-specific Cox models were used to estimate hazard ratios (HRs) for CVD events associated with changes in MetS status and risk factor count.

Results: Over a median follow-up of 5.4 years after the 3-year cancer survival, 4,711 incident CVD events occurred. The cumulative incidence of CVD event was highest among participants consistently with MetS and lowest among those consistently without MetS. Compared to sustained absence of MetS, the CVD risk was higher for newly developed MetS (HR, 1.25 [95% CI, 1.14-1.37]), regressed MetS (HR, 1.23 [95% CI, 1.11-1.36]) and persistent MetS (HR, 1.37 [95% CI, 1.28-1.47]) (Figure B). Compared to persistent MetS, the risk was lower for regressed MetS (HR, 0.89 [95% CI, 0.81-0.99]). Increase in MetS risk factor count after cancer diagnosis was associated with higher CVD risk (per +1 change in count; HR, 1.08 [95% CI, 1.05-1.11]). Moreover, the risk was higher in participants who consistently exhibited high risk factor counts than in those who newly developed high risk factor counts after cancer diagnosis (per +1 pre-diagnosis count; HR, 1.05 [95% CI, 1.02-1.08]) (Figure C).

Conclusions: Post-diagnosis changes in MetS status and risk factor count were associated with CVD risk among cancer survivors. These findings suggest that comprehensive management of MetS may reduce CVD burden in cancer survivors.

Keywords: Cancer survivors, Metabolic syndrome, Cardiovascular diseases

MOP2-I-7

Impact of different quantity and source of dietary protein intake on cardiovascular diseases risk factors in Singapore older adults: a randomized controlled trial

Yueying Yao[1*], Ian Mak[1], Clarinda Sutanto[1], Khoo Chin Meng[2], Roger Sy Foo[3], Jung Eun Kim[1]

[1]Department of Food Science and Technology, National University of Singapore, Singapore,
[2]Division of Endocrinology, University Medicine Cluster, National University Hospital, Singapore,
[3]NUS Yong Loo Lin School of Medicine, National University of Singapore, Singapore

Objectives: This study aims to assess the effects of a healthy dietary pattern (NPI) alone, or NPI with either 20 g/d soy (SOY) or casein protein supplementation on CVD risk factors.

Methods: In this 16-week trial with 43 Singapore older adults, blood pressure, lipid-lipoprotein profile, other calculated CVD risks, as well as the number of circulating endothelial progenitor cells (EPCs) in human blood were assessed before and after the intervention. Also, blood outgrowth endothelial cells (BOECs) derived from peripheral blood mononuclear cells were cultured and their angiogenic and migration activities were measured at pre- and post-intervention.

Results: Both protein-supplement groups showed trends of reduced total and low-density lipoprotein cholesterol levels, with significant reductions in the SOY group (P=0.018 and 0.044, respectively). An interaction effect (P=0.016) was observed in atherogenic index, driven by the increase in the NPI group and the decrease in the SOY group. Additionally, the SOY group showed trends of decreased vascular age and Framingham risk score. All groups showed increase in expression of CD34+ cells% (time effect, P=0.028) while only protein-supplement groups showed increasing trend in expression of CD34+KDR+ cells%. Besides, the SOY group showed a trend of improved overall tube formation capacity of BOECs. However, no difference was observed in blood pressure, number of KDR+ cells%, and migration ability of BOECs among the 3 groups.

Conclusions: Overall, following a healthy dietary pattern along with a higher-protein intake, particularly from soy, shows promise in lowering CVD risk, especially by modulating lipid-lipoprotein profile and increasing the quantity of circulating EPCs as well as the angiogenesis capacity of BOECs, in Singapore older adults.

Keywords: Dietary protein, Cardiovascular disease risk factors, Protein quantity, Protein source, Randomized control trial

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

Author Index

K

L

M

N

O

P

Q

R

S

ICoLA 2024

The 13th International Congress on Lipid & Atherosclerosis

발행일 2024년 9월 20일
인쇄일 2024년 9월 26일

발행처 한국지질 · 동맥경화학회
[04168] 서울시 마포구 마포대로 68 마포아크로타워 707호
전 화 02-3272-5330
팩 스 02-3272-5331
이메일 ksla@lipid.or.kr

편집제작 플랜베어
[07806] 서울시 강서구 공항대로 220 우성에스비타워II 11층 1101호
전 화 02-6734-1011
팩 스 02-6734-1009

ICoLA by KSoLA
International Congress on Lipid & Atherosclerosis

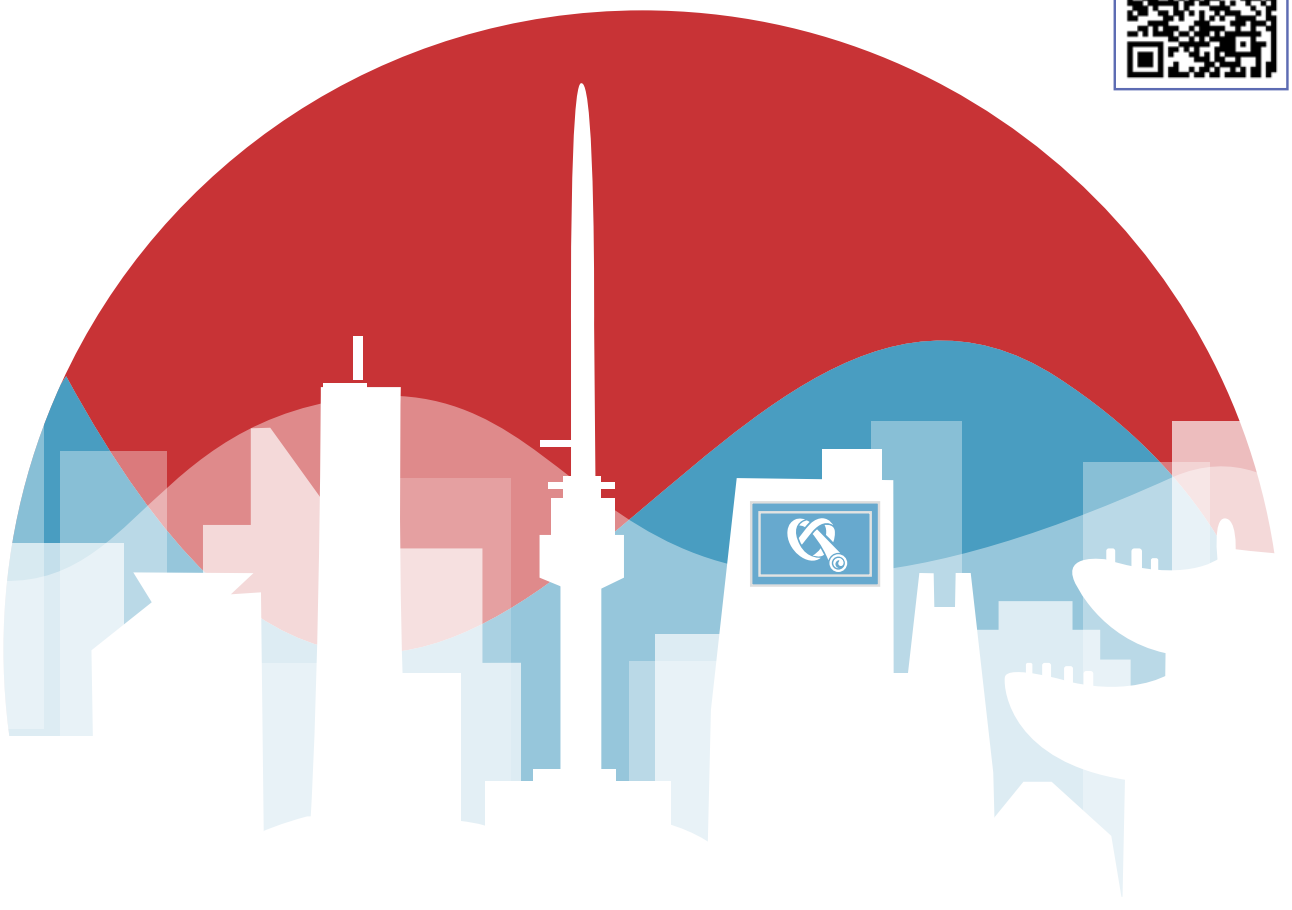
ICoLA 2025

The 14th International Congress on Lipid and Atherosclerosis

September 11(Thu)~13(Sat), 2025

Conrad Seoul, Republic of Korea

SAVE THE DATE



SAVE THE DATE

SoLA 2025

한국지질·동맥경화학회 춘계학술대회

2025 Spring Congress on Lipid and Atherosclerosis of KSoLA

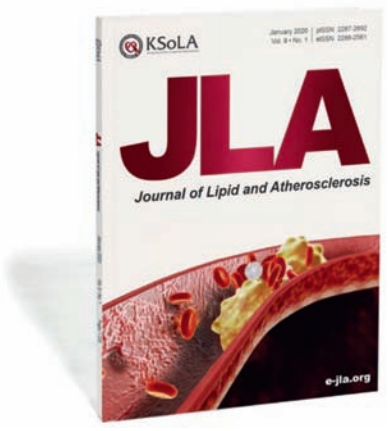
2025년 4월 4일(금)~5일(토)

서울드래곤시티 컨벤션센터 3층 한라홀

www.lipid.or.kr

한국지질·동맥경화학회
The Korean Society of Lipid and Atherosclerosis

Submit to JLA!
KSoLA's Official Journal



The JLA is an official journal of the Korean Society of Lipid and Atherosclerosis. The journal is devoted to the dissemination of knowledge of the mechanisms responsible for lipid metabolism and atherosclerosis and enhance insight into prevention, treatment, and ultimate cure for cardiovascular diseases.
The JLA covers basic, translational, and clinical research of lipid and atherosclerosis. The JLA also encourages articles on broad aspects of vascular biology, thrombosis, metabolism, nutrition, or cardiovascular health.
Only manuscripts written in English are accepted. This journal includes review article, editorial, original article, brief report, opinion, and letter to the editor.

Submit your manuscipt

We invite you to submit your papers to JLA. The Journal is published on the official website of the JLA (**https://e-jla.org/**), and you can submit your work through the online submission system (**https://www.editorialmanager.com/la/**).

Recent articles

Check out our recently published articles.
https://www.e-jla.org/index.php

No submission fee

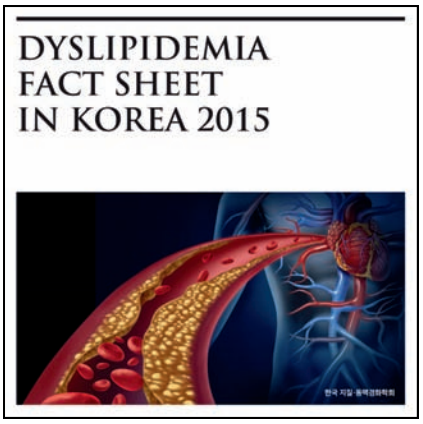
No author's submission fee or other publication-related fee since all article processing costs is supported by KSoLA.

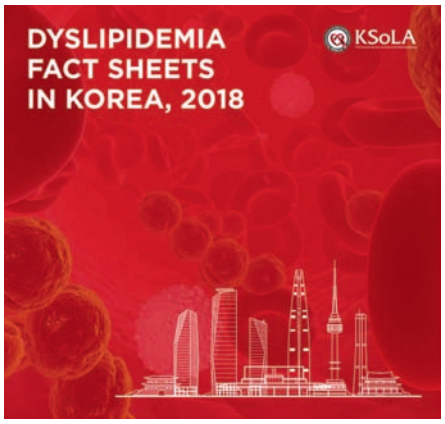
Watch JLA articles in quick video format!

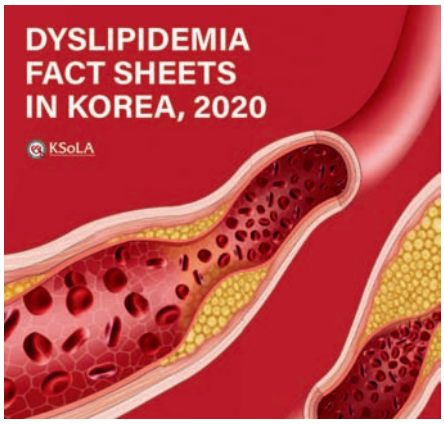
www.youtube.com/@JLA_Journal

Search for JLA journal on YouTube.

Like, Share, Subscribe!







What's New in Dyslipidemia Fact Sheet 2024?

혈관 건강 지킴이

#이상지질혈증 #콜레스테롤 #동맥경화증 #죽상경화증

혈관건강지킴이 Lipid **on YouTube**

Like, Share, Subscribe!

