대한심장학회 🍑 심장학연구재단 KSC 2018 Daily

2018. 10. 11. Thursday

Today's Highlights

New Frontiers in Cardiology 1

Past, Present and Future of Cardiology 08:40-10:10 AM Rm. Theatre

Late Breaking & Featured Research from Asia-Pacific 1

10:20-11:50 AM Rm. Theatre

Cross Specialty 1: Intervention & Arrhythmia

NOAC in CAD and PAD 14:00-15:30 PM Rm. Theatre

JCS-KSC Joint Symposium: Basic Research

Drug Discovery for Heart Failure 14:00-15:30 PM Rm. Grand 2

Late Breaking & Featured Research from Korea

15:40-17:10 PM Rm. Theatre

E-Poster Session

08:40 AM-17:10 PM Rm. Vista (B2, B3)

Welcome Message



Wan Joo Shim, MD, PhD President, The Korean Society of Cardiology

1 would like to congratulate the opening of The 62nd Annual Scientific Meeting of The Korean Society of Cardiology (KSC 2018) and hope it to be a successful meeting!

The long dreary season of summer has passed, and autumn, the season of harvest has arrived. The time to learn the basic and clinical knowledge of cardiovascular diseases and share the crops of our research has also come. Every year, I encourage all of our members to attend the Annual Scientific Meeting of The Korean Society of Cardiology as it is a great chance to gain and exchange knowledge in various areas of cardiology. Since the changes in population increase of chronic disease has become the important social issue, it is essential for cardiologist to update information through opportunities as KSC 2018.

Over the past decade, members of the KSC have put efforts to improve the meetings in many ways. As a result of their efforts, KSC 2018 is organized with instructive sessions for all attendees. From the fundamental knowledge to the latest issues, KSC 2018 would cover various themes comprehensively.

I am convinced that every participants will be satisfied with advantages from KSC 2018. Lastly, I would like to express my gratitude to all of our board members for their dedication in preparing KSC 2018 the 62nd Annual Scientific Meeting of The Korean Society of Cardiology.



Seung-Jung Park, MD, PhD Chairman The Korean Society of Cardiology

On behalf of The Korean Society of Cardiology, I would like to extend my sincere welcome to all of attendees at KSC 2018 (62nd Annual Scientific Meeting of The Korean Society of Cardiology) which is being held on October 11th to 13th at Walkerhill, Seoul, Korea.

KSC 2018 (62nd Annual Scientific Meeting of The Korean Society of Cardiology) aims to explore the latest research findings and exchange scientific development with healthcare professionals in the field of cardiology. The congress features the most applicable issues related to the diagnosis, treatment, and management of cardiovascular diseases through interesting scientific sessions, educational workshops, and cutting edge lectures.

Over the three days, KSC 2018

in Cardiology" session handling the advance of scientific knowledge by world leading experts. During the conference, chances to learn the informative and practical techniques for fellows and trainees will be prepared in the "Education Workshop". Moreover, Editors-in-Chief of prominent foreign journals (Arteriosclerosis, Thrombosis, and Vascular Biology, Circulation Journal, Journal of the American College of Cardiology: Cardiovascular Interventions) will give a lecture with the topic "Learning insights from the Editors" in the "Meet the Editor-in-Chief" session. There are also various presentations such as oral, mini oral, cases and e-poster sessions including award session to foster prestigious young investigators. Through these fruitful programs, KSC 2018 will manage the currently encountered major issues covering air pollution, healthcare policy, and rehabilitation on cardiovascular disease.

will be composed with interesting sessions starting with "New Frontiers

> 1 hope that The 62nd Annual Scientific Meeting of The Korean Society of Cardiology to be the meaningful time for healthcare professionals to open the new era in the field of cardiology.





Program at a glance: Day 1, Oct 11, 2018

(B1)	(B1)	(B1)	Grand 3 (B1)	Grand 4 (B1)	Grand 5 (B1)	Walker 1 (1F)	Walker 2 (1F)	Cosmos (3F)	Calla (3F)	Vista (B2)		Vista (B3)	
New Froniters in Cardiology 1 Past, Present and Future of Cardiology	Myocardial Infarction 1 The Burden of Myocardial Infarction in the World	Basic Research 1 Drug Development and Therapy	Women Heart Disease 1 Gender and Medicine	Cardiometa- bolic Syndrome 1 Crosstalk between Vascular Calcification and Cardiometabolic Syndrome	Oral Abstracts CAD 1 1-6	Oral Abstracts Arrhythmia 1 7-12	Heart Failure 1 Multidisciplinary Team Approach in HF Management	Imaging 1 Multimodal Imaging Approach for Infiltrative Heart Disease	Oral Abstracts Intervention 1 13-18	Oral Abstracts Vascular& Hypertension 1 19-24 (Case & Abstract Zone 1) Oral Abstracts Vascular& Hypertension 2 31-36 (Case & Abstract Zone 1)		E-Poster 1-197	
Late Breaking & Featured Research from Asia-Pacific 1	Intervention 1 40 Years of PCI: From Basic to Beyond	Basic Research 2 The Fire of Life: Cardiac Energy Metabolism	Women Heart Disease 2 Update CVD in Women	Cardiometa- bolic Syndrome 2 Current Status of Cardiometabolic Syndrome	Myocardial Infarction 2 Therapeutic Decisions beyond Guideline	Arrhythmia 1 ECG Review Course	Heart Failure 2 Advanced Heart Failure	Imaging 2 Coronary Artery Bypass Graft Surgery; Contemporary Practice in 2018	Oral Abstracts CAD 2 25-30				
Scientific Session [Bayer]	Diamond Session [BMS] [Pfizer/BMS]					Scientific Session [Daewoong/ Daiichisankyo]	Scientific Session [Novartis]						
										Mini Oral Zone 1 1-8	Case Zone 1 1-7	Mini Oral Zone 3 17-25	Case Zone 3 15-21
										Mini Oral Zone 2 9-16	Case Zone 2 8-14	Mini Oral Zone 4 26-31	Zone 4 22-28
Cross Specialty 1: Intervention& Arrhythmia NOAC in CAD and PAD	Myocardial Infarction 3 Current Practice and Debate	*JCS-KSC Joint (Basic Research) Drug Discovery for Heart Failure	Lipid 1 Progression and Regression of Atherosclerosis	Oral Abstracts Intervention 2 37-42	Oral Abstracts Heart Failure 1 43-48	Oral Abstracts Arrhythmia 2 49-54	Echo 1 Imaging in Heart Failure	Smart Healthcare Use of Smart Health Techonologies and Big Data Analysis for Cardiovascular Research	Oral Abstracts CAD 3 55-60			E-Poster 1-197	
Late Breaking & Featured Research from Korea	Intervention 2 Hot Issues in Antithrombotic Therapy	Oral Abstracts Basic Research 1 61-66	Lipid 2 Cardiometabolic Risk Factors beyond Lipids	Oral Abstracts Arrhythmia 3 67-72	Oral Abstracts CAD 4 73-78	Arrhythmia 2 Stroke Summit	Echo 2 Valvular Heart Diseases	Epidemiology Improvement of CVD Prediction in the General Population	Oral Abstracts Intervention 3 79-84	85- (Case &	90 Abstract		
	in Cardiology 1 Past, Present and Future of Cardiology Late Breaking & Featured Research from Asia-Pacific 1 Scientific Session [Bayer] Cross Specialty 1: Intervention& Arrhythmia NOAC in CAD and PAD Late Breaking & Featured Research	in Cardiology 1 Past, Present and Future of Cardiology Late Breaking & Featured Research from Asia-Pacific 1 Cross Specialty 1: Intervention & Arrhythmia NOAC in CAD and PAD Late Breaking & Featured Research from Asia-Pacific 1 Cross Specialty 1: Intervention& Arrhythmia NOAC in CAD and PAD Late Breaking & Featured Research for Intervention & Arrhythmia NOAC in CAD and PAD Late Breaking & Featured Research Intervention 2 A Featured Research Antithrombotic	in Cardiology 1 Past, Present and Future of Cardiology Late Breaking & Featured Research from Asia-Pacific 1 Cross Specialty 1: Intervention 2 Arrhythmia NOAC in CAD and PAD Late Breaking World Intervention 1 40 Years of PCI: From Basic to Beyond Session [BMS] [Pfizer/BMS] Algorardial Infarction 3 Urent Practice and Debate NoAC in CAD and PAD Late Breaking & Featured Research Intervention 2 Arrhythmia NoAC in CAD and PAD Intervention 2 Arrhythmia NoAC in CAD and PAD Late Breaking & Featured Research Intervention 2 Hot Issues in Antithrombotic Research 1 Drug Development Research 2 Research 2 The Fire of Life: Cardiac Energy Metabolism *JCS-KSC Joint (Basic Research) Drug Discovery for Heart Failure Oral Abstracts Basic Research 1	Infarction 1 The Burden and Future of Cardiology Ca	Infarction 1 The Burden and Future of Cardiology Card	Infarction 1 The Burden and Future of Cardiology Ca	Infarction 1 Past, Present and Future of Cardiology C	In Cardiology Past, Present and Future of Cardiology Past, Present and F	Incarciology Infarction The Burds of Mycoardial Infarction in the World The Purpose of Cardiology Price Progression of Mycoardial Infarction The Purpose of Cardiology Medicine Progression of Mycoardial Infarction The Purpose of Cardiology Medicine Progression of Mycoardial Infarction The Purpose of Price Progression of Mycoardial Infarction The Purpose The Progression of Mycoardial Infarction The Purpose The Progression of Mycoardial Infarction The Purpose The Progression of Cardiometabolic Syndrome The Progression of Cardiome	Process Proc	Incardiology Past, Present Past, Present	Infarction Infarction The Burden of Mycoardial Infarction The Myco	Infarction The Burden and Future of Cardiology Infarction The Burden and Future of Cardiology Infarction in the World Infarction in the

