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## Aims and Scope

The Korean Journal of Physiology & Pharmacology (Korean J. Physiol. Pharmacol., KJPP) is the official journal of both the Korean Physiological Society (KPS) and the Korean Society of Pharmacology (KSP). The journal launched in 1997 and is published bi-monthly in English. KJPP publishes original, peer-reviewed, scientific research-based articles that report successful advances in physiology and pharmacology. KJPP welcomes the submission of all original research articles in the field of physiology and pharmacology, especially the new and innovative findings. The scope of researches includes the action mechanism, pharmacological effect, utilization, and interaction of chemicals with biological system as well as the development of new drug targets. Theoretical articles that use computational models for further understanding of the physiological or pharmacological processes are also welcomed. Investigative translational research articles on human disease with an emphasis on physiology or pharmacology are also invited. KJPP does not publish work on the actions of crude biological extracts of either unknown chemical composition (e.g. unpurified and unvalidated) or unknown concentration. Reviews are normally commissioned, but consideration will be given to unsolicited contributions. All papers accepted for publication in KJPP will appear simultaneously in the printed Journal and online.

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All communications should be addressed to:

## The Editorial Office and the Publisher

### - Physiology

1209, 14 Teheran-ro 83-gil, Gangnam-gu, Seoul 06169, Korea

Tel: 82-2-568-8026, Fax: 82-2-568-8051

E-mail: master@koreaphysiology.org

### - Pharmacology

208, Hyunil TowerOfficetel, 87, Seongmisan-ro, Mapo-gu, Seoul 03978, Korea

Tel: 82-2-326-0370, Fax: 82-2-326-0371

E-mail: head@kosphar.org

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## Welcome Message

대한생리학회 회원 여러분, 안녕하십니까?

풍요로운 가을이 익어가고 있습니다.

그간 교육과 연구에 몰두하신 여러분의 열정과 기쁨이 드디어 한자리에 모이게 되었습니다. 지난 6월 ‘실험동물의 생리학적 이해’라는 주제로 기초학술대회부터 시작된 공식적인 행사에 이어 이번에는 여기 대구 영남대학교 의과대학에서 그간의 결실을 알리고 서로 발전할 수 있는 대한생리학회가 벌써 71회 째에 들어섰습니다.

이번에는 “Leading the Future”라는 슬로건에 걸맞게 주로 사카이, 마틴 모라드 등 두 교수님의 Plenary lecture를 비롯해 워크샵, Satellite meeting, 젊은 과학자 세션, 다양하고 9개의 심포지움이 마련되어 있습니다. 올해 심포지움에서는 대사, 줄기세포 및 피부와 이온통로와 운동생리 세션 등 다양하고 흥미로우면서도 중요한 연구주제와 연자로 구성되어 있어 우리 대한생리학회 회원 여러분을 즐겁게 할 것으로 기대하고 있습니다. 이번 프로그램을 마련한 회원 여러분과 이사님들 노고에 진심으로 감사드립니다

오랜만에 다시 만나는 가족의 정으로 가득한 제71회 대한생리학회에서 기쁘고 즐겁게 그간의 결실을 알리고 토론하면서 깊어가는 가을의 풍요로움을 만끽하시기 바랍니다. 끝으로 이 자리를 마련해 주신 영남대학교 의과대학 김종연 학장님과 관계자 여러분께 깊은 감사를 학회를 대표하여 우리 회원님의 고마움을 전하고자 합니다.

회원 여러분 또 다시 만날 때까지 행복하시기를 기원합니다.

대한생리학회 회 장 **홍 성 근**  
대한생리학회 이사장 **서 인 석**

## 주관교 환영사

회원 여러분 안녕하십니까?

제71회 대한생리학회 학술대회를 영남대학교 의과대학에서 개최하게 된 것을 영광으로 생각합니다. 영남의대는 제40회 학술대회를 경주에서 주관하였으며, 올해는 개교 40주년이 되는 해에 학회를 의대 캠퍼스에서 개최하게 되어 더욱 뜻깊습니다. 그동안 우리 학회는 영남대학교의 창학 역사와 같은 1947년에 결성된 이후로 괄목할 만한 양적 및 질적 성장을 이루었습니다. 이러한 성장에는 경제발전과 국력의 신장이 큰 역할을 하였으며, 지금은 선진국 수준의 의학 연구와 의료 서비스로 인류 건강 향상에 이바지하고 있습니다. 우리나라의 의학 발달에는 생명의 본질을 연구하는 생리학의 기여를 결코 간과할 수가 없을 것입니다.

이번 학술대회에서는 미래 생명과학을 선도하는 학문적 성과의 공유와 더불어 회원 여러분의 친목도 돈독히 하시기를 바랍니다. 마지막으로 학회의 성공적인 개최를 위하여 애쓰신 홍성근 대한생리학회장님과 서인석 이사장님 이하 모든 임원과 관계자 여러분께 감사드리고, 또한 영남의대 생리학교실 교직원과 대구.경북 생리학연구회 교수님들께도 깊은 감사 말씀드립니다.

영남대학교 의과대학 생리학교실 **김 종 연**

## Schedule (일정표)

## ▶ 10월 31일 목요일

Time	Contents
12:00-12:30	Registration
12:30-13:20	Laboratory workshop with Lunch Box
13:20-13:30	Opening Remarks
13:30-15:30	Special Academic Session: Systems biology for physiologists
15:30-15:50	Coffee Break
15:50-16:50	Poster-Oral Session
16:50-18:40	Young Physiologists' Session
18:40-20:00	Welcome Reception with Poster session

## ▶ 11월 1일 금요일

Time	Contents		
	Room A	Room B	Room C
09:00-10:40	<b>Symposium 1:</b> Modeling pathologic pain	<b>Symposium 2:</b> Pathophysiology of metabolic diseases	<b>Symposium 3:</b> Multifaceted functions of ion channels
10:40-11:00	Coffee Break		
11:00-11:45	Plenary Lecture 1: Juro Sakai (Univ. Tokyo, Japan)		
11:45-12:30	Plenary Lecture 2: Martin Morad (Medical Univ. South Carolina)		
12:30-13:40	Lunch / Committee Meeting		
13:40-14:40	Poster Session - 2		
14:40-15:00	Coffee Break		
15:00-16:40	<b>Symposium 4:</b> Physiology of higher nervous functions	<b>Symposium 5:</b> Cardiac physiology and pathophysiology	<b>Symposium 6:</b> Stem cell physiology; beyond the limits
16:40-18:00	Move & Relax		
18:00-20:00	Official Buffet		

## ▶ 11월 2일 토요일

Time	Contents		
	Room A	Room B	Room C
09:00-09:40	Yudang Lecture		
09:40-10:00	Coffee Break		
10:00-11:40	<b>Symposium 7:</b> Exercise physiology	<b>Symposium 8:</b> Skin pathophysiology and ion channels	<b>Symposium 9:</b> Altered shape and work of mitochondria
11:40-12:10	General Assembly		
12:10-12:20	Closing Remarks		

## Venue Guide (학술대회장 안내)

## ► Plenary Lecture (11월 1일 금요일)

Contents
<b>Plenary Lecture 1 (11:00–11:45)</b>
11:00–11:45 Histone demethylase-mediated adaptive thermogenesis <i>Juro Sakai (Univ. Tokyo, Tohoku University Graduate school of Medicine, Japan)</i>
<b>Plenary Lecture 2 (11:45–12:30)</b>
11:45–12:30 Cardiac calcium signaling: Calcium Imaging, Genetically-engineered Mice, and RyR2-Gene editing <i>Martin Morad (Medical Univ. South Carolina, USA)</i>

## ► Special Academic Session (10월 31일 목요일)

Contents
<b>New applications in systems biology and physiology (13:30–15:30)</b> Chair: 우현구, 박웅양
13:30–14:00 1. Re-wiring intercellular interaction in colon cancer 박웅양 (성균관대)
14:00–14:30 2. Deciphering brain somatic mutations in neurological disorders 이정호 (KAIST)
14:30–15:00 3. Highly efficient base-editing in mice 김경미 (고려대)
15:00–15:30 4. Pharmacogenomic landscape of patient-derived tumor cells for precision oncology 이진구 (아주대)