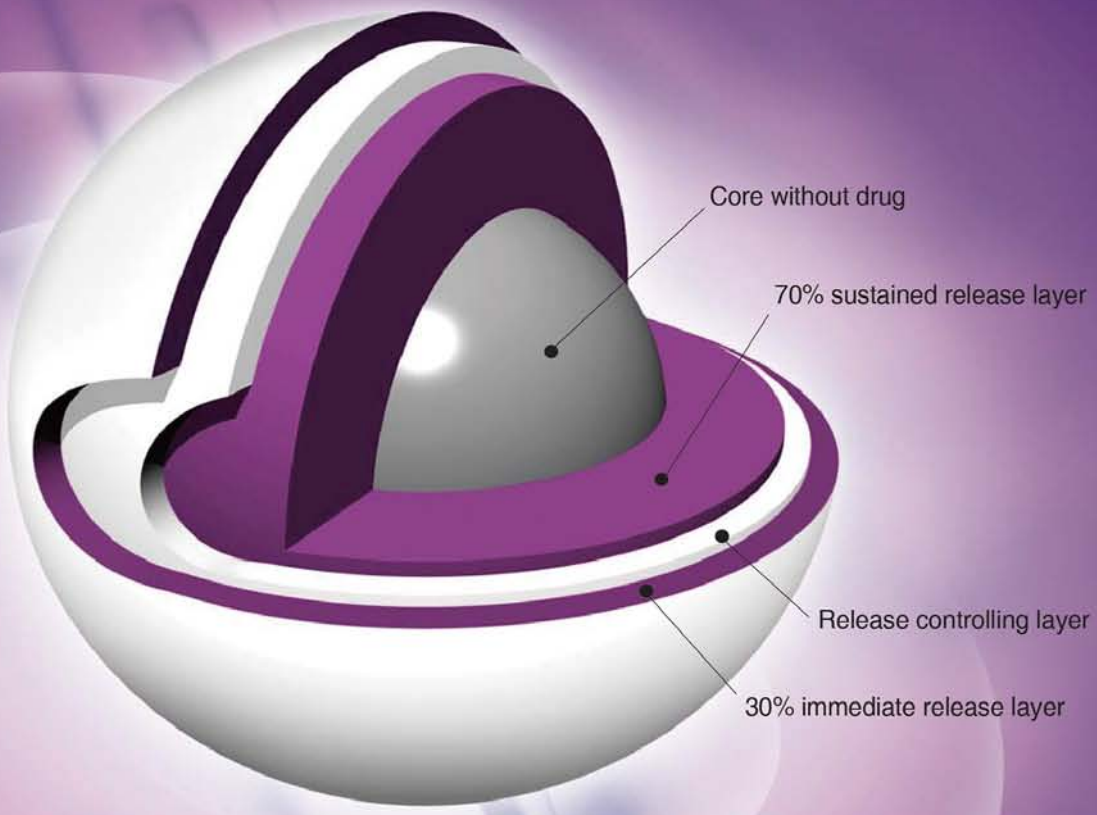
www.youtube.com/@lipidorkr

QR

No Sugar. Only Taste.

설탕제로·당류제로
ZERO

Protection dawn till dusk



엘탄서방정 펠렛의 단면도

협심증 치료제
Protection dawn till dusk

엘탄서방정® 60/30mg
Isosorbide-5-mononitrate

효능효과

관동맥심질환 (협심증, 심근경색 등)
울혈성심부전의 보조요법

용법용량

1. 1일 1회 아침에 60mg(1정) 경구투여한다.
   협심증인 경우 필요에 따라 아침에 120mg(2정) 으로 증량 투여할 수 있다.
2. 초기투여용량은 2~4일간 30mg으로 하여 두통의 요인을 최소화 하도록 용량을 조절한다.
3. 이 약은 분할복용이 가능하지만 씹거나 부수어서는 안되고 음료와 함께 반드시 삼키도록 한다.

- 30mg 저함량 출시로 처방함량의 확대화
- 생체 이용률의 극대화 [1)]
- 신속한 작용 발현 [2)]
- 1회 복용으로 24시간 지속 효과 [3)]

References
1) Taylor et al. Biopharmaceutics & Drugs Disposition. 1981;2:225-263
2) Belder et al., Am J Cardiol. 1990;6J-8J
3) Am J Cardiol 61;12E-14E(1988)

제조
에리슨제약(주)

판매
(주)경풍약품

보건복지부 인증 혁신형 제약기업

Advanced Technology Center

KOSDAQ 코스닥상장법인

고지혈증 치료제

수바로® 오디정

SUVARO® ODT

로수바스타틴칼슘(미분화)

국내 최초

구강붕해정 스타틴

약 복용을 자주 잊는 환자에게

약 복용을 잊었을 경우, 생각났을 때 언제, 어디서든 약을 복용할 수 있어, **복용을 미루다가 복용 자체를 빼먹는 경우를 방지**합니다.

복용 약제수가 많아, 부담감을 갖는 환자에게

다른 약물과 함께 복용 시 **구강 내에서 신속히 붕해되어 복용 약제 수에 대한 부담감을 개선**시켜 줍니다.

정제를 삼키는데 어려움이 있는 고령 또는 여성환자에게

약을 삼키는데 어려움이 있는 고령, 여성 환자에게 보다 안전하고 일관된 약물 복용이 가능합니다.

bcwp 주|비씨월드제약

BIO&CHEMICAL R&D

For HCP Only

A Leading Duo, Together for Enhanced Control in T2D[1]

SIDAPVIA

Offer your patients the leading SGLT2i and a DPP4i,*[1] without increasing pill burden

SIDAPVIA FDC is indicated as an adjunct to diet and exercise to improve glycaemic control in adults with type 2 diabetes mellitus when treatment with both dapagliflozin and sitagliptin is appropriate.[2]
SIDAPVIA, at 1 tablet once daily, contains 10mg dapagliflozin and 100mg sitagliptin.[2]

*Based on global IQVIA Days of Therapy (DoT) volume data, as of May 2023.

DPP4i, dipeptidyl peptidase 4 inhibitor; FDC, fixed-dose combination; SGLT2i, sodium-glucose co-transporter-2 inhibitor; T2D, type 2 diabetes.

KR-14571 | Exp.2025-09 (Prep. 2023-09)

Reference 1. IQVIA Data SGLT2 and DPP4 MAT May 2023 2. SIDAPVIA (Dapagliflozin 10mg/ Sitagliptin 100mg) Prescribing Information. [Approved on Jun 30, 2023]

AstraZeneca

AstraZeneca Co.Ltd.
21th Floor, ASEM Tower, Yeongdong-daero 517, Gangnam-gu,
Seoul, Republic of Korea
Tel: 02-2188-0800 Fax: 02-2188-0852

inno.N

HK inno.N Corporation
Headquarters: 239, Osongsaengmyeong 2-ro, Osong-eup,
Heungdeok-gu, Cheongju-si, Chungcheongbuk-do
Tel. 043-249-8800
Seoul Branch: 6~8F, A-dong, 100, Eulji-ro, Jung-gu, Seoul
Tel: 02-6477-0000

Sidapvia
dapagliflozin/sitagliptin

※ Please refer to SIDAPVIA (Dapagliflozin 10mg/ Sitagliptin 100mg) Prescribing Information for details.

보건의료전문가용

전문의약품

FENOZETIBE Tab.

Fenofibrate 160mg + Ezetimibe 10mg

새로운 조합의 혼합형 고지혈증 치료제[1]

혼합형 고지혈증 환자의 지질 프로파일 개선[2]

복약순응도 향상을 위한 고정용량 복합제[3,4]

48주 및 52주 장기 임상시험을 통해 양호한 안전성 프로파일 확인[5,6]

References

1. 의약품안전나라 (https://nedrug.mfds.go.kr/) [Acessed on 2022.11.07]. **2.** Farnier M, et al. Eur Heart J. 2005 May;26(9) 897-905. **3.** Divchev D, et al. Cardiol Ther. 2019 Dec;8(2):317-328. **4.** Mach F, et al. Eur Heart J. 2020 Jan 1;41(1):111-188. **5.** S Oikawa et al. J Atheroscler Thromb. 2017 Jan 1;24(1):77-94. **6.** JM McKenney et al. J Am Coll Cardiol. 2006 Apr 18;47(8):1584-7.

[원료약품 및 그 분량] 이 약 1정 중 • 유효성분: 에제티미브(USP) - 10.00 mg 페노피브레이트(EP) - 160.00 mg • 동물유래성분: 스테아르산마그네슘(소-우지), 유당수화물(소-우유) • **기타 첨가제**: 라우릴황산나트륨, 부틸히드록시톨루엔, 오파드라이amb화색(88A180040), 콜로이드성이산화규소, 크로스카멜로오스나트륨, 포비돈, D-만니톨 **[성상]** 흰색의 원형 필름 코팅정 **[효능·효과]** 혼합형 고지혈증 환자의 상승된 총콜레스테롤(total-C), 저밀도지단백 콜레스테롤(LDL-C), 아포지단백 B(Apo B) 및 비-고밀도지단백 콜레스테롤(non-HDL-C)을 감소시키기 위한 식이요법의 보조제로서, 이 약을 투여한다. **[용법·용량]** 성인: 이 약은 1일 1회 1정을 식후 즉시 복용한다. 이 약은 반드시 식이요법과 병행하여 투여한다. 이 약 성분 중 페노피브레이트는 빈속에 흡수가 덜 될 수 있으므로 반드시 식후 즉시 투여한다. ○ 간장애환자에는 투여하지 않는다. ○ 신장애환자는 중등도 ~ 중증 신장애 환자(혈청 크레아티닌치 2.5 mg/dL 이상)의 경우 이 약을 투여하지 않는다. ○ 고령자는 신기능이 감소되지 않은 경우 일반적으로 용량 감량이 필요하지 않다. 에제티미브와 페노피브레이트를 병용으로 복용하고 있는 환자의 경우, 복용의 편리함을 위하여 이 약(개개의 주성분 함량이 동일한 복합제)으로 전환할 수 있다. **[사용상의 주의사항]** 1. 다음 환자에는 투여하지 말 것. 1) 이 약 및 이 약의 구성성분에 과민증이 있는 환자 2) 활성 간질환 환자 혹은 설명되지 않는 혈청 아미노전이효소 수치 증가가 지속되는 환자에게는 이 약과 HMG-CoA 환원효소 억제제를 병용투여하지 않는다. 3) 임부 또는 임신하고 있을 가능성이 있는 여성 및 수유부(6. 임부 또는 수유부에 대한 투여 참조) 4) 간장애환자 5) 중등도 ~ 중증 신장애 환자(혈청 크레아티닌치 2.5 mg/dL 이상)(횡문근융해증이 나타날 수 있다.) 6) 담낭질환 환자(선재성 담낭 질환 환자 포함) 7) 피브레이트 또는 케토프로펜으로 치료하는 동안 광알레르기 또는 광독성을 경험한 환자 8) 소아 9) 담관간경화증 환자 10) 췌장염 환자(중증 고중성지질형증으로 인한 급성 췌장염 제외) 11) 이 약은 유당을 함유하고 있으므로, 갈락토오스 불내성(galactose intolerance), lapp(유당분해효소 결핍증(Lapp lactase deficiency) 또는 포도당-갈락토오스 흡수장애(glucose-galatose-malabsorption) 등의 유전적인 문제가 있는 환자에게는 투여하면 안된다. 2. 다음 환자에게는 신중히 투여할 것 1) 경증 신장애 또는 그 병력이 있는 환자(혈청 크레아티닌치 1.5mg/dL 이상 2.5mg/dL 미만) (횡문근융해증이 나타날 수 있으므로 투여량을 감량 또는 투여간격을 연장하여 사용한다.) 2) 간기능조사에 이상이 있는 환자 또는 그 병력이 있는 환자(간기능 검사값의 이상변동이 나타날 수 있다.) 3) 저알부민혈증(신증후군) 환자 4) 담석의 병력이 있는 환자(담석형성이 보고되었다.) 5) 혈액응고저지제를 투여중인 환자 6) HMG-CoA 환원효소저해제(예, 프라바스타틴, 심바스타틴 등)를 투여중인 환자 7) 고령자 **[포장단위]** 30정/피티피(10정/PTPx3) **[저장방법]** 기밀용기, 실온(1-30℃)에서 보관 **[제조의뢰자]** 알보젠코리아㈜ 경기도 화성시 향남읍 제약공단2길 36 소비자상담번호 : 02-2047-7700 [제조자] 현대약품㈜ 충청남도 천안시 동남구 풍세면 잔다리길 55 **[작성년월일]** 2022-09-15

※ 자세한 내용은 제품설명서를 참조하십시오.

11202A-FNZ-22-220202

www.alvogenkorea.com

Alvogen

의료전문가용

2제 요법으로 목표 혈압에 도달하지 못한 고혈압 환자에게

2제 그만! 3제 시작!