Scientific & Diamond Sessions

Scientific Session 1 [Bayer]

Tailored Protection for Your Cardio-Vascular Patients

» Oct 11. 12:00-12:40 PM Rm. Theatre

Scientific Session 2 [Daewoong/Daiichisankyo]

Effective Treatments of Hypertension

» Oct 11, 12:00-12:40 PM Rm. Walker 1

Scientific Session 3 [Novartis]

ARNI: PARADIGM Shift in Heart Failure

» Oct 11, 12:00-12:40 PM Rm. Walker 2

Diamond Session [Pfizer/BMS]

Strategies to Optimize Management of Atherosclerotic CVD and Stroke Prevention in Atrial Fibrillation

» Oct 11, 12:00-12:40 PM Rm. Grand 1





New Frontiers in Cardiology 1

Digital Medicine



Evan Muse, MD, PhD Institute, USA

Digital medicine encompasses not only the use of mobile sensors, cloud computing, smartphones and devices but genomics, automated data analytics and even machine learning. Given that traditional medical systems have been

too slow, too costly and unable to promote the kind of improved health and wellness outcomes that would be expected for the amount invested, patients and healthcare providers are looking to fresh solutions to help not only manage chronic diseases but also have better metrics for wellness in an effort to prevent disease from the very beginning.

To overcome the challenges within the digital medicine space, we are seeing a growth of specialized centers and institutes set up at major universities and hospitals tasked solely to the study and advancement of digital medicine. Additionally, mobile applications and sensors are being integrated into cutting edge trials as digital biomarkers and are facilitating a shift in the way clinical trials are conducted from the start of patient recruitment to endpoint assessment and safety monitoring.

Digital medicine affords patients the opportunity to play a more centralized and active role in their overall health care. The ultimate hope is to see a seamless integration of patient level data gathered outside the traditional clinical spheres with patient specific data analytics to provide individual insights to disease management and prevention without diminishing the human elements that are so integral and vital to health. As we continue to identify barriers to patient engagement, health empowerment and individualized behavior change, and adapt our tools according with the individual in mind, these new tools will need thorough validation and continued study. The learning curve in testing and implementing digital medicine technologies into our lives and care systems has been steep but the momentum forward is as strong as it is exciting.

Past, Present, and Future of | Past, Present, and Future of **Myocardial Imaging**



Jeroen J. Bax, MD Medical Center

Imaging has become critical in clinical cardiology to understand pathophysiology and selection and/ or guidance of therapy. While it is wellestablished that echocardiography is the imaging technique of first choice to evalu-

ate patients with cardiovascular disease. other techniques (nuclear imaging with positron emission tomography [PET] and single-photon emission computed tomography [SPECT], cardiovascular magnetic resonance (CMR) and computed tomography (CT) - mostly read as 2-dimensional, but increasingly becoming 3-dimensional) are needed to image specific-disease characteristics or pathophysiological mechanisms that may impact on the patient's management. The evidence showing the incremental diagnostic and prognostic value of all these different imaging techniques is growing rapidly. More recently, fusion imaging (which is integration of the different imaging modalities - PET and CT or PET and CMR) is becoming popular. Advances in all the non-invasive cardiac imaging techniques have provided important new insights in the pathophysiology of all different cardiovascular diseases, but also permit risk stratification, and therapeutic guidance.

Past, Present, and Future of **Cardiac Epidemiology**



Katsuyuki Miura, MD PhD

Cardiovascular diseases (CVD) have become worldwide epidemic during the 20th century; which are mainly coronary heart disease (CHD) in Europe and North America, and stroke in East Asia. An international epidemiologic study,

the Seven Countries Study, tried to reveal the factors affecting the cross-country CVD difference in the 1960s. Cohort studies, such as the Framingham Heart

1960s, and they found "risk factors" which predict future CVD risk. Hypertension, hypercholesterolemia, smoking, and diabetes have been established as major CVD risk factors by the 1970s. Numerous cohort studies on CVD have been conducted in many countries and large-scale meta-analyses of cohort studies, such as Prospective Studies Collaboration (PSC), Asia-Pacific Cohort Studies Collaboration (APCSC), and Emerging Risk Factor Collaboration (ERFC), have been done since the 1990s. It was found that the modification of CVD risk factors by medication can reduce CVD risk in randomized controlled trials (RCTs) by the 1990s, and the treatment of hypertension or hypercholesterolemia has been common worldwide. Metaanalyses of RCTs, like Blood Pressure Lowering Treatment Trialists' Collaboration (BPLTTC) and Cholesterol Treatment Trialists Collaboration (CTTC) confirmed the evidence of the treatment of risk factors. Many observational and interventional epidemiologic studies revealed the causal relationship of lifestyle (nutritional) factors to CVD risk factors. Future challenges in CVD epidemiology would be: (1) screening and treatment of CVD risk factors and their cost in developing countries, (2) population strategy for CVD prevention, (3) worldwide epidemic of obesity, salt, and smoking, (4) personalized medicine for CVD prevention, (5) information technology for CVD prevention and management, and (6) CVD epidemiology in very old population (heart

Past, Present, and Future of **Antithrombotic Therapy**



failure and dementia).

Antithrombotic therapies for the treatment of acute coronary syndromes (ACS) and stable coronary artery disease have evolved substantially since groundbreaking trials more than 30 years demonstrated

the benefits of aspirin for the treatment of acute myocardial infarction (MI). Subsequently, intravenous and subcutaneous anticoagulants such as

Study and Whitehall Study, began in the | unfractionated heparin, low molecular weight heparins, and direct thrombin inhibitors were shown to provide additional benefit for patients with ACS when administered during the index hospitalization

> On top of the foundation of aspirin + an anticoagulant, intravenous glycoprotein IIb-IIIa inhibitors were shown to provide additional ischemic event reduction, with an increased risk of bleeding, for patients with ACS and for those undergoing percutaneous coronary intervention (PCI). However, oral glycoprotein IIb-IIIa inhibitors for extended duration use for the treatment of coronary artery disease (CAD) did not show benefits, so this class of anti-platelet therapies did not move

> Meanwhile, the advent of PCI showcased the need for dual anti-platelet therapy (aspirin + P2Y12 inhibitor: ticlopidine or clopidogrel) during and after PCI to prevent stent thrombosis and other ischemic complications. Further benefits were seen with more potent oral (prasugrel or ticagrelor) and intravenous (cangrelor) P2Y12 inhibitors when used during PCI and for the treatment of ACS.