## ► Symposium (11월 1일 금요일)

Contents
<b>Symposium 1: Modeling pathologic pain</b> Chair: 황선욱(고려의대), 김선광(경희대)
1. Development of depression-related pain animal model 김현우 (충남의대)
2. Decoding of spontaneous pain information from cortical two-photon calcium imaging in awake mice with machine learning 김선광 (경희한의대)
3. Novel Strategies for Inhibiting TRPV1 Activation using Human DRG Neuron Platform 김용호 (가천의대)
4. In vitro Spine-on-a-chip for application of biological microenvironment 최 혁 (고려의대)
<b>Symposium 2: Pathophysiology of metabolic diseases</b> Chair: 임승순(계명의대), 전태일(전남대)
1. Obesity-induced inflammation in the development of insulin resistance 이종순 (순천향대)
2. The role of cytosolic calcium in insulin resistance 오병철 (가천의대)
3. The role of ER stress on the development of obesity and type 2 diabetes 이재민 (DGIST)
4. Fat depot selective inflammation and insulin resistance in obesity 김재범 (서울대)
<b>Symposium 3: Multifaceted functions of ion channels</b> Chair: 서인석(서울의대), 김성준(서울의대)
1. Lipid transports by TMEM16 channel/ scramblases 이병철 (한국뇌연구원)
2. Allosteric modulation of TMEM16A channels by PI(4,5)P2 and CaMKII 서병창 (DGIST)
3. Bicarbonate permeation through anion channels 이민구 (연세의대)
4. Biophysical and physiological functions of Tentonin 3 오우택 (KIST)

Symposium 4: Physiology of higher nervous functions		Chair: 이덕주(가톨릭의대), 박주민 (IBS)
1. Sensory encoding in the cerebellar climbing fiber		김상정 (서울의대)
2. The origin and function of cerebellar tonic inhibition		윤보은 (단국대의대)
3. Serotonin-induced excitation of deep cerebellar nuclei mediates muscle tension abnormalities		김대수 (KAIST)
4. Cerebellar modulation of emotional learning and memory		이용석 (서울의대)
Symposium 5: Cardiac physiology and pathophysiology		Chair: 김성준(서울의대), 우선희(충남대)
1. Ryanodine receptor type 2 as a potential target for novel antiarrhythmic drugs		Nagomi Kurebayashi (Juntendo Univ., Japan)
2. Mechanism of atrial fibrillation		최종일(고려의대)
3. A multidisciplinary approach for pharmacological assessment using human iPSC-derived cardiomyocytes		Junko Kurokawa (Univ. Shizuoka, Japan)
4. NOS signaling in cardiac E-C coupling and metabolism		Yin Hua Zhang (서울의대)
5. Role of extracellular matrix in cardiac tissue regeneration		김민석 (이화대의대)
Symposium 6: Stem cell physiology; beyond the limits		Chair: 정진섭(부산의대), 김재호(부산의대)
1. Plant callus reprograms human dermal fibroblasts into multipotent skin-derived neural precursor cells		권유욱 (서울의대)
2. Blood cell production using human hematopoietic stem cells		백은정 (한양의대)
3. Expression profiles of MSCs in FBS-based and chemically defined media		박상규 (아주약대)
4. Salivary gland organoid-based development of exosome therapeutics for menopause-induced xerostomia		김형식 (부산치대)
5. Dissecting cellular heterogeneity using single-cell RNA sequencing		김종경 (DGIST)
Symposium 7: Exercise physiology		Chair: 한 진(인제의대), 박효범(인하대)
1. The role of arginine methylation in the maintenance of skeletal muscle function		강종순(성균관대)
2. Effect of exercise on p66shc and vascular function in cardiovascular diseases		이상기 (충남대)
3. Genetic approaches to study physiology of exercise using mouse models		김승겸(서울과기대)
4. Can exercise intervention improve endothelial TRPV4 channel-dependent cell-cell communication?		홍광석 (중앙대)
5. Cerebral and peripheral microvascular function in individuals with elevated cardiovascular disease risk		허찬술 (전북대)
Symposium 8: Skin pathophysiology and ion channels		Chair: 남주현(동국의대), 고재홍(중앙의대)
1. Skin aging and ion channels		정진호(서울의대)
2. The involvement of TRPV1 in the effects of external stressors on the skin		이종성(성균관대)
3. Understanding molecular mechanisms of histamine-independent itch pathways		심원식(가천약대)
4. Transcriptomic analysis of gene expressions in two different murine models: prediction of itching diagnostic markers on early stage of scratching behavior		김영원(중앙의대)
Symposium 9: Altered shape and work of mitochondria		Chair: 임채현(울산의대), 박규상(원주의대)
1. Defective D-lactate metabolism induces methylglyoxal accumulation and causes cardiomyopathy		박찬배 (아주의대)
2. The coordinated regulation of mitochondrial structure and function for mitochondrial quality surveillance		선 웅 (고려의대)
3. Function of mitochondrial chaperone TRAP1 during progression of metabolic diseases		강병현 (UNIST)
4. A novel post-transcriptional regulation of L-type calcium channel in mice heart		김형규 (인제의대)

▶ Young Physiologists' Session (10월 31일 목요일)

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16:50–17:05	YP-01	Neutrophil-derived extracellular vesicles: proinflammatory trails and anti-inflammatory microvesicles <i>Chang-Won Hong (Kyungpook National University)</i>
17:05–17:20	YP-02	Effect of proton pump inhibitor on gastric smooth muscle in functional dyspepsia <i>Heeman Kim (Yonsei University Wonju)</i>
17:20–17:35	YP-03	Effects of lipid peroxidants on ion channels and proarrhythmia potential <i>Seong Woo Choi (Seoul National University)</i>
17:35–17:50	YP-04	Distress, behavioral coping, and correlation patterns of mGluR5 in neuropathic pain brain <i>Geehoon Chung (Yeungnam University)</i>
17:50–18:05	YP-05	Disruption of Ca2+i Homeostasis and Connexin 43 Hemichannel Function in the Right Ventricle Precedes Overt Arrhythmogenic Cardiomyopathy in Plakophilin-2-Deficient Mice <i>Joon-Chul Kim (New York University)</i>
18:05–18:20	YP-06	An Autaptic Culture System for Standardized Analyses of iPSC-Derived Human Neurons <i>ChoongKu Lee (University of Bonn)</i>
18:20–18:35	YP-07	Induction of AP-1 by YAP/TAZ contributes to cell proliferation and organ growth <i>Ja Hyun Koo (The Catholic University of Korea)</i>

▶ Oral Poster (10월 31일 목요일)

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16:00-16:10	OP-02	NALCN channel is essential for pacemaking and burst activities in substantia nigra dopamine neurons <i>Suyun Hahn (Sungkyunkwan University)</i>	
16:10-16:20	OP-03	Three-dimensional heart model-based screening of proarrhythmic potential by in silico simulation of action potential and electrocardiograms: verapamil and ranolazine vs. dofetilide <i>Eun Bo Shim (Kangwon National University)</i>	
16:20-16:30	OP-04	Feature selection models for the survival of human pancreatic cancer patients using deep learning algorithms <i>Han-Jun Cho (CHA University)</i>	
16:30-16:40	OP-05	HCN channel regulates somatodendritic membrane trafficking of voltage-gated potassium channel <i>Sol Hee Park (Kyung Hee University)</i>	