국내 최초!
Telmisartan+Amlodipine
+Hydrochlorothiazide
고혈압 3제 복합제 [1)]

우수한 목표 혈압 조절률!
Telmisartan+Amlodipine
2제 복합제 대비 2.1배
더 많은 환자를 목표 혈압에 도달 [2)]

편리한 복용!
3가지 약제를 한 알로!
Telmisartan+Amlodipine
2제 복합제와 동일한 크기 [3)]

투탑스플러스정

(텔미사르탄/암로디핀베실산염/히드로클로로티아지드)

ILDONG 일동제약

1) 식약처 허가사항 기준(24.08) 2) Sung KC, et al .Clin Ther. 2018 Jan;40(1):50-63.e3. 3) 투탑스정 40/5mg과 투탑스플러스정 40/5/12.5mg 기준

Telmisartan/Amlodipine/Hydrochlorothiazide **40/5/12.5mg, 80/5/12.5mg, 80/10/12.5mg**

[효능효과] 텔미사르탄과 암로디핀의 복합요법으로 혈압이 적절하게 조절되지 않는 본태성 고혈압 **[용법용량]** 이 약은 1일 1회 1정을 식사와 관계없이 물과 함께 복용한다. 가능하면 매일 같은 시간(예 : 아침)에 복용하는 것이 권장된다. 이 약을 투여하기 전에 개개의 성분(텔미사르탄과 암로디핀의 단독요법 또는 복합요법)으로 용량을 조절할 것이 권장된다. 텔미사르탄/암로디핀의 복합요법으로 혈압이 조절되지 않는 환자에게 이 약 40/5/12.5밀리그램을 투여하며, 환자의 혈압 반응을 고려하여 2주 이상의 간격을 두고 용량을 조절한다. 이 약의 최대 투여용량은 80/10/25밀리그램이다. 텔미사르탄/암로디핀 복합제와 히드로클로로티아지드 단일제를 병용하고 있는 환자의 경우, 복용의 편리함을 위하여 이 약(개개의 주성분 함량이 동일한 복합제)으로 전환할 수 있다.
※자세한 사항은 제품 설명서를 참조하여 주십시오.

TAH2408Z1-2508

Pioneering a New Class of **mRNA** Medicines

모더나 코리아 홈페이지

moderna®

모더나코리아

서울시 종로구 새문안로76 콘코디언빌딩 5층 모더나코리아, 03185

MED-KR-Platform-2400003

플라스틱 폐기물의 재활용
덴마크 Hillerød에 있는 노보 노디스크에서는 펜에서 나오는
플라스틱 폐기물을 의자와 같은 다양한 제품을 만들 때 재사용합니다.

2023 | Driving change for generations

Driving change for generations

어떻게 하면 세계의 플라스틱 딜레마를 해결 하는데 도움을 줄 수 있을까요? 펜 디바이스는 수백만 명의 환자들에게 필요로 하지만, 일회용 플라스틱이 환경에 미치는 영향에 대해서도 인지하고 있습니다. 노보 노디스크의 순환적 사고방식을 바탕으로, 우리는 더욱더 견고한 디바이스 사용을 장려하며, 재활용 플라스틱(non-virgin plastic)의 활용으로 전환하고, 전반적인 플라스틱 사용을 줄이는 것을 목표로 합니다. 또한 우리는 재활용을 위해 사용된 플라스틱 디바이스를 수거하는 '테이크백(take-back)' 프로그램을 시행하고 있습니다. 우리의 디바이스의 재료를 재사용함으로써 우리는 미래 세대를 위해 세상을 보다 지속 가능하게 만들기 위한 우리의 역할을 할 수 있습니다.

Discover more at **novonordisk.com**

novo nordisk®

KR23CD00011

한국 노보 노디스크제약(주)
서울시 송파구 올림픽로 35길 137 한국광고문화회관 16층 (신천동, 우 05510)
대표번호 02-2188-8900 | www.novonordisk.co.kr

BORYUNG

당뇨병 안전성 프로파일을 확보한 콜레스테롤 흡수 저해제

피타바스타틴[1] ⊕ 에 제 티 미 브

NODM

LZERO ZET

엘제로젯정

Ezetimibe | Pitavastatin

혈관 관리 순위

당신의 혈관을 YOUNG하게!

NODM LZERO ZET 엘제로젯정 Ezetimibe | Pitavastatin

NODM, New-onset diabetes mellitus

[References] 1. DL Tribble et al. Metabolism. 2008 Jun;57(6):796-801. 2. M Farnier et al. Eur Heart J 2005 May;26(9):897-905. 3. SS Kumar et al. Lipids Health Dis. 2009 Dec 17;8:56. 4. Nagula Jayababu. JMSCR. 2019 Oct; 7(10):963-970. 5. A Shinnakasu et al. J Atheroscler Thromb. 2017 Jul 1;24(7):735-748. 6. M Farnier et al. Am Heart J. 2007 Feb;153(2):335.e1-8. 7. M Farnier et al. Diab Vasc Dis Res. 2012 Jul;9(3):205-15. 8. S Oikawa et al. J Atheroscler Thromb. 2017 Jan 1;24(1):77-94. 9. JM McKenney et al. J Am Coll Cardiol. 2006 Apr 18;47(8):1584-7.

[제품요약정보] **제품명** 에제페노 정 **주성분함량** 1정(515mg) 중 에제티미브 10mg 및 페노피브레이트 160mg **성상** 흰색의 원형 필름 코팅정 **효능효과** 혼합형 고지혈증 환자의 상승된 총콜레스테롤(total-C), 저밀도지단백 콜레스테롤(LDL-C), 아포지단백 B(Apo B) 및 비-고밀도지단백 콜레스테롤(non-HDL-C)을 감소시키기 위한 식이요법의 보조제 **용법용량** 성인 : 이 약은 1일 1회 1정을 식후 즉시 복용한다. 이 약은 반드시 식이요법과 병행하여 투여한다. 이 약 성분 중 페노피브레이트는 빈속에 흡수가 덜 될 수 있으므로 반드시 식후 즉시 투여한다. 간장애환자에는 투여하지 않는다. 신장애환자는 중등도~중증 신장애 환자(혈청 크레아티닌치 2.5 mg/dL 이상)의 경우 이 약을 투여하지 않는다. 고령자는 신기능이 감소되지 않은 경우 일반적으로 용량 감량이 필요하지 않다. 에제티미브와 페노피브레이트를 병용으로 복용하고 있는 환자의 경우, 복용의 편리함을 위하여 이 약(개개의 주성분 함량이 동일한 복합제)으로 전환할 수 있다. **사용상의 주의사항(일부)** 1. 다음 환자에는 투여하지 말 것 1) 이 약 및 이 약의 구성성분에 과민증이 있는 환자 2) 활성 간질환 환자 혹은 설명되지 않는 혈청 아미노전이효소 수치 증가가 지속되는 환자에게는 이 약과 HMG-CoA 환원효소 억제제를 병용투여하지 않는다. 3) 임부 또는 임신하고 있을 가능성이 있는 여성 및 수유부 4) 간장애환자 5) 중등도~중증 신장애 환자(혈청 크레아티닌치 2.5 mg/dL 이상)(횡문근융해증이 나타날 수 있다.) 6) 담낭질환 환자(선재성 담낭 질환 환자 포함) 7) 피브레이트 또는 케토프로펜으로 치료하는 동안 광알레르기 또는 광독성을 경험한 환자 8) 소아 9) 담관간경화증 환자 10) 췌장염 환자(중증 고중성지질형증으로 인한 급성 췌장염 제외) 11) 이 약은 유당을 함유하고 있으므로, 갈락토오스 불내성(galactose intolerance), lapp(유당 분해효소 결핍증(Lapp lactase deficiency) 또는 포도당-갈락토오스 흡수장애(glucose-galatose-malabsorption) 등의 유전적인 문제가 있는 환자에게는 투여하면 안된다. 2. 다음 환자에게는 신중히 투여할 것 1) 경증 신장애 또는 그 병력이 있는 환자(혈청 크레아티닌치 1.5mg/dL 이상 2.5mg/dL 미만)(횡문근융해증이 나타날 수 있으므로 투여량을 감량 또는 투여간격을 연장하여 사용한다.) 2) 간기능조사에 이상이 있는 환자 또는 그 병력이 있는 환자(간기능 검사값의 이상변동이 나타날 수 있다.) 3) 저알부민혈증(신증후군) 환자 4) 담석의 병력이 있는 환자(담석형성이 보고되었다.) 5) 혈액응고저지제를 투여중인 환자 6) HMG-CoA 환원효소 저해제(예, 프라바스타틴, 심바스타틴 등)를 투여중인 환자 7) 고령자 3. 이상반응: 이 약은 각 단일제인 에제티미브 및 페노피브레이트의 이상반응을 포함한다. **포장단위** 30정/PTP (10정/PTP X3) **저장방법** 기밀용기, 실온(1~30℃) 보관 제품에 대한 자세한 사항은 사용설명서를 참고하시기 바랍니다. 가장 최근 개정된 제품설명서의 내용은 현대약품 홈페이지를 통해 확인하실 수 있습니다. 설명서 작성년월: 2021년 10월

[제조원정보]

현대약품(주) 서울특별시 강남구 봉은사로 135 현대약품빌딩 | 대표전화(고객센터) : 1666-9979 | www.hyundaipharm.co.kr

안국약품

Add for Better Safety Choice[1]

페바로젯®정

Pitavastatin calcium/Ezetimibe 2/10 mg, 4/10 mg

☑ 신규 당뇨병 발생률이 낮은 **Pitavastatin**[1*]과
Ezetimibe의 **복합제**로 **유의한 LDL-C 감소** 효과[2]

☑ **자체 3상 임상**으로 **유효성 & 안전성 확인**[2]

*Moderate-intensity pitavastatin (2-4 mg) vs. moderate-intensity atorvastatin (10-20 mg) and rosuvastatin (5-10 mg).

[References] 1. Choi JY, *et al.* Effect of pitavastatin compared with atorvastatin and rosuvastatin on new-onset diabetes mellitus in patients with acute myocardial infarction. *Am J Cardiol.* 2018;122:922-28. **2.** Data on file. 임상시험 결과보고서. 원발성 고콜레스테롤혈증 환자를 대상으로 AGT, AGZ의 병용요법과 AGT 단일요법의 유효성 및 안전성을 비교평가하기 위한 다기관, 무작위배정, 이중눈가림, 활성 대조, 요인설계 제 3상 임상시험. 2023 (version 2.0).

페바로젯정

[원료약품 및 분량] 1정 중 2/10 mg : 피타바스타틴칼슘(별규) 2 mg, 에제티미브(별규) 10 mg, 4/10 mg : 피타바스타틴칼슘(별규) 4 mg, 에제티미브(별규) 10 mg **[성상]** 2/10 mg : 노란색의 타원형 필름코팅정, 4/10 mg : 분홍색의 타원형 필름코팅정 **[효능/효과]** 원발성 고콜레스테롤혈증 : 원발성 고콜레스테롤혈증(이형접합 가족형 및 비가족형) 또는 혼합형 이상지질혈증 환자의 상승된 총 콜레스테롤(total-C), LDL-콜레스테롤(LDL-C), 아포 B 단백(Apo-B), 트리글리세라이드(TG) 및 non-HDL-콜레스테롤을 감소시키고, HDL-콜레스테롤(HDL-C)을 증가시키기 위한 식이요법의 보조제로서 이 약을 투여한다. **[용법/용량]** 이 약은 식사와 관계없이 1일 1회 투여한다. 이 약을 투여하기 전 또는 투여 중인 환자는 반드시 표준 콜레스테롤 저하식을 지속적으로 해야 한다. 이 약의 투여량은 환자의 LDL-콜레스테롤의 기저치, 권장되는 치료목표치 및 환자의 반응에 따라 조절되어야 한다. 이 약은 초회용량으로 1일 1회 2/10 mg이 권장된다. LDL-콜레스테롤치의 저하효과가 충분하지 않은 경우 1일 최대 4/10 mg까지 증량할 수 있다. LDL-콜레스테롤치, 치료 목표 및 환자의 반응에 따라 4주 또는 그 이상의 간격을 두고 용량을 적절히 조절한다. 피타바스타틴칼슘과 에제티미브를 병용으로 복용하고 있는 환자인 경우, 복용의 편리함을 위하여 이 약(개개의 주성분 함량이 동일한 복합제)으로 전환할 수 있다. **[금기]** 1) 이 약의 구성성분에 과민증이 있거나, 그 병력이 있는 환자 2) 활동성 간질환 환자 또는 원인이 밝혀지지 않은 아미노전이효소수치의 지속적 상승이 있는 환자 3) 중증의 간장애 또는 담도폐쇄가 있는 환자 및 담즙울체 환자 4) 사이클로스포린을 투여중인 환자 5) 근육병증 환자 6) 임부 또는 임신의 가능성이 있는 부인 및 수유부 7) 소아(사용경험이 없다.) 8) 이 약은 유당을 함유하고 있으므로, 갈락토오스 불내성(galactose intolerance), Lapp 유당분해 효소 결핍증(Lapp lactase deficiency) 또는 포도당-갈락토오스 흡수장애(glucose-galactose malabsorption) 등의 유전적인 문제가 있는 환자에게는 투여하면 안된다. **[포장단위]** 30정/병 **[저장방법]** 차광기밀용기, 실온(1~30°C) 보관 **[사용기한]** 제조일로부터 36개월 **[제조자]** 안국약품(주)

※제품 정보는 축약된 내용이므로, 자세한 정보는 최신의 각 제품설명서를 참고하시기 바랍니다.