> The last major development has been with novel oral anticoagulants (NOACs direct thrombin inhibitors and factor Xa inhibitors) that have shown reduced bleeding risk and ischemic event (in some cases) when compared with warfarin for patients with an indication for long-term anticoagulation such as atrial. Lower NOAC doses for certain agents have been shown to be associated with a lower risk of ischemic events when used to treat patients with ACS and those with stable CAD but it still remains uncertain whether NOACs have a role in the immediate post-ACS treatment period when patients are recommended to receive dual antiplatelet therapy for at least 12 months. As the developments are reflected upon, a new class of oral anticoagulants, factor XI inhibitors, are being developed and may offer a safer, more effective treatment option compared with NOACs

New Frontiers in Cardiology 1 Past, Present and Future of Cardiology

» Thursday, Oct 11, 08:40-10:10 AM / Theatre



JCS-KSC Joint Symposium

The main theme of JCS-KSC Joint Symposium this year is "Drug Discovery for Heart Failure". Four distinguished speakers will present to attendees the achievements and current research trends in heart failure treatment. This session will offer opportunities to learn from and interact with the experts from Japan and Korea.

BIO-based Cardiac Regeneration



Youngkeun Ahn, MD, PhD

In infarcted myocardium, cellular networks actively communicate with each other. Cardiac macrophages are significant cell type in the cardiac microenvironment and carry out pivotal regulatory functions during ventricular

remodeling

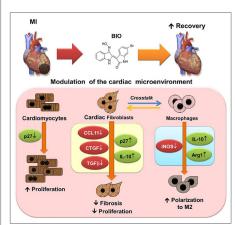
Macrophages can be broadly classified into two phenotypes: pro-inflammatory macrophages and anti-inflammatory macrophages. Studies have shown that increasing the numbers of antiinflammatory macrophages improved cardiac recovery.

Dr. Ahn have interest in the targeting microenvironment as a novel approach and found that a natural compound derivative BIO (6-Bromoindirubin-3-oxime) modulated the cardiac microenvironment to exert a therapeutic effect. In a series of in vitro and in vivo studies, he has

의료전문인용

proliferation, decreased pro-inflammatory factors expression, and induced polarization to the anti-inflammatory macrophages.

Dr. Ahn will deliver a lecture on the role of BIO as a drug that can modulate cardiac remodeling to improve cardiac function He will demonstrate that BIO induces opposing effects in cardiomyocytes and cardiac fibroblasts, which could promote



environment to improve remodeling after myocardial infarction

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remodeling. Moreover, BIO can shift macrophages from an inflammatory to anti-inflammatory phenotype (Figure 1).

Targeting Seno-metabolites/ Seno-antigens for the Treatment of Cardiovascular Disease



MD. PhD

Epidemiological studies have shown that age is the dominant risk factor for lifestyle-related diseases. However, the molecular mechanisms remain unclear. Cellular senescence is accompanied by a specific set of ph-

enotypic changes in morphology and gene expression including negative regulators of the cell cycle such as p53. Primary cultured cells from patients with premature aging syndromes are known to have a shorter lifespan than cells from age-matched healthy persons. It is also reported that the number of senescent cells increases in various tissues with

shown that BIO induced cardiomyocyte | cardiac functional recovery during | advancing age. Interestingly, such accumulation of senescent cells in aged animals is attenuated by caloric restriction that regulates the lifespan regulatory system and delays age-associate phenotypes.

> Dr. Minamino hypothesize that cellular senescence in vivo contributes to the pathogenesis of age-associated disease and have shown a critical role of cellular senescence in age-related pathologies. However, a direct inhibition of cellular aging signaling would lead to the increased incidence of cancer, so they need to develop anti-senescent therapy without cancer development.

Dr. Minamino will give a talk on a novel strategy of anti-senescent therapy for cardiovascular disease by targeting senometabolites and seno-antigens, which would not promote tumorigenesis.

JCS-KSC Joint Symposium Drug Discovery for Heart Failure Thursday, Oct 11, 14:00-15:30 PM / Grand 2

Lipid & Atherosclerosis





Cardiovascular diseases (CVD), mainly related to atherosclerosis, are the leading cause of death worldwide. Atherosclerosis is a multi-factorial disaster provoked and progressed by different risk factors such as hypertension, smoking. dyslipidemia, diabetes

mellitus, and so on.

Currently, it is regarded that atherosclerosis is a systemic inflammatory disease. Firstly, blood monocytes stick to the dysfunctional endothelial surface by binding to leukocyte adhesion molecules. Once the monocytes stick to the activated endothelium, proinflammatory cytokines induce a chemotactic stimulus that triggers them to enter the intima. Proinflammatory cytokines can act at different stages in the process: interleukin 1 (IL-1) and tumor necrosis factor (TNF) can control the expression of adhesion molecules involved in early and late leukocyte recruitment. Indeed, IL-1 and TNF can

lead to local production of growth factors, which draw smooth muscle cells from the media into the intima in the vascular wall. Within the intima, the monocytes mature into macrophages, which express scavenger receptors that allow them to engulf modified lipoprotein particles. The cytoplasm becomes engorged with lipid particles, giving the macrophages the typical microscopic frothy appearance of the foam cells found in atherosclerotic plaques. Finally, all the processes lead to advanced atherosclerotic plagues causing clinical CV events.

C-reactive protein (CRP) is an acute phase reaction protein, provoked especially by interleukin-6 (IL-6) and produced by the liver, which is often used as an inflammatory marker in inflammatory disease. Moreover, CRP could be useful biomarker to monitor subclinical inflammatory state stemming from atherosclerosis. Data from observational studies also give some support to the inflammatory hypothesis of CVD. A plenty of prospective cohort data demonstrates that elevated circulating levels of CRP are associated with an increased risk of future CVD events. These data imply that low grade systemic inflammation precedes

Continued on page 5

Arrhythmia

Korean AF Guideline



Severance Hospital.

by 1.3 to 2.0 standard deviation units. The prevalence rate of Furthermore, most patients with AF come atrial fibrillation (AF) to the clinics for the first time because is estimated to be of their symptomatic discomfort such 1-2% of the general as palpitations, dyspnea, and general population. In 2001, fatigue, and their major interest is the Go et al. anticipated elimination of AF-related symptoms. that the number of Importantly, there are effective treatments AF patients in the to prevent serious complications such United States would be 5.6 million by the year 2050. In 2006,

5%

4%

3%

2%

1%

rate

however, Miyasaka et al. reported that the age adjusted incidence rate of AF had significantly increased during 1980 to 2000 in Olmsted County and based on this epidemiologic shift, the total number of AF patients in the United Stated was estimated to be 10 million in 2050. This widely prevalent disease, which is anticipated to be even more prevalent in the near future, is associated with an increased longterm risk of stroke, heart failure (HF), and all-cause mortality. Importantly, AF is not only associated with the longterm adverse clinical outcomes, but also with a significant impairment in the quality of life. Dorian et al. reported that all 8 domains of the SF-36 were lower | Figure 1. The projected prevalence rate of AF in Korea.

- Projected prevalence

20052010 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060

least suppress AF itself. Radiofrequency catheter ablation is becoming a game changer due to recent advances in technologies and important randomized clinical trials.

Current guidelines for AF is based on data from the Western population. Due to ethnic difference, AF guideline for

in the AF patients than healthy controls | as ischemic stroke and to eliminate, or at | East Asian people has long been desired. Recently, Korean Heart Rhythm Society (KHRS) published "2018 Korean guideline of atrial fibrillation". Most important feature of this guideline is the generation of AF guideline using Korean evidence. Dr. Joung will present about this guideline. With populations aging, AF is becoming a greater public health burden in Korea. The prevalence of AF progressively increased by 2.10-fold from 0.73% in 2006 to 1.53% in 2015 in Korea. The annual trend of AF incidence was stable with the 10year overall incidence of 1.77 per 1,000 person-years. The prevalence of Korean AF is expected to be 5.81% (2,290,591 AF patients) in 2060 (Figure 1). Dr. Joung will discuss about care burden of AF in Korea. Appropriate management of Korean AF patients will also be presented in this session including anticoagulation, rate control, and rhythm control.