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15:50–16:00	OP-06	TRPML1/3 heteromer regulates autophagosome–lysosome fusion as a PI4P downstream effector	<i>So Woon Kim (Sungkyunkwan University)</i>
16:00–16:10	OP-07	Orai1–Mediated Store–Operated Ca <sup>2+</sup> Entry in Podocyte is Critical for Kidney Filter Integrity	<i>Bao Thi Ngoc Dang (Yonsei University Wonju)</i>
16:10–16:20	OP-08	Neddylation blockade induces HIF–1 $\alpha$ driven cancer cell migration via upregulation of ZEB1	<i>Jun Bum Park (Seoul National University)</i>
16:20–16:30	OP-09	Sympathetic stimulation–mediated mitochondrial regulation in mouse beige and brown adipocytes	<i>Dat Da Ly (Yonsei University Wonju)</i>
16:30–16:40	OP-10	Reduction of human non–small cell lung cancer cell growth by sea hare hydrolysates through regulation of macrophage polarization and pyroptosis and necroptosis	<i>Marie Merci Nyiramana (Gyeongsang National University)</i>

## Plenary Lecture

- S 25** Plenary Lecture 1 Acute response and chronic adaptation to cold stress via a single epigenetic enzyme but through distinct mechanisms  
Juro Sakai  
Division of Metabolic Medicine, RCAST, The University of Tokyo, Tokyo, Japan,  
Division of Molecular Physiology, Tohoku University Graduate School of Medicine, Sendai, Japan
- S 27** Plenary Lecture 2 Cardiac Calcium Signaling: Calcium Imaging, Genetically-engineered Mice, and RyR2-Gene editing  
Martin Morad  
Cardiac Signaling Center of USC, MUSC and Clemson University, Charleston, USA

## Special Academic Session

### New applications in systems biology and physiology

- S 47** SS-1 Altered tumor microenvironment in colorectal cancer  
Woong-Yang Park  
Samsung Genome Institute, Samsung Medical Center, Sungkyunkwan University, Seoul, Korea
- S 47** SS-2 Deciphering brain somatic mutations in human neurological disorders  
Jeong Ho Lee  
Graduate School of Medical Science and Engineering, KAIST
- S 47** SS-3 Highly efficient base-editing in mice  
Kyoungmi Kim  
Department of Physiology, Korea University College of Medicine, Seoul, Republic of Korea
- S 47** SS-4 Pharmacogenomic landscape of patient-derived tumor cells for precision oncology  
Jin-Ku Lee  
Department of Biochemistry, Ajou University, School of Medicine

## Symposium

### Symposium 1: Modeling pathologic pain

- S 47** S-1-1 Development of depression-related pain animal model  
Hyun-Woo Kim  
Departments of Physiology and Medical Science, College of Medicine and Brain Research Institute, Chungnam National University, Daejeon, Republic of Korea
- S 47** S-1-2 Decoding of spontaneous pain information from cortical two-photon calcium imaging in awake mice with machine learning  
Sun Kwang KIM  
Departments of Physiology, College of Korean Medicine, Kyung Hee University, Seoul, Korea
- S 47** S-1-3 Novel Strategies for Inhibiting TRPV1 Activation using Human DRG Neuron Platform  
Yong Ho Kim  
Gachon Pain Center and Department of Physiology, College of Medicine, Gachon University, Incheon, Republic of Korea
- S 47** S-1-4 In vitro Spine-on-a-chip for application of biological microenvironment  
Min Ho Hwang<sup>1</sup>, Hyuk Choi  
Department of Medical Sciences, Graduate School of Medicine, Korea University, Seoul, South Korea

### Symposium 2: Pathophysiology of metabolic diseases

- S 48** S-2-1 Different Fat in Metabolic Regulation  
Jongsoon Lee  
Soonchunhyang Institute of Medi-bio Science (SIMS), Soonchunhyang University, Cheonan, Korea
- S 48** S-2-2 Molecular mechanism of insulin resistance and Akt inactivation by intracellular calcium  
Byung-Chul Oh  
Department of Physiology, Lee Gil Ya Cancer and Diabetes Institute, Gachon University College of Medicine, Incheon, Korea
- S 48** S-2-3 The Role of the Endoplasmic Reticulum Stress on the Development of Leptin Resistance and Obesity  
Jaemin Lee  
Departments of New Biology, DGIST, Daegu, Korea

- S 49 S-2-4 Different Fat Depots with Different Adipogenic Progenitor Cells in Metabolic Regulation  
In Jae Hwang, Kyung Cheul Shin, Jee Park, Jong In Kim, Sung Sik Choe and Jae Bum Kim\*  
Center for Adipose Tissue Remodeling, Department of Biological Sciences, Institute of Molecular Biology and Genetics, Seoul National University, Seoul, Korea

### Symposium 3: Multifaceted functions of ion channels

- S 49 S-3-1 Lipid transports via TMEM16 channel/scramblases  
Byoung-Cheol Lee  
Department of Structure and Function on Neural Network, Korea Brain Research Institute, Daegu, Korea
- S 49 S-3-2 Allosteric modulation of TMEM16A channels by PI(4,5)P2 and CaMKII  
Byung-Chang Suh  
Department of Brain & Cognitive Sciences, Daegu Gyeongbuk Institute of Science and Technology (DGIST), Daegu, Korea
- S 49 S-3-3 Bicarbonate permeation through anion channels  
Min Goo Lee  
Department of Pharmacology and Brain Korea 21 Project for Medical Sciences, Yonsei University College of Medicine, Seoul, Korea
- S 50 S-3-4 Biophysical and physiological functions of Tentonin 3  
Uhtaek Oh  
Brain Science Institute, KIST, Seoul, Korea

### Symposium 4: Physiology of higher nervous functions

- S 50 S-4-1 Sensory encoding in the cerebellar climbing fiber  
Sang Jeong Kim  
Departments of Physiology, Seoul National University College of Medicine, Seoul, Korea
- S 50 S-4-2 The origin and function of cerebellar tonic inhibition  
Bo-Eun Yoon  
Department of Molecular biology, Dankook University, Cheonan, Korea
- S 50 S-4-3 Cerebellar 5HT-2A receptor agonism mediates stress-induced dystonia  
Jungeun Kim, Sujin Chae, Sungsoo Kim, Myounggoo Kang, Wondo Heo and Daesoo Kim  
Department of Biological Sciences, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea
- S 50 S-4-4 Cerebellar modulation of emotional learning and memory  
Yong-Seok Lee  
Departments of Physiology, Seoul National University College of Medicine, Seoul, Korea

### Symposium 5: Cardiac physiology and pathophysiology

- S 51 S-5-1 Ryanodine receptor type 2 as a potential target for novel anti-arrhythmic drugs  
Nagomi Kurebayashi  
Cellular and Molecular Pharmacology, Juntendo University Graduate School of Medicine, Tokyo, Japan
- S 51 S-5-2 Mechanism of atrial fibrillation  
Jong-Il Choi  
Division of Cardiology, Department of Internal Medicine, Korea University College of Medicine and Korea University Anam Hospital, Seoul, Korea
- S 51 S-5-3 A multidisciplinary approach for pharmacological assessment using human iPS-derived cardiomyocytes  
Junko Kurokawa  
Departments of Bio-Informational Pharmacology, School of Pharmaceutical Sciences, University of Shizuoka, Shizuoka, Japan
- S 51 S-5-4 NO signaling in cardiac E-C coupling and metabolism  
Yin Hua Zhang  
Department of Physiology & Biomedical Sciences, Seoul National University, College of Medicine, Seoul, Korea
- S 52 S-5-5 Extracellular matrix-derived vesicles affect cardiac atria  
Minsuk Kim  
Department of Pharmacology, College of Medicine, Ewha Womans University, Seoul, Korea

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- S 52 S-6-1 Plant callus reprograms human dermal fibroblasts into multipotent skin-derived neural precursor cells  
Yoo-Wook Kwon  
Seoul National University College of Medicine, Seoul, Korea