안국약품 서울특별시 영등포구 시흥대로 613(대림동) Tel. 02-3289-4200

PVZ-C058-A20230810

STAFEN

Overall Improvement in Lipid Profile
by Optimizing TG, HDL-C as well as LDL-C Levels

BEYOND
LDL-C
lowering

pitavaSTAtin+FENofibrate

한림제약에서 최초로 개발한 스타펜캡슐은
집중적으로 LDL-C를 표적으로 삼기보다
TG, HDL-C, ApoB, 피브리노겐, hs-CRP 등
여러 가지 Factor의 긍정적인 개선 효과로
심혈관혜택을 기대할 수 있습니다.

대한민국 최초 달 탐사선 다누리호가 선택한 궤도
Ballistic Lunar Transfer(BLT) 태양, 지구, 달 등 움직이는 주변 천체들의 중력 효과를 이용해 연료 소모를 최소화

스타펜 임상3상 결과, 스타펜®캡슐은 피타바스타틴 단일군과 비교하여 **non-HDL-C을 유의하게 감소**시켰으며, $p<.0001$
40%의 TG lowering과 **20%의 HDL-C raising 효과**를 나타내었습니다 Ref.) Clinical Therapeutics/Volume 42, Number 10, 2020(한림제약 스타펜 임상3상)

성분/함량	피타바스타틴칼슘 2mg + 페노피브레이트160mg	용법용량	1일 1회 1캡슐 식사 직후 복용
효능효과	관상동맥심질환(CHD) 고위험이 있는 성인환자에서 피타바스타틴 2mg 단일 치료요법시 LDL-콜레스테롤 수치는 적절히 조절되지만 트리글리세라이드 수치는 높고 HDL-콜레스테롤 수치는 낮은 복합형이상지질혈증의 치료	성상	흰색의 원형 필름코팅정과 흰색의 구형 미세과립을 함유 하고 있는 상부 담녹색, 하부 흰색의 경질캡슐
		저장방법	기밀용기, 실온(1~30℃)보관
약가	872원 / 보험코드 645306120	포장단위	30캡슐/상자(10캡슐/PTPX3), 300캡슐/병 / 제조/판매원 한림제약(주)

CREDIBLE LDL-C lowering Effect	**BEYOND** LDL-C lowering	**EXPAND** Metabolic Effect
크레더블정 Ezetimibe/Rosuvastatin 10/5, 10/10, 10/20mg	스타펜® Pitavastatin/Fenofibrate 2/160mg	스타젯 Pitavastatin/Ezetimibe 2/10mg, 4/10mg
CV high risk의 **Intensive LDL-C lowering**을 통한 **CV Risk** 감소	**Mixed Dyslipidemia**의 다양한 **Lipid Profile** 관리를 통한 **Residual CV Risk** 감소	지질개선 뿐 아니라 긍정적인 **Metabolic effect**로 안전하고 효과적으로 **CV Risk** 감소

한림제약 이상지질혈증 **개량신약 복합제 치료옵션** 입니다.

한림제약

YOOYOUNG PHARMACEUTICAL
유영제약

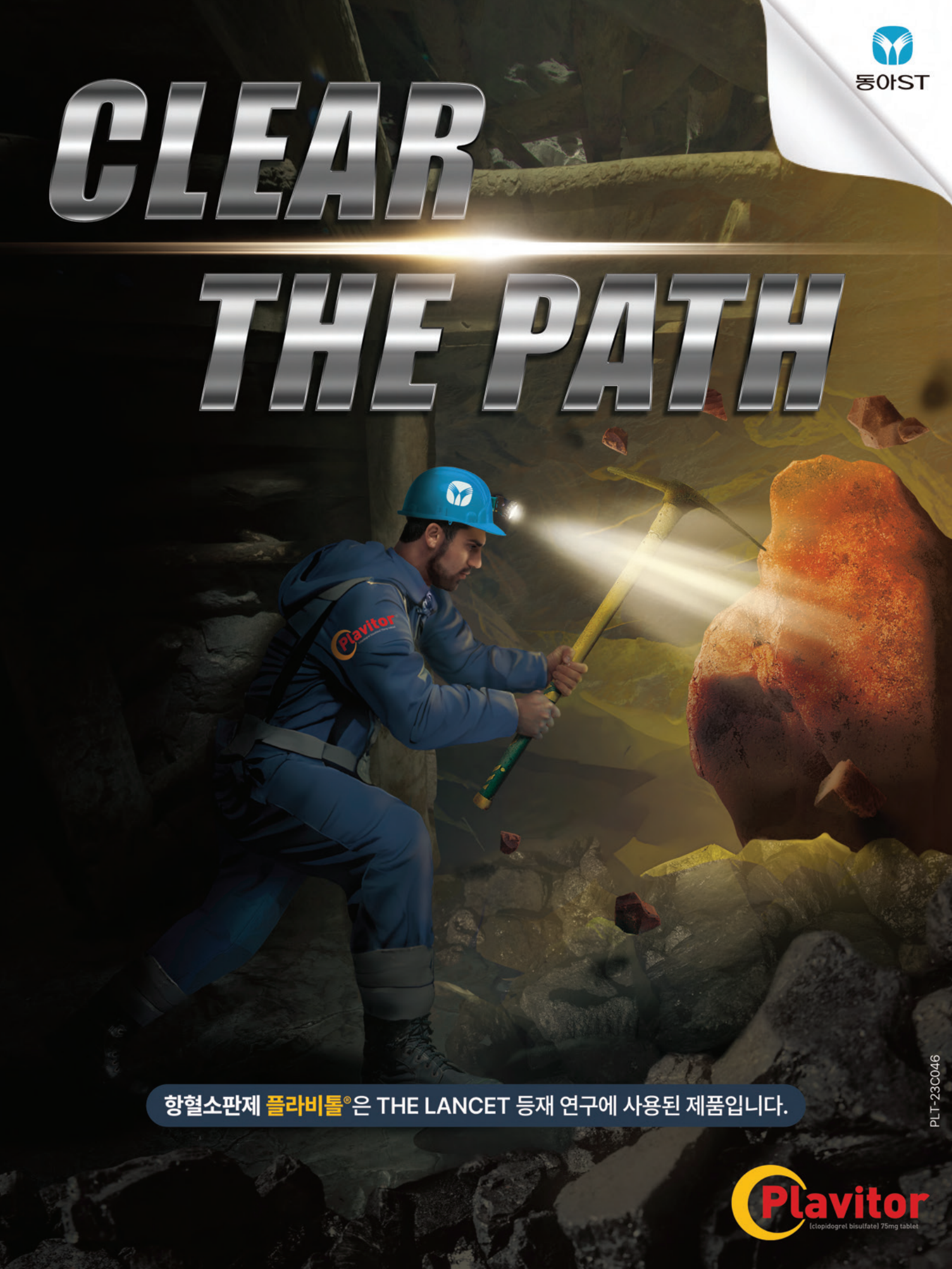
프라바페닉스
(Pravastatin 40mg+Fenofibrate 160mg)

프라바페닉스

The 1st Choice of Mixed Dyslipidmia

당뇨병발생률부터
근육관련 부작용과
약물상호작용의 위험까지 적은

프라바페닉스는
당근약입니다.


CLEAR
THE PATH
동아ST
Plavitor
항혈소판제 플라비톨®은 THE LANCET 등재 연구에 사용된 제품입니다.
PLT-23C046
Plavitor
(clopidogrel bisulfate) 75mg tablet

타바로젯®정

피타바스타틴칼슘 / 에제티미브

DAEWON

올래

Efficacy는 올리고[1]

NODM* 위험은 내리고[2]

LDL-C 감소 효과는 올리고 부작용 위험은 내리고 싶다면
지금 **바로** 타**바로**젯®으로 시작하세요

*NODM: New-Onset Diabetes Mellitus, Atorvastatin, Rosuvastatin 대비

References 1. 타바로젯 제 3상 임상시험 결과 2. Seo WW, et al. Cardiovasc Diabetol. 2022 May 23;21(1):82.

Drug information

타바로젯정 (피타바스타틴칼슘/에제티미브) 2/10 mg, 4/10 mg [성상] 2/10 mg 노란색의 타원형 필름코팅정, 4/10 mg 분홍색의 타원형 필름코팅정 **[효능·효과]** 원발성 고콜레스테롤혈증 **[용법·용량]** 이 약은 식사와 관계없이 1일 1회 투여한다. **[저장 방법]** 차광기밀 용기, 실온(1~30℃) **[사용기간]** 제조일로부터 36개월 **[포장단위]** 30정/병 ※제품에 대한 자세한 정보는 최신 제품설명서를 참고하시기 바라며, 홈페이지(www.daewonpharm.com)를 통해 확인하실 수 있습니다.

DAEWON 04808 서울특별시 성동구 천호대로 386 **TEL** 02 2204 7000 **FAX** 02 3436 4878 **WEB** www.daewonpharm.com

[효능 · 효과] 1. 만성동맥폐색증(버거씨병, 폐색성 동맥경화증, 당뇨병성 말초혈관병증 등)에 따른 궤양, 동통 및 냉감 등 허혈성 제증상의 개선 2. 뇌경색(심인성뇌색전증 제외) 발증 후 재발억제

[용법 · 용량] **프레탈®정**은 성인 1회 100mg을 1일 2회 경구 투여합니다. 단, 연령, 증상에 따라 적절히 증감합니다. **프레탈®서방캡슐**은 성인 1회 200mg을 1일 1회 경구 투여합니다. 이 약은 식사를 피하여 공복 상태에서 복용합니다.

PLT-23-001 | 20230116 approved

The First

세계 최초의 Statin, Compactin[1] 으로부터 시작된 메바로친®

Compactin은
Sankyo Co., Ltd.(現, Daiichi Sankyo Co., LTD)에서
1976년 Akira Endo박사에 의해 발견된
전 세계 최초의 Statin이며,
메바로친® **[프라바스타틴나트륨]**의
모체가 되었습니다[2].
약 50년의 역사를 지닌 메바로친®

이상지질혈증 치료의 첫 번째 선택으로
다시 주목해야 할 분명한 이유입니다.

Reappraise, **메바로친®**

[References] 1. Endo, Akira. "A historical perspective on the discovery of statins." *Proceedings of the Japan Academy. Series B, Physical and biological sciences* vol. 86,5 (2010): 484-93. doi:10.2183/pjab.86.484
2. Kishida, Y et al. *Yakugaku zasshi : Journal of the Pharmaceutical Society of Japan* vol. 111,9 (1991): 469-87. doi:10.1248/yakushi1947.111.9_469

메바로친®정 5, 10, 20, 40 mg

[주성분] 프라바스타틴 나트륨 **[효능·효과]** 1. 원발성고지혈증: 고콜레스테롤혈증(IIa형), 고콜레스테롤혈증과 고트리글리세라이드혈증의 복합형(IIb형) 2. 고콜레스테롤혈증 또는 복합성고콜레스테롤혈증을 갖고 있는 환자 중 다음의 고위험군 환자에서 심근경색의 초발, 관상동맥심질환성 사망의 위험성 감소 3. 심근경색 또는 불안정성 협심증의 병력이 있는 환자에서 심근경색, 심혈관재관류술의 필요성, 허혈성 뇌졸중, 일과성 허혈발작 질환의 위험성 감소 **[용법·용량]** 치료를 시작하기 전에, 환자는 저콜레스테롤 식이를 시작해야 하고, 치료 중에도 이를 지속하여야 한다. 통상의 개시용량은 10 mg, 20 mg 혹은 40 mg 단일 용량으로 1일 1회이다. 환자의 반응에 따라 최대 40 mg까지 증량할 수 있다. **[사용상의 주의사항]** 1. 다음 환자에는 투여하지 않는다. 1) 이 약에 과민증 또는 그 병력이 있는 환자 2) 활성 간질환 또는 원인이 밝혀지지 않는 트랜스아미나제의 지속적 상승이 있는 환자 3) 임부 또는 임신하고 있을 가능성이 있는 부인, 수유부 4) 소아 5) 중증의 간·신부전 환자 6) 근병증 환자 7) 담즙울체 환자 8) HDL 콜레스테롤 상승이 동반된 hyperalphalipoproteinaemia에 의한 고콜레스테롤혈증 환자 9) 이 약은 유당을 함유하고 있으므로, 갈락토오스 불내성(galactose intolerance), Lapp 유당분해효소결핍증(Lapplactase deficiency) 또는 포도당-갈락토오스 흡수장애(glucose-galactose malabsorption)등의 유전적인 문제가 있는 환자 2. 이상반응 1) 과민증: 발진, 아나필락시스, 혈소판감소, 백혈구 감소, 용혈성 빈혈, 항핵항체(ANA) 양성, 혈액침강속도 증가, 혈관염, 루푸스양증후군, 광과민증, 혈압강하, 혈관부종, 피부근염, 소양증. 2) 소화기계: 설사, 구역, 구토, 변비, 복통, 위부불쾌감, 구내염, 가슴쓰림, 복부팽만감, 식욕부진. 3) 간장: 간기능 이상. 4) 신장: BUN, 혈청 크레아티닌치의 상승. 5) 골격근: 횡문근 융해증, 관절염, 관절통, 근육병변. 6) 정신신경계: 두통, 어지러움, 불면, 말초신경병증, 우울증, 권태감, 피로, 수면장애, 인지장애. 7) 기타: 요산상승, 혈뇨, 부종, 탈모, 발기부전 **[제조원]** HK inno.N **[개정년월일]** 2023년 3월 1일 ※ 본 정보는 요약된 일부의 정보입니다. 따라서 최신 변경 된 허가사항이나, 보다 자세한 내용은 한국다이이찌산교 홈페이지(www.daiichisankyo.co.kr)의 제품 설명서나 의약품안전나라(nedrug.mfds.go.kr)을 참고하시기 바랍니다.