Thursday, Oct 11, 15:40-17:10 PM / Walker 1

Arrhythmia 2

Continued from page 4

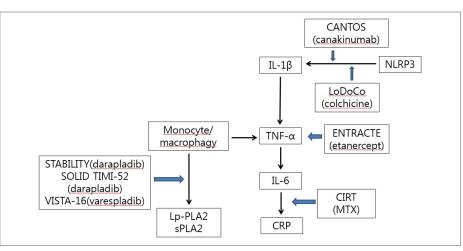


Figure 1. Inflammatory pathways and phase III trials of anti-inflammatory drugs for cardiovascular disease

occurrence of CV events and, as such, also | this presentation, Dr. Lee will discuss the suggest that inflammation might cause vascular diseases

Despite the current large availability of anti-inflammatory agents in the medical field (Figure 1), targeting specifically inflammation in humans remains challenging. In fact, most of available antiinflammatory drugs have side effects which make their use not feasible and some of them have proved to be harmful. Notwithstanding many failures of phase III clinical researches, canakinumab proved for the first time that targeting specifically inflammation lowers CV events in 2017. In key practicable therapeutic targets in the management of vascular inflammation as treating strategy for atherosclerosis. Of note, any novel strategy will require vigorous safety evaluation and testing in randomized CV outcome clinical trials well before potential use in practice.

Lipid 1 Progression and Regression of Atherosclerosis » Thursday, Oct 11, 14:00-15:30 PM / Grand 3





Cross Speciality Session I: Intervention & Arrhythmia

Hundreds of trials on optimal combinations of antithrombotic drugs for patients with stable coronary artery disease (CAD) and peripheral artery disease (PAD) have been conducted and concluded that antiplatelet therapy is the optimal therapy in those patients. However, patients with atherosclerotic disease remain at high risk for recurrent cardiovascular events despite of antiplatelet therapy. Since these individuals have an increased activation of the coagulation system and novel oral anticoagulants (NOACs), which do not need dose adjustment are introduced, oral anticoagulation is suggested as an option for these patients at high cardiovascular risk. The ATLAS-ACS TIMI 51 trial tested the role of very low-dose rivaroxaban after acute coronary syndrome (ACS) and cardiovascular event was significantly reduced with very low dose of rivaroxaban at the expense of more major bleeding and intracranial hemorrhage. These findings for very low-dose anticoagulation continued into the Cardiovascular Outcomes for People Using Anticoagulation Strategies (COMPASS) trial, which showed positive result of very low dose of rivaroxaban added to antiplatelet treatment in patients with stable CAD or PAD. Based on these clinical trials, the indication of NOACs is beginning to expand to patients with atherosclerotic disease. Another important issues of NOAC is the burden of atrial fibrillation (AF) patient who need co-administration of anticoagulant and antiplatelet therapy, because the prevalence of AF is significantly frequent in patients with atherosclerotic vascular diseases and co-administration of anticoagulant and antithrombotic therapy would result in high bleeding risk. Therefore, optimal selection of antithrombic therapy and appropriate duration of combination therapy would be important issues for these patients. Finally, no physicians are totally free from bleeding event. Even though we are in the era of NOAC, appropriate strategy for managing bleeding patient with NOAC will be challenging topic for us.

COMPASS Impact in Real-World



Matthew Todd Roe will give us talk about the impact of the Cardiovascular Outcomes for People Using Anticoagulation Strategies (COMPASS) trial on real-world practice. The COMPASS trial challenged the

In this session, Dr.

regimen by showing a significant reduction of cardiovascular event (cardiovascular death, myocardial infarction, or stroke) with very low-dose rivaroxaban added to aspirin in patients with stable coronary artery disease (CAD) and peripheral artery disease (PAD). As the labelled indications for rivaroxaban are updated by regulatory authorities in countries, clinicians will have the option to treat patients with stable CAD and PAD with this regimen with rivaroxaban. However, the addition of rivaroxaban to aspirin is associated with increasing risk of major bleeding. The key driver of treatment will likely be the clinician's estimation of long-term risk for these patients to guide decision making about the benefits vs. risks of the addition of low-dose rivaroxaban to aspirin monotherapy for patients without a recent ischemic event. Therefore, clinical decision support tools focusing upon contemporary secondary prevention risk models will be needed to optimize treatment selection.

or Addictive to DAPT - Still **Promising?**



Young-Hoon Jeong,

Despite of dual antiplatelet therapy (DAPT) including potent P2Y12 inhibitors, recurrent ischemic events occur in a significant number of acute coronary syndrome (ACS) patients, warranting new antithrombotic strategies. In this session. Dr. Young

Hoon Jeong will discuss about the role of novel oral anticoagulant (NOAC) in ACS. Increase in thrombin production and the prothrombotic state of ACS patients have suggested a role for anticoagulants to treat patients during and following the acute event and has led to clinical trials for secondary prevention of the post-acute state patients with anticoagulants (Figure 1). In the phase III ATLAS ACS 2-TIMI 51 clinical trial, combinations of very low dose rivaroxaban with antiplatelet significantly reduced the rate of recurrent ischemic events, with the increased risk for major bleeding. Upon the amplified risk of bleeding with NOAC added to DAPT and positive result of newest antiplatelet agents (prasugrel and ticagrelor), the future of NOAC in ACS seems to be unclear. However, rivaroxaban and apixaban have ongoing studies related to ACS patients and we are hoping that those studies may aid in clarifying the role of NOACs in ACS.

NOACs for Stable CAD and PAD: | Role of NOAC in ACS: Alternative | Appropriate Anticoagulation in AF **Patients Undergoing Procedure: PCI** and Ablation



Ki Hong Lee,

Dr. Ki Hong Lee will discuss about optimal antithrombotic strategy in atrial fibrillation (AF) patients undergoing percutaneous coronary intervention (PCI) and radiofrequency ablation of AF. For patient who had elective PCI or PCI due to acute coronary syndrome (ACS), triple therapy

(oral anticoagulant [OAC], aspirin 75-100 mg daily, clopidogrel 75 mg daily) is given for limited duration after PCI and the duration is determined by risk of bleeding and stability of coronary disease state. In selected cases, dual therapy with clopidogrel and OACs can be considered as an alternative to triple therapy. WOEST trial and Denmark nationwide registry showed feasibility and safety of dual therapy In recently published articles, use of dabigatran (REDUAL-PC] trial) and rivaroxaban (PIONEER-AF trial) in AF patients undergoing PCI significantly diminished major bleeding with similar composite hard clinical outcomes (death, myocardial infarction, re-PCI, and stroke) Along with these two landmark trials, AUGUSTUS trial and ENTRUST-AF PCI study are now ongoing in trials dealing with these patients.

thromboembolic risk. Therefore, to decide when and which OAC should be given is a major problem. Most clinical trials and meta-analyses demonstrated AF ablation with uninterrupted OACs did not increase major bleeding. ESC 2016 guideline recommended uninterrupted OAC use during AF procedure as class IIb. However, it should be tailored to patients' condition including CHA2DS2-VASc score, renal function, and experience of the operator. RE-CIRCUIT, VENTURE AF, and AXAFA-AFNET 5 trials demonstrated uninterrupted dabigatran, rivaroxaban, and apixaban

high bleeding risk but also with high

Management of Bleeding in AF **Patients with NOAC**

during AF ablation as safe and effective

without increment of major bleeding.