- S 52** S-6-2 Blood cell production using human hematopoietic stem cells  
So Yeon Han<sup>1</sup>, Eun Mi Lee<sup>1</sup>, Eun Jung Baek<sup>1,2</sup>  
<sup>1</sup>Department Translational Medicine, Graduate School of Biomedical Science and Engineering, Hanyang University; <sup>2</sup>Dept. of Laboratory Medicine, Hanyang University College of Medicine, Hanyang University, Korea
- S 52** S-6-3 Differential Gene Expression in Mesenchymal Stem Cells  
Sang Gyu Park  
Department of Pharmacy, Ajou University, Suwon, Korea
- S 53** S-6-4 Organoid-based study of epithelial homeostasis and regeneration  
Hyung-Sik Kim<sup>1,2</sup>  
<sup>1</sup>Department of Life Science in Dentistry, School of Dentistry, Pusan National University; <sup>2</sup>Dental and Life Science Institute, Pusan National University, Yangsan, Korea
- S 53** S-6-5 Dissecting cellular heterogeneity using single-cell RNA-seq  
Jong Kyoung Kim  
Department of New biology, DGIIST, Daegu, Korea

## Symposium 7: Exercise physiology

- S 53** S-7-1 Protein arginine methylation in muscle aging  
Jong-Sun Kang  
Departments of Molecular Cell Biology, Sungkyunkwan University School of Medicine, Suwon, Korea
- S 53** S-7-2 Effect of exercise on p66shc and vascular function in cardiovascular diseases  
Sang Ki Lee  
Departments of Sport Science, Chungnam National University College of Natural Science, Daejeon, Korea
- S 53** S-7-3 Smooth muscle cell mineralocorticoid receptor contributes to pathogenesis of heart failure  
Seung Kyum Kim  
Departments of Sports Science, Seoul National University of Science and Technology, Seoul, Republic of Korea
- S 54** S-7-4 Can exercise intervention improve endothelial TRPV4 channel-dependent cell-to-cell communication?  
Kwangseok Hong  
Department of Physical Education, College of Education, Chung-Ang University, Seoul, Korea
- S 54** S-7-5 Cutaneous Microvascular Function in Individuals with Elevated Cardiovascular Disease Risk  
Chansol Hurr  
Departments of Physical Education, Chonbuk National University, South Korea

## Symposium 8: Skin pathophysiology and ion channels

- S 54** S-8-1 Skin aging and ion channels  
Jin Ho Chung  
Department of Dermatology, Seoul National University College of Medicine, Seoul, Korea
- S 55** S-8-2 Effects of blue-light irradiation on human keratinocytes are mediated via transient receptor potential vanilloid (TRPV)-1-mediated signaling  
Jongsung Lee  
Molecular Dermatology Laboratory, Department of Integrative Biotechnology, College of Biotechnology and Bioengineering, Sungkyunkwan University, Suwon, Korea
- S 55** S-8-3 Understanding molecular mechanisms of histamine-independent itch pathways  
Won-Sik Shim  
Gachon University, College of Pharmacy, Incheon, Korea
- S 55** S-8-4 Transcriptomic analysis of gene expressions in two different murine models: prediction of diagnostic markers on early stage of scratching behavior  
Young-Won Kim  
Departments of Physiology, College of Medicine, Chung-Ang University, Seoul, Korea

## Symposium 9: Altered shape and work of mitochondria

- S 55** S-9-1 Defective D-lactate metabolism induce methylglyoxal accumulation and cause cardiomyopathy  
Chan Bae Park  
Department of Physiology, Ajou University School of Medicine, Suwon, Korea
- S 56** S-9-2 Drp1-dependent mitochondrial fission for the quality surveillance  
Woong Sun  
Department of Anatomy, Korea University College of Medicine, Seoul, Korea
- S 56** S-9-3 Function of mitochondrial chaperone TRAP1 during progression of metabolic diseases  
Byoung Heon Kang  
Department of Biological Sciences, Ulsan National Institutes of Science and Technology (UNIST), Ulsan, Korea

- S 56 S-9-4** A novel post-transcriptional regulation of L-type calcium channel in mice heart  
Hyoungh Kyu Kim, Nammi Park, Jubert Marquez, Tae Hee Ko, Pham Trong Kha, Sung Hak Choi, Jiyoung Moon, Jae Boum Youm and Jin Han  
Cardiovascular and Metabolic Disease Center, Department of Physiology, Department of Health Sciences and Technology, BK21 plus Project Team, College of Medicine, Inje University, Busan, Republic of Korea

## Young Physiologists' Session

- S 57 YP-01** Neutrophil-derived extracellular vesicles: proinflammatory trails and anti-inflammatory microvesicles  
Young-Jin Youn<sup>1,†</sup>, Sanjeeb Shrestha<sup>1,†</sup>, Jun-Kyu Kim<sup>1</sup>, Yu-Bin Lee<sup>1</sup>, Jee Hyun Lee<sup>2</sup>, Keun Hur<sup>2</sup>, Nanda Maya Mali<sup>3</sup>, Sung-Wook Nam<sup>4</sup>, Sun-Hwa Kim<sup>1</sup>, Dong-Keun Song<sup>5</sup>, Hee Kyung Jin<sup>6,7</sup>, Jae-sung Bae<sup>1,7</sup>, Chang-Won Hong<sup>1,\*</sup>  
Department of <sup>1</sup>Physiology, <sup>2</sup>Department of Biochemistry and Cell Biology, <sup>3</sup>Anatomy, and <sup>4</sup>Molecular Medicine School of Medicine, Kyungpook National University, Daegu, <sup>5</sup>Department of Pharmacology, College of Medicine, Hallym University, Chuncheon, <sup>6</sup>Department of Laboratory Animal Medicine, College of Veterinary Medicine, <sup>7</sup>Stem Cell Neuroplasticity Research Group, Kyungpook National University, Daegu, Korea
- S 57 YP-02** Effect of proton pump inhibitor on gastric smooth muscle in functional dyspepsia  
Heeman Kim<sup>1</sup>, Seung-Bum Ryoo<sup>2</sup>, Tae Sik Sung<sup>3</sup>, Jiyeon Lee<sup>3</sup>, Sang Don Koh<sup>3</sup>  
<sup>1</sup>Department of Gastroenterology, Yonsei University Wonju College of Medicine, Wonju, <sup>2</sup>Department of Surgery, Seoul National University College of Medicine, Seoul, Korea, <sup>3</sup>Department of Physiology & Cell Biology, University of Nevada Reno, Reno, Nevada
- S 57 YP-03** Effects of lipid peroxidants on ion channels and proarrhythmia potential  
Seong Woo Choi<sup>2</sup>, Sung Joon Kim<sup>1,2</sup>  
Departments of <sup>1</sup>Physiology and, <sup>2</sup>Ischemic/Hypoxic Disease Institute, Seoul National University College of Medicine, Seoul, Korea
- S 57 YP-04** Distress, behavioral coping, and correlation patterns of mGluR5 in neuropathic pain brain  
Geehoon Chung<sup>1</sup>, Sang Jeong Kim<sup>2</sup>, Sun Kwang Kim<sup>1</sup>  
Departments of <sup>1</sup>Physiology and <sup>2</sup>Internal Medicine, Yeungnam University College of Medicine, <sup>3</sup>Department of Physiology, Keimyung University School of Medicine, Daegu, <sup>1</sup> Department of Physiology, College of Korean Medicine, Kyung Hee University, <sup>2</sup> Department of Physiology, Seoul National University College of Medicine, Seoul, Korea
- S 58 YP-05** Disruption of Ca<sup>2+</sup><sub>i</sub> Homeostasis and Connexin 43 Hemichannel Function in the Right Ventricle Precedes Overt Arrhythmogenic Cardiomyopathy in Plakophilin-2-Deficient Mice  
Joon-Chul Kim<sup>1</sup>, Marta Pérez-Hernández<sup>1</sup>, Francisco J. Alvarado<sup>2</sup>, Svetlana R. Maurya<sup>3</sup>, Jerome Montnach<sup>4</sup>, Yandong Yin<sup>5</sup>, Mingliang Zhang<sup>1</sup>, Xianming Lin<sup>1</sup>, Carolina Vasquez<sup>1</sup>, Adriana Heguy<sup>6</sup>, Feng-Xia Liang<sup>7</sup>, Sun-Hee Woo<sup>8</sup>, Gregory E. Morley<sup>1</sup>, Eli Rothenberg<sup>5</sup>, Alicia Lundby<sup>3,9</sup>, Hector H. Valdivia<sup>2</sup>, Marina Cerrone, Mario Delmar  
<sup>1</sup>The Leon H Charney Division of Cardiology, New York University School of Medicine, New York NY, <sup>2</sup>Department of Medicine and Cardiovascular Research Center, University of Wisconsin-Madison School of Medicine and Public Health, Madison WI, <sup>3</sup>Department of Biomedical Sciences, Faculty of Health and Medical Sciences, University of Copenhagen, <sup>4</sup>Institut du Thorax, Nouvelle Université à Nantes. INSERM. Nantes Cedex <sup>1</sup>, France, <sup>5</sup>Department of Pharmacology and Biochemistry, <sup>6</sup>Department of Pathology and Genome Technology Center, <sup>7</sup>Microscopy laboratory, Division of Advanced Research Technologies. New York University School of Medicine. New York NY, <sup>8</sup>Laboratory of Physiology, College of Pharmacy, Chungnam National University, Daejeon, Korea, <sup>9</sup>NNF Center for Protein Research, Faculty of Health and Medical Sciences, University of Copenhagen
- S 58 YP-06** An Autaptic Culture System for Standardized Analyses of iPSC-Derived Human Neurons  
ChoongKu Lee<sup>1</sup>, Hong Jun Rhee<sup>1</sup>, Ali H. Shaib<sup>1</sup>, Kristina Rehbach<sup>2,3,6</sup>, Anja Guenther<sup>1</sup>, Tamara Krutenko<sup>2</sup>, Matthias Hebisch<sup>2</sup>, Michael Peitz<sup>2,4</sup>, Nils Brose<sup>1</sup>, Oliver Brustle<sup>2</sup>, Jeong Seop Rhee<sup>1</sup>  
<sup>1</sup>Max Planck Institute of Experimental Medicine, Department of Molecular Neurobiology, Göttingen, <sup>2</sup>Institute of Reconstructive Neurobiology, University of Bonn School of Medicine & University Hospital Bonn, <sup>3</sup>LIFE & BRAIN GmbH, Cellomics Unit, <sup>4</sup>Cell Programming Core Facility, University of Bonn School of Medicine, Bonn, Germany
- S 58 YP-07** Induction of AP-1 by YAP/TAZ contributes to cell proliferation and organ growth  
Ja Hyun Koo  
Department of Physiology, College of Medicine, The Catholic University of Korea, Seoul, Korea