P23-136-2025.06-V11

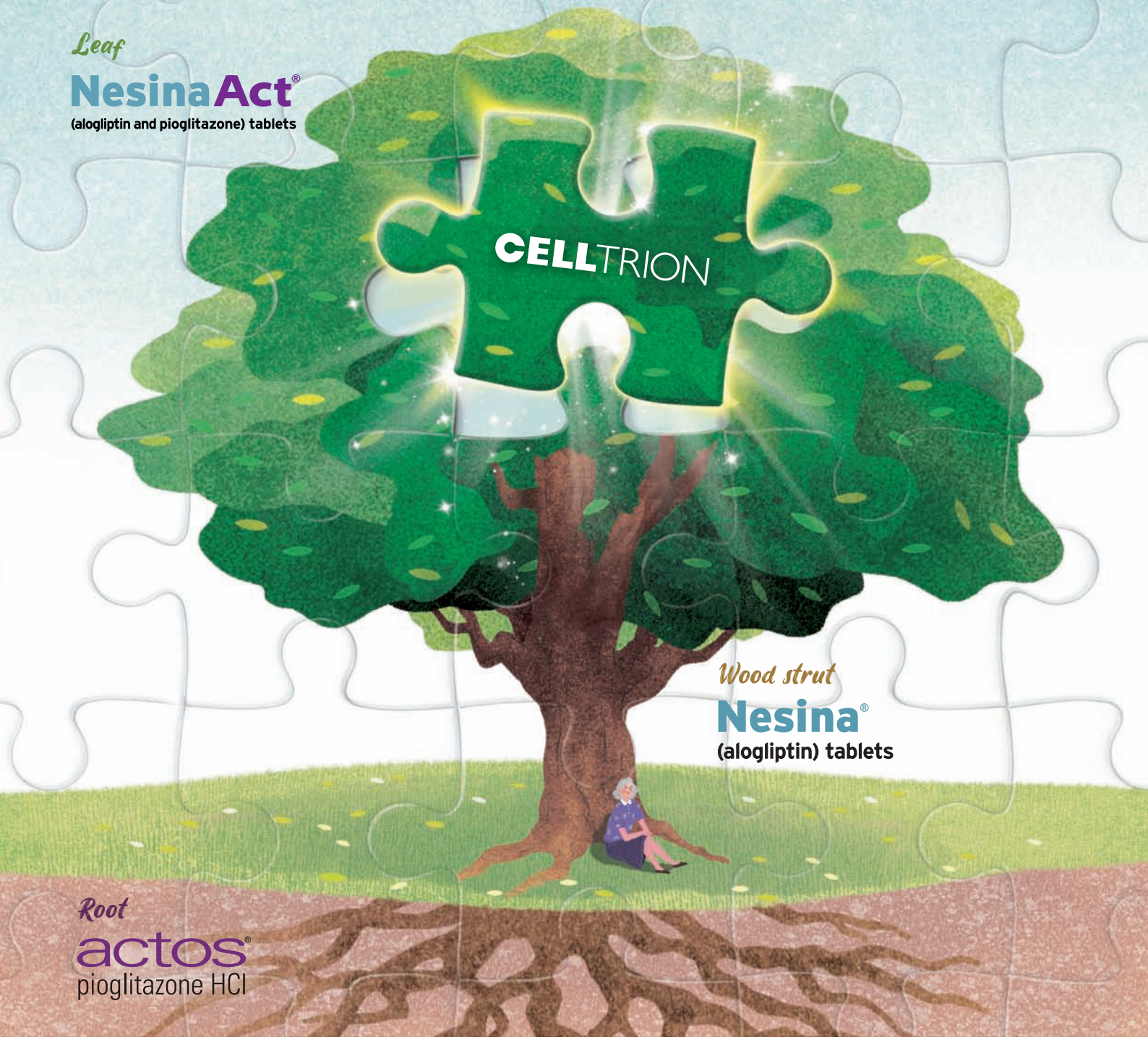
[판매원]
Daiichi-Sankyo 한국다이이찌산교주식회사
서울시 중구 을지로5길 26 미래에셋 센터원빌딩 동관 15층 Tel. 02-3453-3300

[공동판매원]
KUHNIL 건일제약㈜ www.kuhnil.com
서울 중구 청계길 14 오송빌딩 건일제약 Tel. 02-714-0091

메바로친® 정 (Pravastatin sodium)

Caring for every Piece of diabetes

Celltrion Pharm Golden Triple for Diabetes



ACTOS® [Product Name] Actos Tablet 15 mg (pioglitazone hydrochloride)/Actos Tablet 30 mg (pioglitazone hydrochloride) **[Active Ingredient]** Pioglitazone hydrochloride 16,53 mg (pioglitazone 15 mg)/Pioglitazone hydrochloride 33,06 mg (pioglitazone 30 mg) **[Indications]** Actos is indicated as an adjunct to dietary and exercise therapy to improve glycemic control in patients with type 2 diabetes. - Monotherapy - Combination therapy **[Dosage and Administration]** Actos should be taken once daily without regard to meals. The dose of Actos should not exceed 30 mg once daily for monotherapy or combination therapy with sulfonylurea, metformin, insulin. **[Precautions]** 1. Warnings 1) Thiazolidinediones, including Actos, cause or exacerbate ongestive heart failure in some patients. 2) Initiation of Actos in patients with heart failure is contraindicated. Actos is not recommended in patients with symptomatic heart failure. 3) Actos, like other thiazolidinediones, can cause fluid retention when used alone or in combination with other antidiabetic medications such as insulin. Fluid retention may lead to or exacerbate heart failure. 4) Instruct patients to promptly report any sign of macroscopic hematuria or other symptoms such as dysuria or urinary urgency that develop or increase during treatment as these may be due to bladder cancer. 2. Do not use in patients with 1) A known history of a hypersensitivity reaction to Actos or its ingredients 2) Heart failure or history of heart failure 3) Active bladder cancer or history of bladder cancer 4) Hepatic impairment 5) Severe renal impairment 6) Diabetic ketoacidosis, diabetic coma and pre-coma, type 1 diabetes 7) Before and after surgery, patients with severe infection or major trauma. 8) Un investigated macroscopic hematuria 9) Pregnant women or women who may become pregnant 10) Hereditary problems of galactose intolerance, the Lapp lactase deficiency or glucose-galactose malabsorption because Actos tablets contain lactose. **[Storage]** Store at 25°C (15-30°C), keep container tightly closed, and protect from light moisture and humidity.

* This is a summary of the approved information, please refer to the package product information or http://drug.mfds.go.kr for detailed information.

OT2022-14

CELLTRION PHARM CELLTRION | [Domestic Chemical Business Unit] IT Venture Tower West Building(17F), 135, Jungdae-ro, Songpa-gu, Seoul
[Customer Service Center] 080-850-3611~2/ www.celltrionph.com

Jardiance® (empagliflozin) JardianceDuo® (empagliflozin/metformin HCl) Esgliteo® (empagliflozin/linagliptin)

MANAGE YOUR PATIENT WITH CRM BENEFIT

제2형 당뇨병 환자의 대사-신장-심장 관리, CRM의 Evidence를 가진 자디앙®을 지금 고려해 주세요![1-3]

3P MACE[1*]
14%
vs. Placebo
HR 0.86
(95.02% CI 0.74, 0.99, *P*=0.04)

CV Death[1]
38%
vs. Placebo
HR 0.62
(95% CI 0.49, 0.77, *P*<0.001)

HbA1c[2]**
1.35%
vs. Baseline

Kidney Disease Progression or CV Death[3]
36%
vs. Placebo
HR 0.64
(95% CI 0.54, 0.77)

※ HCP 대상으로 제작된 홍보물이며 가공 또는 복사 및 배포를 금지합니다.
※ 자디앙®의 만성심부전, 만성신장병 적응증은 자디앙 10mg에만 해당됩니다.
※ 자디앙®은 제2형 당뇨병 환자의 심혈관계 사망 및 주요 심혈관질환의 위험 감소를 목적으로 국내에서 승인받지 않았습니다.
*Pooled empagliflozin group (empaglifozin10mg and 25mg) Change from baseline in HbA1c at week 24 in empagliflozin 10mg q.d.

3P-MACE, 3-point major adverse cardiovascular event; **CI**, confidence interval; **CRM**, cardio-renal metabolic; **CV**, cardiovascular; **HbA1c**, glycated hemoglobin; **HR**, hazard ratio; **q.d.**, once daily.

References 1. Zinman B, et al. *N Engl J Med.* 2015;373(22):2117-2128 and supplementary data. **2.** Hadjadj S, et al. *Diabetes Care.* 2016;39:1718-1728. **3.** Herrington WG, et al. *N Engl J Med.* 2023;388(2):117-127.

Product Information ※제품에 대한 자세한 사항은 QR코드로 연결되는 허가사항을 통해 확인 부탁드립니다.

자디앙®정 10mg | 자디앙®정 25mg | 에스글리토®정 10/5mg | 에스글리토®정 25/5mg

자디앙듀오®정 5/500mg | 자디앙듀오®정 5/850mg | 자디앙듀오®정 5/1000mg | 자디앙듀오®정 12.5/500mg | 자디앙듀오®정 12.5/850mg | 자디앙듀오®정 12.5/1000mg

Boehringer Ingelheim | 서울특별시 중구 통일로 10 연세재단세브란스빌딩 16층 (04527) www.bikr.co.kr TEL : 080-222-0110
YUHAN | 서울특별시 동작구 노량진로 74 www.yuhan.co.kr
Lilly | 서울특별시 중구 후암로 98 LG서울역빌딩 4층 www.lilly.com/kr

PC-KR-104579, 202407

HE SURVIVED A CV EVENT.*
NOW PROTECT HIM FURTHER WITH PRALUENT®

Redefining expectations for those at risk of cardiovascular events

Treatment options for high CV risk patients with ASCVD[4] – Praluent®

PRALUENT® demonstrated a significant reduction in risk of MACE and a favourable safety profile in CV high-risk patients.[1-4]

[STUDY DESIGN] ODYSSEY OUTCOMES was a randomised, double-blind, placebo-controlled phase 3 study. Patients with a recent MI or unstable angina, and on high-intensity statin (40 mg or 80 mg atorvastatin or 20 mg or 40 mg rosuvastatin, or maximally tolerated dose of one of these agents) +/- other lipid-lowering therapy but not at predefined target LDL-C were enrolled.

*Defined as hospitalised with an acute coronary syndrome (myocardial infarction or unstable angina).

ASCVD, atherosclerotic cardiovascular disease; **CV,** cardiovascular; **MACE,** major adverse cardiovascular event; **MI,** myocardiac infarction.