Edoxaban (ELIMINATE-AF) waits for

clinical results during AF ablation.



coagulant (NOAC) has a low bleeding complication risk compared to warfarin. However, if bleeding complications occurs with NOAC, the Myung-Jin Cha, MD treatment option is relatively limited. For the patients with bleeding complication,

it is important to perform appropriate diagnostic tests and choose the effective treatment option according to the type of bleeding and the patient's clinical situation. AF ablation is associated with not only In this lecture. Dr. Cha will discuss the

Continued on page 7

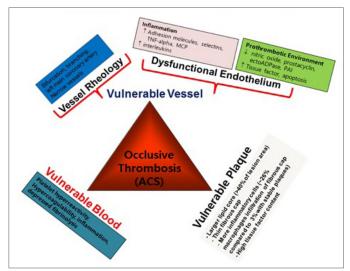
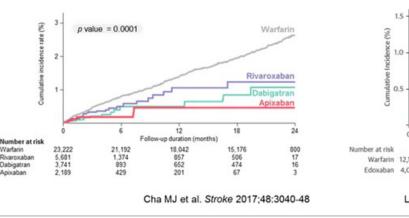


Figure 1. Mechanism of ACS: enhanced thrombogenicity



Log-rank p = 0.01 Lee SR et al. JACC 2018 ;72:838-53

Figure 2. Intracranial hemorrhage: warfarin versus NOACs

Continued from page 6

epidemiology of bleeding complication related with NOAC, the characteristics of bleeding complication associated with each NOAC, and hemostatic strategies (Figure 2). Bleeding events should be accurately assessed as minor/major and fatal/non-fatal bleeding to determine the level of treatment. Also, since NOAC have a short half-life, the last NOAC dose time should be assessed. Other clinical factors such as renal and liver function that may affect the blood drug concentration should also be evaluated. Depending on these clinical features, the patient may be required to observe for the natural excretion of the drug or to use a selective reversing agent. If the bleeding is minor, it is also important to educate the patient so that the risk of stroke due to drug withdrawal may be higher than the risk of hemorrhage. If bleeding is fatal and should be actively controlled, hemostatic agents or blood transfusion is attempted, but research is still lacking. To prevent bleeding complications regarding NOAC, it is important to use the appropriate NOAC dose for the patient

Cross Specialty 1 NOAC in CAD and PAD » Thursday, Oct 11, 14:00-15:30 PM / Theatre

The Evolving Landscape of Myocardial Infarction **Care and Outcomes in the United States**

Insights from the ACTION and Cath-PCI Registries of the ACC-NCDR



Colorado Anschutz

20 years, the American College of Cardiology National Cardiovascular Data Registry (NCDR) programs have been critical to measuring and improving the quality of care for acute myocardial infarction (AMI) Dr. Masoudi said that these registries

are not simply methods of collecting data, but rather transforming data into information that can be used to improve quality, generate knowledge in the form of research, and play an important role in health policy. The NCDR has supported these functions in AMI with two registry programs: Cath-PCI and Chest Pain-Mvocardial Infarction (formerly known as ACTION).

The principal role of the NCDR programs is to support quality improvement, both locally and nationally. Since these programs were initiated, they have provided feedback to participating

evidence-based care to patients with AMI, as well as measures of outcomes that account for differences in case mix using risk-adjustment. With these data, hospitals can identify areas for quality improvement and direct resources to optimizing the care they deliver. As part of the national Door-to-Balloon Time (D2B) initiative. Cath-PCI data were the basis of the feedback provided to hospitals that were engaged in efforts to improve the timeliness of acute reperfusion therapy for ST segment elevation AMI (STEMI). The D2B program was associated with marked improvements in this measure, to the extent that failures to provide PCI within 90 minutes for STEMI rarely occur in the US hospitals.

NCDR programs have also supported cutting-edge outcomes research that has advanced our understanding of what to measure and how to improve. For example, data from the ACTION registry characterized the door-in-door-out time (DIDO) for patients with STEMI that presented to emergency departments without the capacity to provide acute PCI who were transferred to hospitals with

For more than | hospitals on the extent that they provide | PCI capacity in order to provide acute reperfusion. This study demonstrated that median DIDO time was 68 minutes and that longer times were associated with higher mortality rates. Because of this research, the DIDO measure is reported to centers that transfer patients with STEMI to other centers, which supports their efforts to streamline the transfer process in order to provide more timely therapy.

> For more than two decades, the NCDR programs have played a central role in measuring the quality of care for patients with AMI, supporting national initiatives, and generating information that is used to advance care and improve outcomes in the US and internationally. Using NCDR as a tool, physicians and hospitals around the world have worked to provide the right care to the right patient at the right time.

Myocardial Infarction 1 The Burden of Myocardial Infarction

in the World » Thursday, Oct 11, 08:40-10:10 AM / Grand 1

Women's Heart Disease: From Medical Education, Career and **Research to Management of Cardiovascular Disease**

Dimension in Academic Research



Vera Regitz-Zagrosek, MD

Gender equality is a key priority of the European research area and should be implemented in all higher education and research in-stitutions, including academic medicine. However, academic medicine lacks behind other disciplines in implementing gender equality plans and the

gender dimension in research.

One reason may be that academic medicine is characterized by specific highly competitive academic, professional, commercial missions and working conditions. It is usually organized in a double structure between medical faculties, responsible for research and teaching, and university hospitals, responsible for patient care. Medical faculties are characterized by very competitive research and training conditions, and a focus on early career development and networking that makes it difficult to combine time for children and

Gender Equality and Gender | work. They also require high a workload for teaching. Furthermore, their structures are very hierarchical and request early placement in networks. Gender imbalance in decision making processes in university hospitals may prevent recruitment of women, particularly into leading faculty

> Equally high clinical as well as scientific, leadership and teaching competences are required to build a career in these two areas. Introducing gender dimensions in research and teaching will improve consciousness for gender aspects and for leadership in medical care. It is important for the quality of medicine and for an optimal health care for women and men

To advance medical progress in Europe for better health of the society, we need integrated concepts to promote gender n faculty development, in academic leadership, in university hospitals and in biomedical research

Women Heart Disease 1 Gender and Medicine Thursday, Oct 11, 08:40-10:10 AM / Grand 3

Are Women Adequately Diagnosed | underused. Sex hormone disturbances and Treated for Cardiovascular

Women have some surprisingly underresearched manifestations of coronary artery disease: they have more frequent microvascular disease, coronary spasms, and coronary dissections than men, syndromes where diagnostic and therapeutic strategies are not well developed. Due to lower awareness, there is a longer delay in women arriving at the hospital with acute coronary syndromes (ACS). In the younger age groups of patients with ACS, the mortality rates are even higher in women compared to men. Low awareness of women and their families and doctors may contribute to

Newly detected risk factors, such as depression, stress, sexual dysfunction and unfavorable socioeconomic conditions are common in women than in men. Stress induced cardiomyopathy is a typical feature of women at older ages. Stress reduction programs lead to great benefit in women but are heavily

and pregnancy complications, like eclampsia and diabetes, are serious predictors of cardiovascular complications in women's life, but are frequently underestimated in prevention programs. Significant sex and gender differences have been reported in the outcome of myocardial infarction and aortocoronary bypass surgery. Women exhibit less frequently sudden coronary arrest (SCA) than men. Treatment with implanted cardioverters/defibrillators (ICD) is life saving. However, women are severely undertreated with ICD even with the same indication and life threatening condition, they receive much less ICD than men in primary and secondary prevention and treatment.

> Women Heart Disease 2 Update CVD in Women

» Thursday, Oct 11, 10:20-11:50 AM / Grand 3



Late Breaking & Featured Research from Asia-Pacific 1

Percutaneous Coronary Intervention in Patients with Acute Coronary Syndromes (SMART-DATE): a Randomized, Open-label, Multicenter Trial



Joo-Yong Hahn, MD, Sungkyunkwan Medical Center.

recommend dual antiplatelet therapy (DAPT) of aspirin plus a P2Y12 inhibitor for at least 12 months after implantation of drugeluting stents (DES) in patients with acute coronary syndrome (ACS). However, data are limited regarding the optimal duration

of DAPT in ACS patients undergoing percutaneous coronary intervention (PCI). This randomized, open-label trial recruited patients from 31 centers in Korea. Patients were eligible if they had unstable angina, non-ST-segment elevation myocardial infarction (MI), or ST-segment elevation MI, and underwent PCI. Enrolled patients were randomly assigned to either 6-month DAPT or 12-month or longer DAPT with stratification by site, clinical presentation, and diabetes. The primary end point was a composite of all-cause death, myocardial infarction (MI), or stroke at 18 months after the index procedure in the intentionto-treat population. 2,712 patients were randomized: 1,357 to the 6-month DAPT group and 1,355 to the 12-month or longer DAPT group. Clopidogrel was used as a P2Y12 inhibitor for DAPT in 1,082 patients (79.7%) in the 6-month DAPT group and | be respected.