## Oral Poster

- S 59 OP-01** Early administration of progesterone activates spinal astrocytes and enhances the development of neuropathic mechanical allodynia  
Sheu-Ran Choi, Ho-Jae Han, Jang-Hern Lee  
Department of Veterinary Physiology, BK21 PLUS Program for Creative Veterinary Science Research, Research Institute for Veterinary Science and College of Veterinary Medicine, Seoul National University, Seoul, Korea
- S 59 OP-02** NALCN channel is essential for pacemaking and burst activities in substantia nigra dopamine neurons  
Suyun Hahn, So Woon Kim, Ki Bum Um, Hyun Jin Kim & Myoung Kyu Park  
Department of Physiology, Sungkyunkwan University School of Medicine, Suwon, Korea
- S 59 OP-03** Three-dimensional heart model-based screening of proarrhythmic potential by in silico simulation of action potential and electrocardiograms: verapamil and ranolazine vs. dofetilide  
Minki Hwang<sup>1</sup>, Chae Hun Leem<sup>2</sup>, Dong-Seok Yim<sup>3</sup>, Eun Bo Shim<sup>1,4</sup>  
<sup>1</sup>SiliconSapiens Inc., <sup>2</sup>Department of Physiology, College of Medicine, University of Ulsan and Seoul Asan Medical Center, <sup>3</sup>Department of Clinical Pharmacology and Therapeutics, Seoul St. Mary's Hospital, Seoul, <sup>4</sup>Department of Mechanical and Biomedical Engineering, Kangwon National University, Chuncheon, Korea

- S 59** OP-04 Feature selection models for the survival of human pancreatic cancer patients using deep learning algorithms  
Han-Jun Cho, Sangcheol Lee, Dong Hyeon Lee  
Department of Physiology, CHA University School of Medicine, Korea
- S 60** OP-05 HCN channel regulates somatodendritic membrane trafficking of voltage-gated potassium channel  
Sol Hee Park<sup>1</sup>, Ji-Yeon Hwang<sup>1</sup>, Kang-Sik Park<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, School of Medicine, and <sup>2</sup>KHU-KIST Department of Converging Science and Technology, Kyung Hee University, Seoul, Korea
- S 60** OP-06 TRPML1/3 heteromer regulates autophagosome-lysosome fusion as a PI4P downstream effector  
So Woon Kim, Hyun Jin Kim  
Department of Physiology, Sungkyunkwan University School of Medicine, Suwon, Korea
- S 60** OP-07 Orai1-Mediated Store-Operated Ca<sup>2+</sup> Entry in Podocyte is Critical for Kidney Filter Integrity  
Bao Thi Ngoc Dang<sup>1-5</sup>, Ji-Hee Kim<sup>1-5\*</sup>, Kyu-Hee Hwang<sup>1-5</sup>, Phan Anh Nguyen<sup>1-5</sup>, Dat Da Ly<sup>1-5</sup>, Kyu-Sang Park<sup>1-5</sup>, Seung-Kuy Cha<sup>1-5</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Department of Global Medical Science, <sup>3</sup>Mitohormesis Research Center, <sup>4</sup>Institute of Mitochondrial Medicine, and <sup>5</sup>Institute of Lifestyle Medicine, Yonsei University Wonju College of Medicine, Wonju, Korea
- S 61** OP-08 Neddylation blockade induces HIF-1 $\alpha$  driven cancer cell migration via upregulation of ZEB1  
Jun Bum Park<sup>1,2</sup>, Jieun Seo<sup>1,2</sup>, Sung Yeon Park<sup>1,2</sup>, Yang-Sook Chun<sup>1,2,3,\*</sup>  
<sup>1</sup>Department of Biomedical Science, <sup>2</sup>Ischemic/hypoxic disease institute, <sup>3</sup>Department of Physiology, Seoul National University College of Medicine, Seoul, Korea,
- S 61** OP-09 Sympathetic stimulation-mediated mitochondrial regulation in mouse beige and brown adipocytes  
Dat Da Ly<sup>1,2</sup>, Hanh Minh T. Nguyen<sup>1,2</sup>, Nuoc Non Tran<sup>3</sup>, Luong Dai Ly<sup>1,2</sup>, Nhung Thi Nguyen<sup>1,2</sup>, Soo-Jin Kim<sup>1,2</sup>, Ha Thu Nguyen<sup>1,2</sup>, Seung-Kuy Cha<sup>1,2</sup>, Byung-Hoon Lee<sup>3</sup>, Kyu-Sang Park<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Mitohormesis Research Center, Yonsei University Wonju College of Medicine, Wonju, <sup>3</sup>Department of New Biology, Daegu Gyeongbuk Institute of Science and Technology, Daegu, Korea
- S 61** OP-10 Reduction of human non-small cell lung cancer cell growth by sea hare hydrolysates through regulation of macrophage polarization and pyroptosis and necroptosis  
Marie Merci Nyiramana<sup>1,2†</sup>, Soo Buem Cho<sup>3†</sup>, Eun-Jin Kim<sup>1</sup>, Min Jun Kim<sup>4</sup>, Ji Hyeon Ryu<sup>1,2</sup>, Hyun Jae Nam<sup>5</sup>, Chang Hyeon Lee<sup>5</sup>, Nam-Gil Kim<sup>6</sup>, Si-Hyang Park<sup>7</sup>, Yeung Joon Choi<sup>8</sup>, Sang Soo Kang<sup>4</sup>, Myunghwan Jung<sup>9</sup>, Min-Kyoung Shin<sup>9</sup>, Jaehee Han<sup>1,2</sup>, In-Seok Jang<sup>10\*</sup>, Dawon Kang<sup>1,2,3\*</sup>  
<sup>1</sup>Department of Physiology and Institute of Health Sciences, <sup>2</sup>Department of Convergence Medical Science, Gyeongsang National University, Jinju, <sup>3</sup>Department of Radiology, Ewha Womans University Medical Center, Seoul, <sup>4</sup>Department of Anatomy, <sup>5</sup>Department of Medicine, College of Medicine, Gyeongsang National University, Jinju, <sup>6</sup>Department of Marine Biology and Aquaculture and Institute of Marine Industry, Gyeongsang National University, <sup>7</sup>Sunmarin Biotech, <sup>8</sup>Department of Seafood Science and Technology and Institute of Marine Industry, Gyeongsang National University, Tongyeong, <sup>9</sup>Department of Microbiology, College of Medicine, Gyeongsang National University, <sup>10</sup>Department of Thoracic and Cardiovascular Surgery, Gyeongsang National University Hospital, Jinju, Korea