References **1.** PRALUENT® SmPC, EMA, 2023. **2.** Schwartz GG, et al. N Engl J Med. 2018;379(22):2097-2107.
3. Steg GP, et al. J. Am. Heart Assoc. 2019;140:103-112. **4.** 프랄런트®펜주 식약처 허가사항(개정년월일: 75 mg, 150 mg 2022.12.20 / 300 mg 2023.02.13)

Praluent®
alirocumab

프랄런트®펜주 75 mg/150 mg/300 mg (알리로쿠맙) | 피하주사용 | 전문의약품
※프랄런트®의 제품정보는 우측 QR코드를 통해 확인하시기 바랍니다.
프랄런트®펜주 75 mg(문안개정년월일: 2022.12.20)
프랄런트®펜주 150 mg(문안개정년월일: 2022.12.20)
프랄런트®펜주 300 mg(문안개정년월일: 2023.02.13)

75 mg 제품설명서 바로보기
150 mg 제품설명서 바로보기
300 mg 제품설명서 바로보기

㈜사노피 아벤티스 코리아 서울특별시 서초구 반포대로 235 TEL: 02)2136-9000 / FAX: 02)2136-9588
MAT-KR-2301698-1.0-08/2023

sanofi

inno.N
innovate New & Next

보건의료전문가용

여러분, 다파엔으로 심신항부하세요!

이노엔, 다파엔

※ 다파엔정은 제2형 당뇨병 환자의 혈당 조절을 위한 단독요법과 병용요법 및 만성 심부전, 만성 신장병을 효능·효과로 허가받았습니다.

다파엔정
제품정보 바로가기

다파엔정10밀리그램
(다파글리플로진프로판디올수화물)

전문의약품

다파엔® 정 10mg
다파글리플로진

다파엔® 듀오 서방정
5/1000, 10/500, 10/1000mg
다파글리플로진 / 메트포르민

에이치케이이노엔㈜ 충청북도 청주시 흥덕구 오송읍 오송생명2로 239 | 서울지사 : 서울특별시 중구 을지로 100 파인에비뉴 6, 7, 8층 | http://www.inno-n.com | Tel.080-700-8802

240510_DAF-BUAD01-11-01

심혈관계 사건 재발 방지를 위해, 지금 선생님의 도움이 필요합니다![1]

ACS 환자 입원 시부터 두 번째 방문 시*까지 빠르게 레파타를 시작하세요.[2]

*최대내약용량 스타틴과 에제티미브 치료 4-6주 후에도 LDL-C 목표 수치에 도달하지 못하면, PCSK9 억제제 추가를 권고합니다. **ACS,** Acute Coronary Syndrome.

References 1. Sabatine MS, et al. *N Engl J Med.* 2017;376(18):1713-1722. **2.** Mach F, et al. *Eur Heart J.* 2020;41(1):111-188.

레파타®주 프리필드펜 140 밀리그램 제품요약정보

[제품명] 레파타®주 프리필드펜 (에볼로쿠맙) **[효능효과]** 1) 고콜레스테롤혈증 및 혼합형 이상지질혈증: 원발성 고콜레스테롤혈증 (이형접합 가족성 고콜레스테롤혈증 포함) 또는 혼합형 이상지질혈증을 가진 성인 환자에서 식이요법에 대한 보조요법으로 투여 - 최대내약용량의 스타틴으로 충분히 LDL-콜레스테롤(LDL-C)이 조절되지 않는 환자에서 스타틴 또는 스타틴과 다른 지질 저하요법과 병용 투여 - 스타틴 불내성 환자에서 이 약 단독 또는 다른 지질 저하요법과 병용 투여 · 이형접합 가족성 고콜레스테롤혈증 (HeFH) 을 가진 만 10세 이상의 소아 환자에서 식이요법에 대한 보조요법으로 다른 지질 저하요법과 병용 투여 2) 동형접합 가족성 고콜레스테롤혈증: 동형접합 가족성 고콜레스테롤혈증 (HoFH) 을 가진 성인 및 만 10세 이상의 소아 환자에서 다른 지질저하제(스타틴, 에제티미브, 지질분리반출법 등)와 병용 투여 3) 죽상경화성 심혈관계 질환: 확립된 죽상경화성 심혈관계 질환을 가진 성인 환자에서 다른 위험인자들의 교정에 대한 보조요법으로 LDL-C 수준을 저하시킴으로써 심혈관계 위험을 감소시키기 위해 최대내약용량의 스타틴 또는 스타틴과 다른 지질 저하요법과 병용 투여 **[용법용량]**원발성 고콜레스테롤혈증 및 혼합형 이상지질혈증 (이형접합 가족성 고콜레스테롤혈증 포함)을 가진 성인 및 소아 (만 10세 이상) 환자, 확립된 죽상경화성 심혈관계 질환을 가진 성인에서 2주 1회 140 mg 또는 월 1회 420 mg (두 용량은 임상적으로 동등하다),동형접합 가족성 고콜레스테롤혈증을 가진 성인 및 소아 (만 10세 이상) 환자에서 월 1회 420 mg을 복부, 허벅지 또는 상완에 피하주사. **[다음 환자에게는 투여하지 말 것]** 주성분 또는 이 약의 구성성분에 과민반응이 있는 환자, **[약물이상반응]** 주요 임상시험에서 가장 흔하게 보고된 이상사례는 비인두염, 상기도 호흡기 감염, 요통, 관절통, 인플루엔자 및 주사부위반응이었다. **[일반적 주의]** 이 약이 운전 및 기계 사용에 미치는 영향은 없거나 무시할 만한 수준이다. **[임부 및 수유]** 임부의 임상적 상태가 이 약의 투여를 요구하는 경우가 아니면 임신기간동안 투여하지 않는다. 이 약이 모유로 이행되는지는 알려지지 않았음. 이 약 치료의 유익성 및 수유의 유익성을 고려하여 수유 중단 또는 이 약 치료 중단 여부를 결정해야 한다. **[보관 및 취급상의 주의사항]** 원포장을 유지하여 차광 냉장 (2-8˚C) 보관. 냉장고에서 꺼내면 실온(최대 25˚C)에 보관하며, 30일 이내에 사용. **[적용상의 주의]** 이 약 투여 전에 제품설명서에 첨부된 프리필드펜 사용설명서를 참고한다. **[수입판매원]** 암젠코리아유한회사 (서울특별시 중구 을지로5길 19, 20층). **[개정년월일]** 2022.03.22 **제품을 처방하시기 전 상세 제품설명서를 참고하여주시기 바랍니다.**

AMGEN 암젠코리아유한회사
서울특별시 중구 을지로5길 19 페럼타워 20층 의약품과 관련된 문의는 암젠 의학정보팀으로 연락주시기 바랍니다.
☎ 전화 : 00798-611-3554 (수신자부담), (02) 3434-4899 ✉ 이메일 : medinfo.JAPAC@amgen.com

JEIL 제일약품 주식회사
서울특별시 서초구 사평대로 343 (반포동, 제일약품사옥) Tel. 02 549 7451 Fax. 02 549 5054
소비자상담 080 555 7171(수신자부담) www.jeilpharm.co.kr

KR-08399-REP-2022-Sep

TG, blind spot of dyslipidemia

Residual CV risk management

Statin 치료로 LDL-C 수치가 목표에 도달하더라도 CV risk는 여전히 남아있습니다.[1-3]

Proven CV Outcome

리피딜은 ACCORD, FIELD study 같은 대규모 임상을 통해 TG가 높고 HDL-C이 낮은 제 2형 당뇨병 환자*에서 심혈관 사건 위험 감소 효과를 입증하였습니다.[4,5]

supra LIPIDIL® 160mg
FENOFIBRATE

* 리피딜슈프라®정의 허가사항 상 효능 · 효과는 원발성 고지혈증이며, 허가받은 효능 · 효과 이외의 사용은 권장하지 않습니다.

References) 1. Sarwar N et al. Triglycerides and the Risk of coronary heart Disease 10158 Incident Cases Among 262525 Participants in 29 Western Prospective Studies, Circulation, 2007;115:450-458 **2.** Park JE et al. Lipid-lowering treatment in hypercholesterolaemic patients: the CEPHEUS Pan-Asian survey. Eur J cardiovasc Prev Rehabil. 2012;19:781-94 **3.** Miller M et al. Impact of Triglyceride Levels Beyond Low-Density Lipoprotein Cholesterol After Acute Coronary Syndrome in the PROVE IT-TIMI 22 Trial J AM Coll cardiol, 2008;51:724-30 **4.** ACCORD Study Group. Effects of Combination Lipid Therapy in Type 2 Diabetes Mellitus. N Engl J Med. 2010;362:1563-74 **5.** The FIELD Study Investigators. Effects of long-term fenofibrate therapy on cardiovascular events in 9795 people with type 2 diabetes mellitus (the FIELD study): randomized controlled trial. Lancet. 2005;366:1849-61

리피딜슈프라®정(페노피브레이트) 제품 정보 전문의약품

[원료약품의 분량] 1정(722.0 mg) 중 페노피브레이트(EP)-160 mg **[효능·효과]** 원발성 고지혈증 : 고콜레스테롤혈증(IIa형), 고콜레스테롤혈증과 고트리글리세라이드혈증의 복합형(IIb형), 고트리 글리세라이드혈증(IV형) **[용법·용량]** 페노피브레이트는 반드시 식이요법과 병행하여 투여하십시오. 이 약은 빈속에서는 흡수가 덜 될 수 있으므로 식후 즉시 투여하십시오. **성인** : 페노피브레이트로서 1일 1회 160 mg을 식후 즉시 경구투여하십시오. **소아** : 소아에 대한 이 약의 사용에 관한 임상자료는 아직 없습니다. **고령자** : 신기능이 감소되지 않은 경우 일반적으로 용량 감량이 필요하지 않습니다. **신장애 환자** : 중등도~중증 신장애 환자(혈청 크레아티닌치 2.5 mg/dL 이상)의 경우 이 약을 투여하지 않습니다. **[사용상의 주의사항]** 1. 다음 환자에는 투여하지 마십시오.1)간장애 환자 2)중등도~중증 신장애 환자(혈청 크레아티닌치 2.5 mg/dL 이상)(횡문근융해증이 나타날 수 있습니다.) 3)임부 또는 임신하고 있을 가능성이 있는 여성, 수유부 4)이 약 및 이 약의 구성성분에 과민반응 환자 5)선재성 담낭질환 환자(담석형성이 보고되었습니다.) 6)피브레이트 또는 케토프로펜으로 치료하는 동안 광알레르기 또는 광독성을 경험한 환자 7)소아 8)담관간경화증 환자 9)췌장염 환자(중증 고중성지질혈증으로 인한 급성 췌장염 제외) 10)이 약은 유당을 함유하고 있으므로, 갈락토오스 불내성(galactose intolerance), Lapp 유당분해효소 결핍증(Lapp lactase deficiency) 또는 포도당-갈락토오스 흡수장애(glucose-galactose malabsorption)등의 유전적인 문제가 있는 환자에게는 투여하면 안 됩니다. **※ 기타 자세한 사항은 제품설명서 전문을 참조하십시오. 첨부문서 내용변경에 대한 자세한 사항은 식품의약품안전처 '의약품통합정보시스템(https://nedrug.mfds.go.kr)'을 참조하시기 바랍니다.**

GC 녹십자
• 수입판매원 : (주)녹십자 충북 음성군 금왕읍 내송리 156-50
• 제조원 : RECIPHARM FONTAINE 프랑스 Rue des Pres-Potets 21121 Fontaine les Dijon France

Abbott

KOR2224280

제일약품

비아트리스 코리아㈜

에제티미브와 리피토®의 Atorvastatin API와 동일한 원료를 사용한 복합제[1]

리피토® 플러스

리피토®플러스는 자사 개발 단계에서 최초 설계된 제형보다 최대 17% 작게 개선시켰습니다.[2]

낱알정보[2,3]

*실제 사이즈 입니다.