Current guidelines | 1,109 patients (81.8%) in the 12-month or longer DAPT group. The primary endpoint occurred in 63 patients in the 6-month DAPT group and in 56 patients in the 12-month or longer DAPT group (the cumulative event rate, 4.7% versus 4.2%; absolute risk difference. 0.5%; the upper limit of 1-sided 95% confidence interval [CI], 1.8%; p=0.03 for noninferiority with a predefined noninferiority margin of 2.0%). While all-cause mortality did not differ significantly between the two groups (2.6%) versus 2.9%; hazard ratio [HR], 0.90; 95% confidence interval [CI], 0.57-1.42; p=0.90), MI occurred more frequently in the 6-month DAPT group than in the 12-month or longer DAPT group (1.8% versus 0.8%;

HR, 2.41; 95% CI, 1.15-5.05; p=0.02)

The rate of bleeding defined by the BARC

type 2-5 was 2.7% in the 6-month DAPT

group and 3.9% in the 12-month or longer DAPT group (HR, 0.69; 95% CI, 0.45-1.05; p=0.09). Increased risk of MI with 6-month DAPT and wide non-inferiority margin prevent us concluding that short-term DAPT is safe in ACS patients undergoing PCI using current DESs. Current quidelines. that recommend prolonged DAPT in ACS patients without excessive risk of bleeding should

Six-Month versus 12-Month or Longer Dual Antiplatelet Therapy after | Coronary Computed Tomographic Angiography for Selective Cardiac



Hvuk-Jae Chang. everance Hospital

CONSERVE (COronary computed tomographic aNgiography for SElective cardiac catheterization Relation to cardioVascular outcomes and Economics) study was to evaluate a selective-referral strategy using coronary computed tomographic angiography (CCTA) for

safety and effectiveness to reduce resource

In this randomized controlled open-label international trial of patients referred to invasive coronary angiography (ICA) for Class II indications, the selective-referral strategy was compared to a direct-referral strategy. The primary comparison was non-inferiority of composite major adverse cardiac events

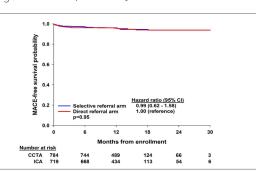
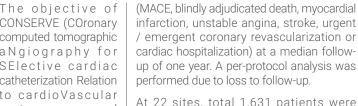


Figure 1. Survival curve of the composite primary endpoint as

Catheterization Relation to Cardiovascular Outcomes and Economics



randomized into selective-referral (n=823) and direct-referral (n=808), with 92% follow-up (median 12.3 months). With a MACE event rate of 4.6% in both arms, the selective-referral strategy met the noninferiority margin of 1.33 (p=0.026), albeit with reduced power in a per-protocol analysis (Figure 1). Selective-referral had lower rates of ICA (0.23 vs. 1.04 per patient, p<0.001), ICA normalcy (24.6% vs. 61.1%) p<0.001) and coronary revascularization (0.13 vs. 0.18 per patient, p<0.001).

In conclusion, in this trial of stable patients with suspected CAD being referred for guideline-directed ICA, a selective-referral strategy was found to be non-inferior compared to a direct-referral strategy. albeit with reduced statistical power in a per-protocol analysis, but resulted in similar clinical outcomes with lower rates of ICA, ICA normalcy, and coronary

Late Breaking & Featured Research from Asia-Pacific 1

» Thursday, Oct 11, 10:20-11:50 AM / Theatre

amyloid substances are deposited in the

mvocardium. Although there are some

differences in the family of amyloid

Cardiometabolic Syndrome

Regulation of Vascular Smooth Muscle Cell Calcification RCTs



Yabing Chen, PhD Birmingham, USA

Vascular calcification is prevalent in patients with atherosclerosis, diabetes mellitus and end stage renal disease, which increases risk of cardiovasculai events and mortality. Dr. Yabing Chen's and other teams have determined an

essential role of the vascular smooth muscle cells (VSMC)-expressed osteogenic transcription factor Runx2 in the pathogenesis of vascular calcification. Furthermore, we have demonstrated that activation of the AKT signaling pathway promoted Runx2 upregulation, via regulating FOXO 1/3-mediated Runx2 ubiquitination and Runx2 transactivity. Dr. Yabing Chen's team's recent studies have identified increased protein O-linked GlcNAc modification (O-GlcNAcylation) in human diabetic arteries, and in low-dose streptozotocin (STZ)-induced diabetic mice. As protein O-GlcNAcylation is dynamically regulated by two enzymes, O-GlcNAc transferase (OGT) that adds O-GlcNAc onto proteins and O-GlcNAcase (OGA) that removes O-GlcNAc, we determined the effects of inhibition of OGA and OGT on VSMC calcification Inhibition of OGA by shRNA increased O-GlcNAcylation and promoted VSMC calcification. In contrast, knockdown of OGT by shRNA inhibited VSMC calcification, which was associated with inhibition of Runx2. Mechanistic studies identified two new O-GlcNAcylation sites on AKT, at T430 and T479, were critical for AKT activation, Runx2 transactivity and VSMC calcification. Collectively, we have demonstrated a crucial role for VSMC-expressed Runx2 in promoting VSMC calcification, and identified the mechanisms underlying AKT activation and protein O-GlcNAcylation in upregulating Runx2 and VSMC calcification. Dr. Yabing Chen's team's studies have provided novel molecular insights linking glucose metabolism to vascular dysfunction, which may lead to identification of potential therapeutic

Cardiometabolic Syndrome 1 Crosstalk between Vascular Calcification and Cardiometabolic Syndrome » Thursday, Oct 11, 08:40-10:10 AM / Grand 4

lesions, several common characteristics

are shared, including plaque burden, thin-

targets for vascular calcification.

Korea Survey of Cardiometabolic Syndrome, KSCMS Fact Sheet



Sungkyunkwan Jniversitv Kanabuk Samsung Hospital,

Little information exists on the prevalence of metabolic syndrome (MetS) in Korea since 2007. Dr. Ki Chul Sung's team aimed to provide up-to-date estimates of the prevalence of MetS and its trend in the general adult population in Korea. The prevalence and pattern of MetS were compared

among participants in the Korean National Health and Nutrition Examination Surveys (KNHANES) IV (2007-2009), V (2010–2012), and VI (2013–2015), aged ≥19 years. Data from the 2005 census of the Korean population were presented according to age standardization. The overall age-standardized prevalence of MetS in 2013-2015 was 20.3% (95% confidence interval [CI].19.6%-21%), Since 2007, the overall prevalence of MetS has remained stable, whereas the prevalences among men and women, respectively, have increased and decreased slightly (Figure 1). By contrast, the prevalence of MetS among men aged 19-49 years has shown an increasing tendency since 2007. Moreover, nearly 40% of women aged ≥60 years had MetS in

2013-2015. Among the five components of MetS, only elevated fasting glucose level has shown an increasing trend since 2007 in both men and women. As the family income and educational level decreased, the prevalence of MetS increased. In summary, although the overall prevalence of MetS has remained stable since 2007, the prevalence of MetS was higher in middleaged men and women aged ≥60 years. Considering the close association between MetS and socioeconomic status, age- and sex-specific strategies should be developed at the national level for the treatment and prevention of MetS in Korea