## Poster Presentation

### P01: Basic neurophysiology and Pain

- S 62** P01-01 Examination of tetraspan contribution to sensory TRP-mediated pain  
Ji Yeon Lim, Pyung Sun Cho, Minseok Kim, Haiyan Zheng, Sun Wook Hwang  
Departments of Biomedical Sciences and Department of Physiology, Korea University College of Medicine, Seoul, Korea
- S 62** P01-02 Differential induction of long-term synaptic plasticity in interneurons of layer 2/3 in rat primary visual cortex  
Kayoung Joo<sup>1</sup>, Kwang-Hyun Cho<sup>1</sup>, Jin Hwa Jang<sup>1</sup>, Dongchul Shin<sup>1</sup>, Duck-Joo Rhie<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Catholic Neuroscience Institute, College of Medicine, The Catholic University of Korea, Seoul, Korea
- S 62** P01-03 Inhibitory effects of aripiprazole on Kv1.4 potassium channels  
Jeaneun Park<sup>1</sup>, Kwang-Hyun Cho<sup>1</sup>, Hong Joon Lee<sup>1</sup>, Sang June Hahn<sup>1</sup>, Duck-Joo Rhie<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Catholic Neuroscience Institute, College of Medicine, The Catholic University of Korea, Seoul, Korea
- S 62** P01-04 Cholinergic and serotonergic modulation of long-term synaptic plasticity in lateral prefrontal cortex of rats  
Dongchul Shin<sup>1</sup>, Kayoung Joo<sup>1</sup>, Kwang-Hyun Cho<sup>1</sup>, Duck-Joo Rhie<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Catholic Neuroscience Institute, College of Medicine, The Catholic University of Korea, Seoul, Korea
- S 63** P01-05 Central VEGF-A pathway plays a key role in the development of trigeminal neuropathic pain in rats  
Jo-Young Son<sup>1</sup>, Jin-Sook Ju<sup>1</sup>, Geun-Woo Lee<sup>1</sup>, Min-Kyoung Park<sup>2</sup>, Min-Kyung Lee<sup>3</sup>, Dong-Kuk Ahn<sup>1\*</sup>  
<sup>1</sup>Department of Oral Physiology, School of Dentistry, Kyungpook National University, Daegu, <sup>2</sup>Department of Dental Hygiene, Kyung-Woon University, Gumi, <sup>3</sup>Department of Dental Hygiene, Dong-Eui University, Busan, Korea
- S 63** P01-06 Methylene Blue is involved in anti-inflammation by lowering the expression level of pro-inflammatory cytokines in knee arthritis rats  
Seung-Won Lee<sup>1</sup>, Jin-Sung Park<sup>1</sup>, Sun-Wook Moon<sup>1</sup>, Eui-ho Park<sup>1</sup>, Hye-Rim Suh<sup>1</sup>, Yu-Jin Kim<sup>1</sup>, Hee-Chul Han<sup>1</sup>  
<sup>1</sup>Department of Physiology, Korea University College of Medicine, Seoul, Korea

- S 63** P01-07 Endogenous spinal PPAR-gamma is necessary to motor function recovery after spinal cord injury in rats  
Youngkyung Kim, Kyu-Won Park, Jeonghwa Oh, Young Wook Yoon  
Department of Physiology and Neuroscience Research Institute, Korea University, Seoul, Korea
- S 64** P01-08 The migration of GABAergic interneurons is modulated by JAK3 signaling during developing brain.  
A Young Kim, Jee Min Chung, Eun Joo Baik  
Department of Physiology, Ajou University School of Medicine, Suwon, Korea
- S 64** P01-09 Understanding the neural and genetic basis of odor discrimination in *C. elegans*  
Hee Kyung Lee<sup>1</sup>, Saebom Kwon<sup>1</sup>, Jessica Antonio<sup>1</sup>, Jin il Lee<sup>2</sup>, Kyoung-hye Yoon<sup>1</sup>  
<sup>1</sup>Department of Physiology, Mitohormesis Research Center, Wonju College of Medicine and <sup>2</sup>Division of Basic Science and Technology, Yonsei University, Wonju, Korea
- S 64** P01-10 Pituitary adenylate cyclase-activating peptide enhances cholinergic transmission at the autonomic synapses via presynaptic mechanisms  
Seong Jun Kang, Seong-Woo Jeong  
Department of Physiology, Yonsei University Wonju College of Medicine, Wonju, Korea
- S 65** P01-11 Assessment of visceral pain using telemetry recording of blood pressure in conscious rat  
Tae Wan Kim<sup>1</sup>, Dong-ho Youn<sup>2</sup>  
<sup>1</sup>Department of Physiology, College of Veterinary Medicine, <sup>2</sup>Department of Oral Physiology, School of Dentistry, Kyungpook National University, Daegu, Korea
- S 65** P01-12 Anatomical analysis of branch specific origin-wise synaptic distribution on tuft dendrites in the neocortex using array tomography  
Nari Kim, Sang-kyu Bahn, Joon Ho Choi, Jinseop Kim, Jong-Cheol Rah\*  
Korea Brain Research Institute, Daegu, Korea