Ezetimibe/Atorvastatin 10/10 mg (가격: 637원/정)

구분	장축	단축	두께	총중량
기존설계	13	5	4	309.4
발매제품	11.3	4.5	4.5	257.50

Ezetimibe/Atorvastatin 10/20 mg (가격: 808원/정)

구분	장축	단축	두께	총중량
기존설계	15	6	5	414.7
발매제품	13.2	5.3	4.7	360.50

Ezetimibe/Atorvastatin 10/40 mg (가격: 1,415원/정)

구분	장축	단축	두께	총중량
기존설계	17	7	7	625.7
발매제품	15.5	6.0	5.6	566.50

기존 증량 대비 감소율

Abbreviations, API: Active Pharmaceutical Ingredient (원료의약품)

References, 1. 리피토®플러스정 허가증 2. Data on file 3. 리피토® 플러스정 국내허가사항 식품의약품안전처 의약품 안전나라. Available at https://nedrug.mfds.go.kr/searchDrug. Accessed Oct 04, 2022

리피토® 플러스정 10/10 mg, 10/20 mg, 10/40 mg (에제티미브/아토르바스타틴칼슘삼수화물) 제품설명서 요약정보

[Safety info.] 당뇨병이 발생할 위험성이 높은 몇몇 환자들에게서 적절한 당뇨병 치료를 요하는 과혈당증을 유발할 수 있다는 몇 가지 증거가 제시됨. 그러나 스타틴 제제의 혈관성 위험성 감소효과는 이러한 위험성을 상회하므로 스타틴 치료중단의 사유가 될 수 없음. 위험성이 있는 환자 (공복혈당 5.6~6.9 mmol/L, BMI>30kg/m2, 중성지방수치 상승, 고혈압들은 진료지침에 따라 임상적 및 실험실적 수치 모니터링을 실시해야 함. [제품명·성분명] 리피토® 플러스정 Lipitor® Plus Tab. (Ezetimibe/Atorvastatin calcium trihydrate 10/10mg, 10/20mg, 10/40mg) [성상] 백색 내지 미백색의 양면이 볼록한 캡슐모양의 필름코팅정 [성분함량] 10/10mg : 1정(257.50mg) 중 아토르바스타틴칼슘삼수화물(벌규) 10.85mg (아토르바스타틴으로서 10mg) 에제티미브(벌규) 10.00mg을 함유, 10/20mg : 1정(360.50mg) 중 아토르바스타틴칼슘삼수화물(벌규) 21.70mg (아토르바스타틴으로서 20mg) 에제티미브(벌규) 10.00mg을 함유, 10/40mg : 1정(566.50mg) 중 아토르바스타틴칼슘삼수화물(벌규) 43.40mg (아토르바스타틴으로서 40mg) 에제티미브(벌규) 10.00mg을 함유 [효능·효과] 원발성 고콜레스테롤혈증(이형접합 가족형 및 비가족형) 또는 혼합형 이상지질혈증 환자의 상승된 총 콜레스테롤(total-C), LDL-콜레스테롤(LDL-C), 아포 B 단백(Apo B), 트리글리세라이드(TG) 및 non-HDL-콜레스테롤을 감소시키고, HDL-콜레스테롤(HDL-C)을 증가시키기 위한 식이요법의 보조제로서 이 약을 투여한다. 동형접합 가족형 고콜레스테롤혈증(HoFH) 환자의 상승된 총 콜레스테롤 및 LDL-콜레스테롤을 감소시키기 위한 다른 지질저하 치료의 보조제로서, 또는 다른 지질 저하 치료가 유용하지 않은 경우 이 약을 투여한다. [용법·용량] 식사와 관계없이 1일 1회 투여한다. 이 약을 투여 전 또는 투여 중인 환자는 반드시 표준 콜레스테롤 저하식을 해야 하며, 투여량은 환자의 LDL-콜레스테롤의 기저치, 권장되는 치료목표치 및 환자의 반응에 따라 조절되어야 한다. 원발성 고콜레스테롤혈증의 경우, 용량범위는 1일 10/10mg~10/80mg이며, 권장 초회용량은 1일 10/10mg 또는 10/20mg이며 LDL-콜레스테롤 감소가 더 많이(55% 이상) 요구되는 환자의 경우, 초회용량으로 1일 10/40mg이 권장된다. 동형접합 가족형 고콜레스테롤혈증 환자의 권장 용량은 1일 10/40mg 또는 10/80mg 이며 다른 지질저하치료에 유용하지 않은 경우 투여한다. [사용상의 주의 사항] [경고] 아토르바스타틴 및 동일 계열의 다른 약물에서 미오글로빈뇨에 의한 이차적인 급성 신부전을 동반하는 횡문근융해가 드물게 보고되었다. 따라서 급성의 심각한 근육병증을 나타내는 환자 또는 횡문근융해에 의해 이차적으로 신부전이 발생될 수 있는 위험요소(예, 중증 급성 감염, 저혈압, 주요 외과수술, 외상, 중증의 대사, 내분비 및 전해질 장애, 조절되지 않는 발작)를 가진 환자는 이 약의 치료를 일시적으로 보류하거나 또는 중단해야 한다. [금기] 이 약의 주성분 또는 구성성분에 과민반응이 있는 환자, 활동성 간질환 환자 또는 혈청 아미노전달효소 수치가 원인불명으로 지속적으로 높은 증상을 수반한 환자, 근질환 환자, 임부 또는 임신하고 있을 가능성이 있는 여성 및 수유부, 글레카프레비르 및 피브렌타스비르를 투여 중인 환자. 이 약은 유당을 함유하고 있으므로 갈락토오스 불내성, Lapp 유당분해효소 결핍증 또는 포도당-갈락토오스 흡수장애 등의 유전적인 문제가 있는 환자 [신중투여] 알코올 중독자 또는 간질환의 병력이 있는 환자, 중등증 또는 중증의 간기능 장애 환자, 근육병증/횡문근융해에 걸리기 쉬운 요인을 가진 환자, 피브레이트 계열 약물을 병용투여하는 환자 [이상반응] 이 약(에제티미브와 아토르바스타틴)에 대한 위약 대조 임상시험에서 투여 기간의 중앙값은 12주였으며 628명의 환자 중 위약군보다 이 약 투여군에서 높은 비율로 발생하여 약물 투여 중단의 원인이 된 가장 흔한 이상반응은 근육통(0.8%), 복통(0.8%), 간 효소 상승(0.8%) 이며, 가장 흔하게 보고된 이상반응은 ALT증가(4%), AST증가(4%), 근골격계 통증(4%) 이었다. [제품설명서 개정년월일] 2021.04.15./제조자: 제일약품 [06543] 서울특별시 서초구 사평대로 343 (반포동, 제일약품) TEL : 02-549-7451~65 FAX : 02-549-4045 https://www.jeilpharm.co.kr / 판매자: 비아트리스코리아㈜(04527) 서울특별시 중구 세종대로 14, 비동 15층 (남대문로 5가, 그랜드센트럴) / Tel : 02-6411-6200 / Fax : 02-6411-6201 리피토플러스 제품 의학정보 문의 Website : www.viatris.co.kr / Tel : 02-6411-6200 / E-mail : VIATRIS-Korea-MI@Viatris.com , 제일약품 [06543] 서울특별시 서초구 사평대로 343 (반포동, 제일약품) TEL : 02-549-7451~65 FAX : 02-549-4045 https://www.jeilpharm.co.kr ※ 제품에 대한 자세한 정보는 제품에 동봉된 제품설명서 및 식품의약품안전처 의약품안전나라 (https://nedrug.mfds.go.kr)를 참고하시기 바랍니다.

제조자: 제일약품 [공장] [17172] 경기도 용인시 처인구 백암면 청강가창로 7 (B동외) Tel : 080-333-6312 Website : www.jeilpharm.co.kr / 리피토플러스 제품 의학정보 문의 pvsafety@jeilpharm.co.kr Tel: 02-549-7451(EXT: 557), Fax: 02-542-7451

판매자: 비아트리스 코리아㈜ [04527] 서울특별시 중구 세종대로 14, 비동 15층 (남대문로 5가, 그랜드센트럴) / Tel : 02-6411-6200 / Fax : 02-6411-6201 / 리피토 제품 의학정보 문의 Website : www.viatris.co.kr / Tel : 02-6411-6200 / E-mail : VIATRIS-Korea-MI@Viatris.com

제일약품 [본사] [06543] 서울특별시 서초구 사평대로 343 (반포동, 제일약품) TEL : 02-549-7451~65 FAX : 02-549-4045 https://www.jeilpharm.co.kr 소비자상담 Tel : 080-555-7171 (수신자부담) E-mail : webmaster@jeilpharm.co.kr
리피토플러스 제품 의학정보 문의 pvsafety@jeilpharm.co.kr Tel: 02-549-7451(EXT: 557), Fax: 02-542-7451

LIPP-2022-0010-11Nov2025

LEQVIO®
(inclisiran) injection 284 mg/1.5 mL

JUST IT
A YEAR BY HCP

JUST TWO IT

렉비오는 **연 2회 투여**로 기존 치료 대비 더 큰 **LDL-C 강하효과**를 나타내며,
한국의 siRNA 치료제 시대를 열었습니다.[1,2]

[Study design[2]] The objective of the study was to evaluate the effectiveness of an "inclisiran first" implementation strategy (adding inclisiran immediately upon failure to reach LDL-C <70 mg/dL despite receiving maximally tolerated statins) vs representative usual care in U.S. patients with atherosclerotic cardiovascular disease. VICTORION-INITIATE, a prospective, pragmatically designed trial, randomized patients 1:1 to inclisiran (284 mg at days 0, 90, and 270) plus usual care (lipid management at treating physician's discretion) vs usual care alone. Primary endpoints were percentage change in LDL-C from baseline and statin discontinuation rates.

References 1. 식품의약품안전처 의약품통합정보시스템. 렉비오프리필드시린지 (인클리시란나트륨). https://nedrug.mfds.go.kr
2. Koren MJ, et al. An "Inclisiran First" Strategy vs Usual Care in Patients With Atherosclerotic Cardiovascular Disease. J Am Coll Cardiol. 2024 May 21;83(20):1939-1952.

LDL-C, low-density lipoprotein cholesterol; **siRNA**, small interfering RNA.

NOVARTIS **한국노바티스주식회사**
서울시 영등포구 국제금융로 10 Three IFC, 49층 07326 TEL: 02)768-9000 FAX: 02)785-1939

※ Product Information 처방하시기 전 QR 코드 또는 식품의약품안전처 의약품통합정보시스템 (https://nedrug.mfds.go.kr)을 통해 상세 제품정보를 참조하시기 바랍니다.

렉비오프리필드시린지
(인클리시란나트륨)

FA-112119411_2026June24

보건의료전문가용

안정적인 혈압 강하 복합제

레바캄정

Lercanidipine HCl·Valsartan

LG화학

레바캄정 (레르카니디핀염산염/발사르탄) 10/80mg, 10/160mg, 20/160mg

■**효능·효과** 레르카니디핀 단독요법으로 혈압이 적절하게 조절되지 않는 본태성 고혈압 ■**용법·용량** 1일 1회, 1회 1정으로, 최소 식사 15분전에 물과 함께 가능하면 매일 같은 시간에(예 : 아침)에 복용하는 것을 권장. ■**사용상의 주의사항** 다음 환자에게는 투여하지 말 것 : 1) 이 약 및 이 약의 구성성분 또는 디히드로피리딘계 약물에 과민반응 환자 2) 임부 또는 임신하고 있을 가능성이 있는 여성 및 수유부 3) 중증의 간장애 환자, 간경화증 또는 담도폐쇄, 담즙정체 환자 4) 유전성 혈관부종 환자이거나, ACE억제제 혹은 안지오텐신 II 수용체 길항제 치료시 혈관 부종의 병력이 있는 환자 5) 중증의 신장애 환자(크레아티닌청소율 10 mL/min 미만)(사용경험이 없다.) 6) 원발고알도스테론증 환자(원발고알도스테론증 환자는 레닌-안지오텐신-알도스테론계가 활성화되지 않기 때문으로 이 약을 투여하지 않는다.) 7) 좌심실 유출로 폐색증 환자 8) 치료되지 않은 울혈심부전 환자 9) 불안정형 협심증 환자 10) 급성 심근경색(1개월 이내) 환자 11) 혈액투석중인 환자 12) 당뇨병이나 중증도~중증의 신장애 환자(사구체여과율 < 60mL/min/1.73m2)에서 알리스키렌 함유제제와의 병용 13) 18세 미만의 소아 및 청소년

■**제조 및 판매원** ㈜LG화학 **※ 자세한 정보는 최신의 제품설명서를 참고하시기 바라며, 홈페이지(www.lgchem.com)에서 확인하실 수 있습니다.**

LEV-BR-A010-03-DEC22

의약전문가용

First Choice
리피로우® 정
아토르바스타틴칼슘삼수화물

CKD, Chong Kun Dang

리피로우정 (아토르바스타틴칼슘삼수화물)

전문의약품

[조성·성상] 1. 원료약품의 분량 1정 중 유효성분: 리피로우정 10 mg - 아토르바스타틴칼슘삼수화물(별규) 10.85 mg (아토르바스타틴으로서 10 mg), 리피로우정 20 mg - 아토르바스타틴칼슘삼수화물(별규) 21.70 mg (아토르바스타틴으로서 20 mg), 리피로우정 40 mg - 아토르바스타틴칼슘삼수화물(별규) 43.40 mg(아토르바스타틴으로서 40 mg), 리피로우정 80 mg - 아토르바스타틴칼슘삼수화물(별규) 86.80 mg(아토르바스타틴으로서 80 mg), **2.** 성상: 흰색의 달걀형 필름코팅정제 **[효능·효과] 1.** 다음의 심장혈관 질환에 대한 위험성 감소 **2.** 고지혈증 **3.** 식이요법에도 불구하고 여전히 아래의 기준에 해당되는 이형접합 가족형 고콜레스테롤혈증을 가진 10~17세의 소아환자(여성의 경우 초경 이후의 환자)의 총콜레스테롤, LDL-콜레스테롤, 아포-B 단백 수치를 감소시키는 식이요법의 보조제(10, 20 mg에 한함): **가.** LDL-콜레스테롤이 여전히190 mg/dL이상 (≥190 mg/dL)이거나 **나.** LDL-콜레스테롤이 여전히 160 mg/dL이상 (≥160 mg/dL)이고, 조기 심장혈관 질환의 가족력이 있는 경우 또는 해당 소아환자에서 두 가지 이상의 다른 심장혈관 질환의 위험인자가 있는 경우 **[용법·용량] 1.** 고지혈증 환자: 1일 1회 10-80 mg 범위로 투여, - 동형접합 가족형 고콜레스테롤혈증 환자: 1일 1회 10-80 mg, **2.** 이형접합 가족형 고콜레스테롤혈증 소아환자(10~17세): 권장 초회용량 1일 10 mg, 권장 최대용량 1일 20 mg(10, 20 mg에 한함)

※ 자세한 내용은 제품설명서를 참고하시기 바랍니다.