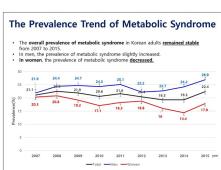


Figure 1. The prevalence trend of metabolic syndrome

Cardiometabolic Syndrome 2 Current Status of Cardiometabolic Syndrome » Thursday, Oct 11, 10:20-11:50 AM / Grand 4

human in speech and image recognition,

How to Improve Prediction of CVD

Improving CVD Prediction with **Machine Learning Technology**



Since more accurate prediction and earlier detection of cardiovascular disease (CVD) is still an important challenge, there have been attempt to increase CVD prediction with

measurement of coronary artery calcium (CAC) improves risk prediction beyond that of conventional risk factor-based CVD prediction models, and guidelines now recommend the use of CAC for people with low-to-intermediate risk. However, CAC may not be a good prediction marker for high-risk individuals, especially for the detection of the vulnerable plaques that are known to be the cause of acute coronary events. Meanwhile, through invasive and pathological studies. high-risk anatomic plaque features have been established as fundamental to the processes of acute coronary syndromes (ACS) and sudden cardiac death. For these

cap fibroatheroma (TCFA), positive arterial remodeling (PR), necrotic cores, spotty calcifications (SC), and macrophage infiltration. Prior invasive data observed that the majority of plagues implicated in ACS were nonobstructive in anatomic stenosis severity, with high-grade stenoses comprising less than one-third of culprit lesions, and have emphasized the need for improved methodology beyond stenosis for identification of high-risk plagues. Noninvasive coronary computed tomographic angiography (CTA) is a technology which can assess several high-risk plague characteristics, such as aggregate plaque volume' positive remodeling, low attenuation plague as a marker for necrotic lipid-laden intraplaque core, and intraplaque spotty calcification, with high accuracy. Similar to invasive studies by intravascular ultrasound, these coronary CTA characteristics have been found to be associated with culprit lesions in retrospective and prospective studies Furthermore, plaque progression by serial plague evaluation has demonstrated a restratification of the risks of cardiac events beyond a single evaluation.

Improving CVD Prediction with **Machine Learning Technology**



Choonaki Min

Kaggle (https://www. kaggle.com) is a famous open platform in which data scientists compete to produce the best models for predicting and describing the datasets, and it includes several problems and datasets

of cardiovascular disease (CVD), such as 'Heart Disease and Stroke Prevention', 'ECG Heartbeat Categorization Dataset', and 'Genetic Variant Classifications'. Kaggle competitions suggest problem solving in two methods: Handcrafted feature engineering' and 'Neural Networks and Deep learning'. The handcrafted method discovers through various analytical methods based on domain knowledge of what prediction signals are already in the data set, but it requires a lot of time to understand the characteristics and the relationship between them (so-called 'Feature Engineering'). In the handcraft method, the ensemble model of decision trees won many championships Meanwhile, the neural networks method is shown to have a higher accuracy than

and does not require much effort of 'feature engineering'. The neural network model has been studied since the 1950s, however, one of the backgrounds of recent remarkable results is the rapid increment of computing power that can learn a lot of data. Prediction with machine learning based on neural networks is rapidly emerging. However, since it requires massive data to learn, the amount of data is insufficient in many cases to derive the generalized performance. Therefore, recent challenges are often preceded by the gathering of sufficient data prior to the development of diagnosis, prediction, and classification models. Neural networks are also hard to accept in the medical field because main purpose of the technique is not interpretation but prediction. It helps us not to understand why something happens but only to expect when something happens. Explainable artificial intelligence (XAI: eXplainable AI) is a very active study subject to overcome this limitation

Improvement of CVD Prediction in the General

» Thursday, Oct 11, 15:40-17:10 PM / Cosmos

Myocardial Viability for Therapeutic | magnetic resonance). Based on the Approach to Ischemic Heart



Imaging

Medical Center Netherlands

Patients with chronic ischemic left ventricular dysfunction have a poor prognosis, despite advances in different therapeutic options. However, when viable myocardium is present, left ventricular function may improve after revascularization Viability can be as-

sessed with various imaging techniques focusing on preserved perfusion and/ or glucose metabolism, cell membrane and mitochondrial integrity, or contractile reserve. The different imaging modalities to visualize and/or detect viability include nuclear imaging (with PET [positron emission tomography] and SPECT single-photon emission computerized tomography]), dobutamine stress echocardiography and CMR (cardiac | the key imaging targets. CMR (cardiac | myocardial disease, where various

assessment of viability, prediction of improvement in function and prognosis is feasible. In general, PET, SPECT, and CMR have a high sensitivity for the detection of viability and/or prediction of outcome, whereas dobutamine stress echocardiography has a lower sensitivity but a higher specificity. Patients with a significant viability are likely to benefit from coronary revascularization with improvement in contractile function and long-term prognosis.

Recent Advances of Cardiac PET in Sarcoidosis and Amyloidosis

Cardiac sarcoidosis is an infiltrative myocardial disease, which may cause arrhythmia and heart failure. Although myocardial biopsy has been used as a definitive diagnosis method, it is often prone to sampling error. Thus, imaging studies have been attempted as noninvasive tools to investigate the whole mvocardium. In cardiac sarcoidosis. inflammation and subsequent fibrosis are

Jin Chul Paeng, MD,

sion tomography) with normal myocar dial suppression are well-known imaging modalities for these targets. Particularly. FDG-PET has ad vantage of visualizing ongoing inflammation activity. Recently, researchers have focused on 3 points

magnetic resonance)

imaging with delayed

enhancement tech-

nique and FDG-PET

(18-fluoro-deoxyglu-

cose positron emis-

regarding FDG-PET in cardiac sarcoidosis; (1) optimal patient preparation for suppressing normal myocardial uptake of FDG, (2) clinical implication of image findings with regard to patients' symptoms and prognosis, and (3) novel quantitative image analysis methods including heterogeneity indexes. Additionally, some new PET probes for inflammation are being attempted in cardiac sarcoidosis.

Cardiac amyloidosis is also an infiltrative

substances, amyloid-targeting PET probes that are used for Alzheimer's disease imaging have been reported to accumulate in the cardiac amyloid. In recent studies, several PET probes hold promise as an effective tool for diagnosing cardiac amyloidosis. Intriguingly these PET imaging probes appear to complement PET probes for bones, which are more selective to ATTR (transthyretinrelated) type amyloidosis than AL (light chain) type. These PET imaging tools are expected to be useful for non-invasive and repetitive evaluation of patients suspected for cardiac sarcoidosis or amyloidosis. and are currently actively investigated.

Multimodal Imaging Approach for Infiltrative

Thursday, Oct 11, 08:40-10:10 AM / Cosmos



Hvuna-Bok Park. MD University Mary's Hospital,

imaging technologies. Numerous studies have demonstrated that noninvasive



Basic Research Symposium

on a Chip" for Assessment of | New Causal Risk Factor for **Drug/Xenobiotic Toxicity**



Edward J. Kellv. PhD

Development of a Human "Kidney | Clonal Hematopoiesis is a **Cardiovascular Disease**



Information from toxicity testing is critical for predicting safety of pharmacotherapies and evaluation of environmental risks from chemical exposure, and serves as the basis for many public health and regulatory decisions

With respect to nephrotoxicity, the proximal tubule is the primary site of drug-induced adverse events. Dr. Kelly will describe the development of a 3-dimensional flow-directed proximal tubule microphysiological system (MPS). The kidney MPS recapitulates the synthetic, metabolic and transport activities of kidney proximal tubule cells. Towards this goal, his lab has evaluated nephrotoxicity in response to challenge with multiple toxicants. In today's talk, he will highlight his

recent studies using a "linked" MPS incorporating a liver system to model first pass metabolism in series with a kidney MPS. This integrated microphysiological system provides an ex vivo approach for investigating organ-organ interactions. Using this platform, they have shown that liver bioactivation is necessary and sufficient to induce nephrotoxicity in response to exposure to aristolochic acid. In particular, they have identified | Dr. Walsh's lab has shown that the acquired

key metabolic intermediates, as well as the enzymes and transporters. responsible for the interplay between liver and kidney in aristolochic acid disposition.