## P02: Neuronal pathophysiology

- S 65** P02-01 The RNAi line of *kdm4a* ameliorates tau-engendered defects in *Drosophila melanogaster*.  
Sung Yeon Park<sup>1,3</sup>, Jieun Seo<sup>2</sup>, Uk Il Ju<sup>2</sup>, Yang-Sook Chun<sup>1,2,3</sup>  
<sup>1</sup>Ischemic/Hypoxic Disease Institute, <sup>2</sup>Department of Biomedical Sciences and <sup>3</sup>Department of Physiology, Seoul National University College of Medicine, Seoul, Korea.
- S 65** P02-02 Membrane targeting of the astrocytic membrane protein, MLC1 regulates cellular morphology and motility  
Junmo Hwang<sup>1</sup>, Hyun-Ho Lim<sup>1,2</sup>  
<sup>1</sup>Neurovascular Unit Research Group, Korea Brain Research Institute and <sup>2</sup>Department of Brain & Cognitive Sciences, Daegu Gyeongbuk Institute of Science & Technology, Daegu, Korea
- S 66** P02-03 Role of group I metabotropic glutamate receptor in low Mg<sup>2+</sup>-induced interictal-like epileptiform activity in rat hippocampal slice  
Ji Seon Yang, Hyun-Jong Jang, Duck-Joo Rhie, Shin Hee Yoon  
Department of Physiology, College of Medicine, The Catholic University of Korea, Seoul, Korea
- S 66** P02-04 SCAMP5-dependent localization of NHE6 to synaptic vesicles is critical for regulating quantal size at glutamatergic synapses  
Unghwi Lee<sup>1</sup>, Daehun Park<sup>1</sup>, Soohyun Kim<sup>1</sup>, Sang-Eun Lee<sup>1</sup>, Yujin Kim<sup>1,2</sup>, Sunghoe Chang<sup>1,2</sup>  
<sup>1</sup>Department of Physiology and Biomedical Sciences, <sup>2</sup>Neuroscience Research Institute, Seoul National University College of Medicine, Seoul, Korea
- S 66** P02-05 Hypothalamic peptide hormone A controls appetite via leptin signaling and induction of  $\alpha$ -melanocyte-stimulating hormone  
Yunseon Jang<sup>1,2,3#</sup>, Soo Jeong Kim<sup>1,3</sup>, Xianshu Ju<sup>1,2,3</sup>, Min Joung Lee<sup>1,2,3#</sup>, Jianchen Cui<sup>1,2,3</sup>, Jiebo Zhu<sup>1,2,3</sup>, Yu Lim Lee<sup>1,2,3</sup>, Min Jeong Ryu<sup>1,4</sup>, Gi Ryang Kweon<sup>1,2,4\*</sup>, Jun Young Heo<sup>1,2,3\*</sup>  
<sup>1</sup> Department of Biochemistry, <sup>2</sup> Department of Medical Science, <sup>3</sup> Infection Control Convergence Research Center, <sup>4</sup> Research Institute for Medical Science, Chungnam National University School of Medicine, Daejeon, Korea
- S 66** P02-06 Crif1 deletion in endothelial cells affects Blood-brain barrier maintenance by the alteration of actin cytoskeleton  
Min Joung Lee<sup>1,2</sup>, Yunseon Jang<sup>1,2</sup>, Soo Jeong Kim<sup>1,2</sup>, Xianshu Ju<sup>1</sup>, Yu Lim Lee<sup>1,2</sup>, Jeong Hwan Son<sup>2</sup>, Jianchen Cui<sup>1</sup>, Min Jeong Ryu<sup>2,3</sup>, Song-Yi Choi<sup>6</sup>, Woosuk Chung<sup>7</sup>, Chaejeong Heo<sup>8</sup>, Yang Hoon Huh<sup>9</sup>, Gi Ryang Kweon<sup>1,2,3\*</sup>, Jun Young Heo<sup>1,2,4,5\*</sup>  
Department of <sup>1</sup>Medical Science, Department of <sup>2</sup>Biochemistry, <sup>3</sup> Research Institute for Medical Science, <sup>4</sup>Brain research institute Chungnam National University School of Medicine, <sup>5</sup>Infection Control Convergence Research Center, College of Medicine, Chungnam National University, <sup>6</sup> Department of Pathology, Chungnam National University School of Medicine, <sup>7</sup>Department of anesthesiology and pain medicine, Chungnam National University Hospital, Daejeon, <sup>8</sup> Center for Neuroscience Imaging Research (CNIR), Institute for Basic Science (IBS), Suwon, <sup>9</sup>Electron Microscopy Research center, Korea Basic Science Institute, Cheongju, Korea
- S 67** P02-07 Experimental evidences for functional changes in cortical blood flow by transcranial direct current stimulation  
Ho Koo, Se Jin, Moon, Xiao Yong Zhang, Myoung Ae Choi, Min Sun Kim  
Department of Physiology, Wonkwang University School of Medicine & Brain Science Institute at Wonkwang University, Iksan, Korea
- S 67** P02-08 Obstructive sleep apnea-induced pathological changes in the rabbit brain  
Hyeyun Kim<sup>1</sup>, Seungeun Lee<sup>2</sup>, Minchae Kim<sup>2</sup>, Yein Choi<sup>2</sup>, Jiyeon Moon<sup>2</sup>, Byong-Gon Park<sup>2</sup>  
Departments of <sup>1</sup>Neurology and <sup>2</sup>Physiology, College of Medicine, Catholic Kwandong University, Gangneung, Korea

- S 67** P02-09 The epigenetic changes in rabbit brain of chronic obstructive sleep apnea model  
Hyeyun Kim<sup>1</sup>, Minchae kim<sup>2</sup>, Yein Choi<sup>2</sup>, Jiyeon Moon<sup>2</sup>, Seungeun Lee<sup>2</sup>, Byong-Gon Park<sup>2</sup>  
Departments of <sup>1</sup>Neurology and <sup>2</sup>Physiology, College of Medicine, Catholic Kwandong University, Gangneung, Korea
- S 68** P02-10 Decreased expression of miR-200a-3p and 200b-3p of rat brain in obstructive sleep apnea associated with Alzheimer's disease  
Hyeyun Kim<sup>1</sup>, Yein Choi<sup>2</sup>, Jiyeon Moon<sup>2</sup>, Seungeun Lee<sup>2</sup>, Minchae kim<sup>2</sup>, Byong-Gon Park<sup>2</sup>  
Departments of <sup>1</sup>Neurology and <sup>2</sup>Physiology, College of Medicine, Catholic Kwandong University, Gangneung, Korea
- S 68** P02-11 Optogenetic stimulation of cortico-subthalamic projections ameliorate the motor symptoms in the 6-hydroxydopamine model of Parkinson's disease  
In sun Choi, Joon Ho Choi, and Jong Cheol Rah  
Korea Brain Research Institute, Laboratory of Neurophysiology, Daegu, Korea

### P03: Electrophysiology and Ca<sup>2+</sup> signaling

- S 68** P03-01 Tricyclic antidepressant doxepin inhibits voltage-dependent K<sup>+</sup> channels in rabbit coronary arterial smooth muscle cells  
Jin Ryeol An, Won Sun Park  
Department of Physiology, Kangwon National University School of Medicine, Chuncheon, Korea
- S 68** P03-02 The inhibitory effect of anticholinergic drug oxybutynin on voltage-dependent K<sup>+</sup> channels in coronary arterial smooth muscle cells  
Jin Ryeol An, Won Sun Park  
Department of Physiology, Kangwon National University School of Medicine, Chuncheon, Korea
- S 69** P03-03 Functional role of the C-terminal domain of Bestrophin-1, a calcium-activated chloride channel  
Dong-Hyun Kim<sup>1</sup>, Junmo Hwang<sup>1</sup>, and Hyun-Ho Lim<sup>1</sup>  
<sup>1</sup>Lab. of Molecular Physiology and Biophysics, Neurovascular Unit Research Group, Korea Brain Research Institute, Daegu, Korea
- S 69** P03-04 Carbon Monoxide Stimulates Large Conductance Ca<sup>2+</sup>-activated K<sup>+</sup> Currents of Human Cardiac Fibroblasts through Diverse Mechanisms  
Hyemi Bae, Jeongyoon Choi, Young-Won Kim, Donghee Lee, Yelim Seo, Seong-Tae Kim, Jae-Hong Ko, Hyoweon Bang, and Inja Lim  
Department of Physiology, College of Medicine, Chung-Ang University, Seoul, Korea
- S 69** P03-05 Effect of Carbon Monoxide on Delayed Rectifier K<sup>+</sup> Currents of Human Cardiac Fibroblasts by Diverse Signaling Pathways  
Hyemi Bae, Jeongyoon Choi, Young-Won Kim, Donghee Lee, Yelim Seo, Seong-Tae Kim, Jae-Hong Ko, Hyoweon Bang, and Inja Lim  
Department of Physiology, College of Medicine, Chung-Ang University, Seoul, Korea
- S 69** P03-06 Different context for shear signaling in left versus right atrial myocytes: differential roles of P2Y<sub>1</sub> - and P2X<sub>4</sub> - purinoceptors  
Joon-Chul Kim, Qui Anh Le, Kyeong-Hee Kim, Vu Thi Van Anh, Sun-Hee Woo  
College of Pharmacy, Chungnam National University, Daejeon, Korea
- S 70** P03-07 Chronic hemodynamic overload of the atria is an important factor for shear signaling remodeling in rat hearts  
Qui Anh Le, Joon-Chul Kim, Vu Thi Van Anh, Berihun Dires Mihiretu, Sun-Hee Woo  
College of Pharmacy, Chungnam National University, Daejeon, Korea
- S 70** P03-08 Adaptive voltage control ensures the precise half inactivation application of voltage gated sodium channels on Qube, 384-well automated patch clamp system  
Hironori Ohshiro<sup>1</sup>, Kazuya Tsurudome<sup>1</sup>, Anders Lindqvist<sup>2</sup>  
<sup>1</sup>Sophion Bioscience KK, <sup>2</sup>Sophion Bioscience A/S
- S 70** P03-09 Regulation of transient receptor potential canonical 4 activity by phospholipase C  $\delta$ 1  
Juyeon Ko<sup>1</sup>, Jongyun Myeong<sup>2</sup>, Misun Kwak<sup>1</sup>, Insuk So<sup>1</sup>  
<sup>1</sup>Department of Physiology, Seoul National University College of Medicine, Seoul, Korea, <sup>2</sup>Department of Physiology and Biophysics, University of Washington School of Medicine, Seattle, U.S.A.
- S 71** P03-10 Different effects of PCBs on steady-state current of human Kv1.3 channel  
Jong-hui Kim<sup>1</sup>, Su-Hyun Jo<sup>1,2</sup>  
<sup>1</sup>Interdisciplinary Graduate Program for BIT Medical Convergence, <sup>2</sup>Department of Physiology, School of Medicine, Kangwon National University, Chuncheon, Korea
- S 71** P03-11 Frequency-dependent Block of Kv1.5 Channel by Ifenprodil  
Soobeen Hwang<sup>1</sup>, Su-Hyun Jo<sup>1,2</sup>  
<sup>1</sup>Interdisciplinary Graduate Program for BIT Medical Convergence <sup>2</sup>Department of Physiology, School of Medicine, Kangwon National University, Chuncheon, Korea