종근당

LPLU_CKD_202401_338(Expire 202602)

SINCE 1999[1]

LIPITOR®

Timeless Choice

TIME TO CHECK THE LIPID **LE**VELS AND **S**TART ATORVA**S**TATIN TREATMENT FOR DYSLIPIDEMIA PATIENT.[3]
WE HOPE THE LIPITOR FAMILY WILL BE YOUR FIRST **CHOICE**.

Total prescription volume of statin monotherapy and combination therapy from 2003 to 2023

st

[Safety information] Some evidence suggests that statins as a class raise blood glucose and in some patients at high risk of future diabetes, may produce a level of hyperglycaemia where formal diabetes care is appropriate. This risk, however, is outweighed by the reduction in vascular risk with statins and therefore should not be a reason for stopping statin treatment. Patients at risk (fasting glucose 5.6 to 6.9 mmol/L, BMI>30kg/m², raised triglycerides, hypertension) should be monitored both clinically and biochemically according to national guidelines.

References 1. 리피토정 품목허가증(1999.12.01) **2.** IQVIA Sales audit data, 2003년~2022년 Full year, 2023 3Q Total 기준 처방량 1위, (스타틴 단일제+복합제 전체 기준, ATC: C10A1+C10C0) **3.** 한국지질•동맥경화학회 진료지침위원회. 이상지질혈증 진료지침 제5판. 2022.

LIPITOR® atorvastatin calcium tablets

Importer VIATRIS Distributor VIATRIS JEIL PHARMACEUTICAL CO.,LTD.

◀ **Lipitor® Product Information**
For more detailed product information, please refer to the product manual or the Viatris website linked via QR code.

VIATRIS [04527] 14, Sejong-daero, Jung-gu, Seoul, Korea **TEL** 02-6411-6200 **FAX** 02-6411-6201 | **Website** www.viatris.co.kr **TEL** 02-6411-6200
E-mail Viatris-Korea-MI@viatris.com

JEIL PHARMACEUTICAL CO.,LTD. **Headquarters** [06543] 343, Sapyeong-daero, Seocho-gu, Seoul, Korea (Ban-podong, Jeil Pharmaceutical Co.,LTD. **TEL** +82-2-549-7451~65 (Tel) **FAX** +82-2-549-4045
Website https://www.jeilpharm.co.kr
Customer service center: 080-555-7171 (Toll free) **E-mail** webmaster@jeilpharm.co.kr
Medical information for Healthcare Professionals: pvsafety@jeilpharm.co.kr **TEL** +82-2-549-7451(EXT: 557) **FAX** +82-2-542-7451

KR-LIPI-2024-00042-27MAR2027

유한양행의 **로수바미브**는
한국인 제2형 당뇨병 환자를 대상으로 한 연구*에서
지질 프로파일 개선의 유효성과 안전성을 입증했으며,
국내에서 **연간 100만 건 이상 처방**§되고 있습니다.

* Diabetes Ther. 2020 Apr;11(4):859-871(rosuvastatin 10mg monotherapy 대비 로수바미브 10/5mg의 유효성과 안전성을 확인). § 2022년 유비스트 '로수바미브정' 처방건 수 기준

전문의약품

로수바미브정(에제티미브/로수바스타틴칼슘) 10/5mg, 10/10mg, 10/20mg [원료약품 및 분량] • 로수바미브 10/5mg : 에제티미브(USP) 10.0mg, 로수바스타틴칼슘(별규) 5.2mg(로수바스타틴으로서 5mg) • 로수바미브 10/10mg : 에제티미브(USP) 10.0mg, 로수바스타틴칼슘(별규) 10.4mg(로수바스타틴으로서 10mg) • 로수바미브 10/20mg : 에제티미브(USP) 10.0mg, 로수바스타틴칼슘(별규) 20.8mg(로수바스타틴으로서 20mg) **[성상]** • 로수바미브 10/5mg : 분홍색의 장방형 필름코팅정 • 로수바미브 10/10mg : 노란색의 장방형 필름코팅정 • 로수바미브 10/20mg : 분홍색의 달걀형 필름코팅정 **[효능 · 효과]** 원발성 고콜레스테롤혈증; 원발성 고콜레스테롤혈증(이형접합 가족형 및 비가족형) 또는 혼합형 이상지질혈증 환자의 상승된 총 콜레스테롤(totalC), LDL-콜레스테롤(LDL-C), 아포 B 단백(Apo B), 트리글리세라이드(TG) 및 non-HDL-콜레스테롤을 감소시키고, HDL-콜레스테롤(HDL-C)을 증가시키기 위한 식이요법의 보조제로서 이 약을 투여합니다. 고콜레스테롤혈증에 기인한 동맥경화성 혈관 질환의 위험성이 증가한 환자에게 지질조절약물을 투여할 때에는 많은 위험 인자를 고려해야 합니다. 지질조절약물은 적절한 식이요법(포화지방 및 콜레스테롤 제한을 포함)과 함께 사용하고, 식이요법 및 다른 비약물학적 조치에 대한 반응이 불충분한 경우에 사용해야 합니다. 이 약 투여에 앞서 이상지질혈증의 다른 이차적 원인(예를 들면, 당뇨, 갑상선기능저하증, 폐쇄성 간질환, 만성 신부전, LDL-콜레스테롤을 증가시키는 약물 및 HDL-콜레스테롤을 감소시키는 약물[progestin, anabolic steroid, 및 corticosteroid])을 확인하여야 하며, 필요한 경우 이차적 원인을 치료해야 합니다. 지질 검사시에는 총콜레스테롤, LDL-콜레스테롤, HDL-콜레스테롤 및 트리글리세라이드를 포함해야 합니다. 트리글리세라이드 수치가 400mg/dL 이상(4.5mmol/L 이상)인 경우에는 초원심분리로 LDL-콜레스테롤 농도를 측정해야 합니다. 급성 관상동맥 사고로 입원할 경우에는 입원 시 혹은 입원 후 24시간 이내에 지질을 측정해야 합니다. 환자의 퇴원 전 혹은 퇴원 시에 LDL 저하치료를 시작하는데 있어 이 측정치가 참고가 될 수 있습니다. **[용법·용량]** 이 약은 식사와 관계없이 1일 1회 투여합니다. 이 약을 투여하기 전 또는 투여 중인 환자는 반드시 표준 콜레스테롤 저하식을 지속적으로 해야 합니다. 이 약의 투여량은 환자의 LDL-콜레스테롤의 기저치, 권장되는 치료목표치 및 환자의 반응에 따라 조절되어야 합니다. 원발성 고콜레스테롤혈증: 이 약의 용량범위는 1일 10/5mg~10/20mg입니다. 초회용량으로 1일 10/5mg이 권장됩니다. LDL-콜레스테롤 감소가 더 많이 요구되는 환자의 경우 용량을 조절하여 투여할 수 있습니다. 이 약의 투여를 시작한 후 또는 용량을 적정한 후에는 4주 이상의 간격을 두고 혈중 지질 수치를 확인한 후 그에 따라 용량을 조절하며, 1일 최대 10/20mg까지 증량할 수 있습니다. 에제티미브와 로수바스타틴을 병용으로 복용하고 있는 환자인 경우, 복용의 편리함을 위하여 이 약(개개의 주성분 함량이 동일한 복합제)으로 전환할 수 있습니다. **[사용상의 주의사항]** 1. 다음 환자에는 투여하지 마십시오. 1) 이 약의 주성분 또는 구성성분에 과민반응이 있는 환자 2) 활동성 간질환 환자 또는 혈청 아미노전달효소 수치가 원인불명으로 지속적으로 높은 증상을 수반한 환자('5. 일반적 주의' 참조) 3) 근질환 환자 4) 사이클로스포린 병용투여 환자 5) 중증의 신부전의 신장애 환자(creatinine clearance (CLcr)<30mL/min) 6) 임부 또는 임신하고 있을 가능성이 있는 여성 및 수유부 ('7. 임부 및 수유부에 대한 투여' 참조) 7) 근병증/횡문근융해증에 걸리기 쉬운 환자들에게 로수바스타틴 40밀리그램 용량 투여는 금기입니다. 이러한 인자들은 아래와 같습니다. (1) 중등도의 신장애 (크레아티닌 청소율 < 60ml/min) (2) 갑상선기능저하증 (3) 유전적인 근질환 병력 또는 가족력이 있는 경우 (4) 다른 스타틴계 약물(HMG-CoA 전환효소 저해제) 또는 피브레이트 계열 약물에 대한 근육 독성의 병력이 있는 경우 (5) 알코올 중독 (6) 혈장 농도가 증가할 수 있는 상황 (7) 아시아계 환자 (8) 피브레이트 계열 약물 병용투여 8) 이 약은 유당을 함유하고 있으므로, 갈락토오스 불내성(galactose intolerance), Lapp 유당분해효소 결핍증(Lapp lactase deficiency) 또는 포도당-갈락토오스 흡수장애(glucose-galactose malabsorption) 등의 유전적인 문제가 있는 환자에게는 투여하면 안 됩니다.자세한 내용은 제품설명서 참조) **[저장방법]** 기밀용기, 실온(1~30℃) 보관 **[포장단위]** 30정(PTP), 100정(병) **[개정연월일]** 22.10.21 ※ 제품에 대한 자세한 내용은 최신의 제품설명서 또는 식약처 의약품통합정보시스템 홈페이지(https://nedrug.mfds.go.kr/)를 참조하여 주시기 바랍니다.

제조판매자
유한양행
• 본사 : 서울 동작구 노량진로 74 • 공장 : 충청북도 청주시 청원구 오창읍 연구단지로 219
• 홈페이지 : www.yuhan.co.kr • 소비자상담실 : 080-024-1188 (수신자 요금부담)

로수바스타틴과 에제티미브의 복합제
로수바미브®정

KR-RSM-2300002

Hanmi 한미약품

강력한 Dual-Action
이상지질혈증 치료제
로수젯정
(에제티미브/로수바스타틴칼슘)

로수젯의 RACING!!
CV Outcome 입증!!

- 세계 최초 Rosuvastatin+Ezetimibe 복합제의 **Long-term CV Outcome 입증**
- Rosuvastatin 단일제와의 비교임상을 통해 로수젯의 **Efficacy & Safety 우수성 입증**
- Rosuvastatin+Ezetimibe 복합제에 대한 **새로운 Landmark Trial**

로수젯,
RACING Trial Lancet
게재!!

ROS-II-2209-01 HM·Design 2209_01

Reference.
Kim BK, Hong SJ, Lee YJ, *et al.* Long-term efficacy and safety of moderate-intensity statin with ezetimibe combination therapy versus high-intensity statin monotherapy in patients with atherosclerotic cardiovascular disease (RACING): a randomised, open-label, non-inferiority trial. *Lancet.* 2022 Jul 30;400(10349):380-390.

JW 중외제약

효과를 높여보세요

당뇨병 걱정없이, 약효까지 강력하게!

강력한 이상지질혈증 솔루션

리바로젯®

효과성
- 복용 후 50% 이상 LDL-C 감소효과 입증 [1)]
- 저·중등위험군은 물론, 고위험군 이상으로 넓어진 치료범위 [2)]

안전성
- 당뇨병 안전성을 공인 받은 유일한 스타틴
- 32개국 당뇨병 안전성 공인 [3)]

1), 2) 리바로젯 3상 허가임상 결과 3) 32개 국가 현황 •유럽(13개국): 영국, 독일, 프랑스, 스페인, 이탈리아, 핀란드, 네덜란드, 스웨덴, 오스트리아, 아일랜드, 포르투갈, 그리스, 노르웨이 •동유럽(5개국): 러시아, 폴란드, 우크라이나, 조지아, 아르메니아 •동아시아(5개국): 싱가포르, 대만, 인도네시아, 말레이시아, 카자흐스탄 •중동(8개국): 사우디아라비아, UAE, 쿠웨이트, 카타르, 요르단, 오만, 레바논, 바레인 •아프리카(1개국): 모로코