They believe that MPS technologies will have major impacts on predictive toxicity testing and human risk assessment MPS technologies will refine safety assessment and re-

duce our need for surrogate animal testing. An ultimate goal is to create integrated human MPS organ systems that could replace animal models

Basic Research 1 Drug Development and Therapy » Thursday, Oct 11, 08:40-10:10 AM / Grand 2 Somatic DNA mu

tations accumulate in all cells with age such that over time tissues become a mosaic of cells with slightly different genotypes. The hematopoietic University of Virginia, system can be viewed as being subjected to Darwinian selective | CVD.

pressures such that driver gene mutations providing a selective advantage can lead to the clonal expansion of hematopoietic stem cells. This process is referred to as "clonal hematopoiesis". A number of recent epidemiological studies have associated the clonal expansion of hematopoietic cells with increased mortality and higher rates of cardiovascular disease

(CVD). Alternatively, these mutations could just be a marker of the biological aging process and not be directly involved in CVD

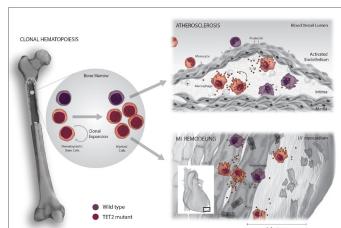


Figure 1, TET2 mutation and cardiovascular disease

mutations in hematopoietic stem cells that trigger clonal hematopoiesis also contribute to cardiovascular disease. To date, their studies have mostly focused on clinically relevant mutations in the driver genes TET2 and DNMT3A that are commonly acquired somatic in the elderly population. Currently, they have the best mechanistic understanding of how mutation in TET2 contribute to cardiovascular disease (Figure 1).

Disoriented Choline Metabolism **Promotes Pathologies in the**



failure are complex, and cardiac metabolism is among the most critical factors to be considered Comprehensive assessment of endogenous metabolit-

metabolomics, and

Continued on page 11

Their experimental studies may shed

light on the findings of the CANTOS

(Canakinumab Anti-inflammatory

Thrombosis Outcomes Study) trial. An

evaluation of clonal hematopoiesis in

CANTOS trial participants has merit as

it could indicate a path for personalized

therapy for the prevention of CVD in

individuals carrying somatic mutations in

In today's talk. Dr. Walsh will review recent

experimental work about the clonal

hematopoiesis as a new mechanism of

their hematopoietic system.

Figure 2. Metabolic pathways or metabolites that were shown to increase (upward arrow) or underlying mechanisms and reduce (down arrow) in the heart. Red metabolites or pathways indicate that they were analyzed in humans (from Ikegami R, Shimizu I et al. Circ J 2017;82(1):10-16).

Failing Heart Pathologies of heart



Ippei Shimizu, MD,

es is described as

recent advancement in this field enabled us to understand the previously unknown metabolites or metabolic pathways critically involved in the maintenance of cardiac homeostasis under physiological, as well as stressed conditions (Figure 2). It has been reported that low body temperature predicts poor clinical outcomes in patients with heart failure; however,

미국·유럽 심부전 가이드라인에서

Class 1의 수준으로 권고1

Continued from page 10

failure

Basic Research 2

pathological implications are largely

unknown. Brown adipose tissue (BAT)

was initially characterized as an organ

involved in thermogenic response, and

studies suggest that BAT has crucial

roles for the maintenance of systemic

metabolic health. Recently, Dr. Shimizu

has found that BAT dysfunction developed

in a murine thoracic aortic constriction

model had causal role for disorientation

in systemic choline metabolism and

progression of heart failure. In today's talk,

Dr. Shimizu will present his unpublished

data, which indicate that maintenance

of BAT homeostasis, and suppression

of disoriented choline metabolism could

become a novel therapeutic target for heart

The Fire of Life: Cardiac Energy Metabolism

» Thursday, Oct 11, 10:30-11:50 AM / Grand 2

Smart Healthcare

Application of EMR-Based Big **Data Registry for Cardiovascular** Disease



Medical expenses and social expenditures due to increasing diagnosis of heart disease and the resulting upsurge in surgical treatment, medical treatment. hospitalization and Asan Medical Center, rehabilitation are continuing to rise. In recent years,

predictive analytics through disease- or event-based risk assessment have been proposed as one of the ways to cope with this growing cost and to improve outcomes in the management of heart disease. With massive amounts of data accumulating through electronic health record (EMR) and related health information system (HIS) subsystems, along with the development of a variety of artificial intelligence (AI) and machine learning (ML) technologies, various AI/ML models exploring complex interrelationships, causal relationships, and disease patterns based on high order time series data from multiple modalities have already been proposed

and published in many areas of medicine. In response to these changes in the

environment, K-DaSH (Korea Data and Software-driven Hospitals) consortium funded by the Ministry of Science and Technology was created based on a nationwide network of 25 hospitals and 19 companies for the development of medical AI software. The K-DaSH consortium aims to develop a total of 21 SW solutions (real-world applicable intelligent precision medicine solutions) in the area of prevention, diagnosis, treatment and prognosis in 8 disease groups (cardiovascular diseases, including cardio-cerebrovascular disease and cardiac disease, cancer and brain diseases). Among them, the team involved in the cardiovascular diseases consisting of Asan Medical Center, Seoul National University Bundang Hospital, Ulsan University Hospital, Kyungpook National University Hospital, Severance Hospital and Linewalks - aims to develop Al models for EMR-based disease recurrence prediction, image-based diagnosis, and a combined (EMR + image) model of calcification-based heart disease

For this purpose, Asan Medical Center constructed a disease registry based on data of diagnosis, examination, operation, medication, prescription of about 57,000 cardiac patients and patients with related medical examinations of 16 years, and developed a standard data model that can perform multi-institutional research by integrating patient data of participating hospitals. Retrospective studies using large-scale EMR data, unlike prospective studies that are densely collected according to precisely defined protocols, require several stages of preprocessing and data reviewing before the data can be used in the model development; hence, multidimensional data analysis and quality control should be preceded. In addition, in order to integrate and analyze multi-institutional patient data, a standard system of data structure is required, as well as a set of standard terminologies. This is an ongoing project on EMRbased big-data registry and model development for cardiovascular disease. which applies standard data model based on international standards for multiinstitutional data integration.

Smart Healthcare Use of Smart Health Techonologies and Big Data Analysis for Cardiovascular Research » Thursday, Oct 11, 14:00-15:30 PM / Cosmos



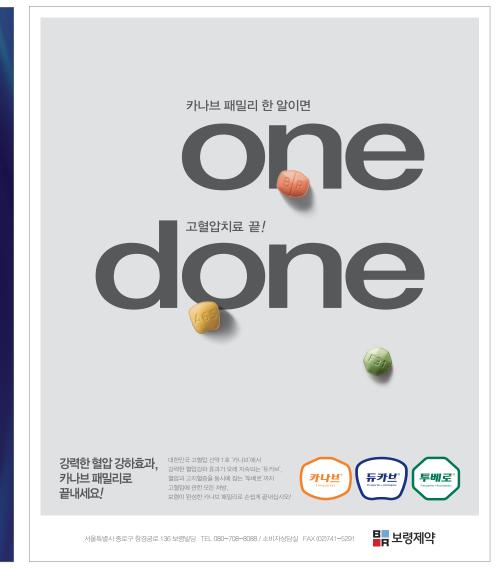
12:00-12:30 New Frontiers in Cardiology 1

INTERVIEWER: Seung-Jung Park, Dae-Won Sohn INTERVIEWEE: Evan Muse, Jeroen Bax, Katsuyuki Miura, **Matthew Todd Roe**

13:00-13:30 New Frontiers in Cardiology 1

INTERVIEWER: Young-Hoon Jeong, Dong Ho Shin INTERVIEWEE: Matthew Todd Roe

> Oct 11, 12:00-13:30 Theatre Lobby





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KSC 2019

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The 63rd Annual Scientific Meeting of The Korean Society of Cardiology

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