- S 71 P03-12** Voltage-independent Inhibition of Human Kv1.5 Currents by Cinnarizine  
Soobeen Hwang<sup>1</sup>, Su-Hyun Jo<sup>1,2</sup>  
<sup>1</sup>Interdisciplinary Graduate Program for BIT Medical Convergence, <sup>2</sup>Department of Physiology, School of Medicine, Kangwon National University, Chuncheon, Korea
- S 71 P03-13** Potentiation of the glycine response by bisphenol A, an endocrine disrupter, on the substantia gelatinosa neurons of the trigeminal subnucleus caudalis in mice  
Hoang Thi Thanh Nguyen<sup>1</sup>, Soo Joung Park<sup>1</sup>, Dong Hyu Cho<sup>2</sup>, Seong Kyu Han<sup>1</sup>  
<sup>1</sup>Department of Oral Physiology, School of Dentistry and Institute of Oral Bioscience, Chonbuk National University, <sup>2</sup>Department of Obstetrics and Gynecology, Chonbuk National University Hospital and School of Medicine, Jeonju, Korea
- S 72 P03-14** Naringenin suppresses the miniature inhibitory transmission on the terminal of substantia gelatinosa neurons in immature mice  
Thao Thi Phuong Nguyen<sup>1</sup>, Soo Joung Park<sup>1</sup>, Dong Hyu Cho<sup>2</sup>, Seong Kyu Han<sup>1</sup>  
<sup>1</sup>Department of Oral Physiology, School of Dentistry and Institute of Oral Bioscience, Chonbuk National University, <sup>2</sup>Department of Obstetrics and Gynecology, Chonbuk National University Hospital and School of Medicine, Jeonju, Korea
- S 72 P03-15** Novel marine compound Echinochrome A is a negative regulator of cardiac contractility  
Ji Young Moon, Hyoung Kyu Kim, Jae Boum Youm, In Sung Song, Seung Hun Jeong, Sung Ryul Lee, Nari Kim, Kyung Soo Ko, Byoung Doo Rhee and Jin Han  
National Research Laboratory for Mitochondrial Signaling, Cardiovascular and Metabolic Disease Center, Department of Physiology, Inje University, Busan, Korea
- S 72 P03-16** Verapamil improves glucose homeostasis and insulin sensitivity in a mouse model of diet-induced obesity by modulating calcium channels  
Ye Rim Kang<sup>1,2</sup>, Jin-Wook Lee<sup>1,2</sup>, Gun-woo Won<sup>2</sup>, Ok-Hee Kim<sup>2</sup>, Byung-Chul Oh<sup>1,2</sup>  
<sup>1</sup>Department of Health Sciences and Technology (GAIHST), Gachon University, <sup>2</sup>Department of Physiology, Lee Gil Ya Cancer and Diabetes Institute, Gachon University College of Medicine, Incheon, Korea
- S 72 P03-17** Plakophilin-2, a negative regulator for fluid shear-induced Cx43 hemichannel activation in cardiac myocytes  
Vu Thi Van Anh, Qui Anh Le, Berihun Dires Mihiretu, Sun-Hee Woo  
College of Pharmacy, Chungnam National University, Daejeon, Korea
- S 73 P03-18** Blockade of heterotetrameric hERG 1A/3.1 channels by iloperidone  
Hong Joon Lee<sup>1</sup>, Sang June Hahn<sup>1</sup>  
<sup>1</sup>Department of Physiology, College of Medicine, The Catholic University of Korea, Seoul, Korea
- S 73 P03-19** Onion Peel Extract and its Constituent, Quercetin Inhibits Human Slo3 in a pH and Calcium Dependent Manner  
Tharaka Darshana Wijerathne<sup>1</sup>, Ji Hyun Kim<sup>1</sup>, Min Ji Kim<sup>1</sup>, Chul Young Kim<sup>2</sup>, Mee Ree Chae<sup>3</sup>, Sung Won Lee<sup>3\*</sup>, Kyu Pil Lee<sup>1\*</sup>  
<sup>1</sup>Department of Physiology, College of Veterinary Medicine, Chungnam National University, Daejeon, <sup>2</sup>College of Pharmacy, Hanyang University, Ansan, <sup>3</sup>The Department of Urology, Samsung Medical Center, Samsung Biomedical Research Institute, Sungkyunkwan University School of Medicine, Seoul, Korea
- S 73 P03-20** Group 1 metabotropic glutamate receptors increases Ca<sup>2+</sup> levels and tonic firing rate via TRPC3 channels in SNc dopamine neurons.  
Ki Bum Um and Myoung Kyu Park  
Department of Physiology, Sungkyunkwan University School of Medicine, Suwon, Korea
- S 74 P03-21** The biphasic effect of TRPC4 and TRPC5 activity by the Tricyclic antidepressant depending on modulation of  $\mu$ -opioid receptor  
Byeongseok Jeong, Chansik Hong  
Department of Physiology, Chosun University School of Medical, Gwangju, Korea
- S 74 P03-22** TRPC5 channel instability induced by depalmitoylation protects striatal neurons against oxidative stress in Huntington's disease  
Chansik Hong<sup>1</sup>, Insuk So<sup>2</sup>  
<sup>1</sup>Department of Physiology, Chosun University School of Medicine, Kwangju, <sup>2</sup>Department of Physiology, Seoul National University College of Medicine, Seoul, Korea
- S 74 P03-23** Inhibition of Kv3.1 currents by citalopram  
Hyang Mi Lee<sup>1</sup>, Seong Han Yoon<sup>1</sup>, Sang June Hahn<sup>2</sup>, Bok Hee Choi<sup>1</sup>  
<sup>1</sup>Department of Pharmacology, Institute for Medical Sciences, Chonbuk National University Medical School, Jeonju, <sup>2</sup>Department of Physiology, College of Medicine, The Catholic University of Korea, Seoul, Korea
- S 74 P03-24** Ca<sup>2+</sup>-CaM binding anchor residue for PKD2L1 channel activity regulation  
Hana Kang, Julia Young Baik, Eunice Yon June Park, Insuk So  
Department of Physiology, Seoul National University College of Medicine, Seoul, Korea
- S 75 P03-25** Effects of various fibrosis patterns on ventricular arrhythmogenesis and pumping efficacy  
Abrha Abebe Tekle, Ki Moo Lim  
Departments of IT Convergence Engineering, Kumoh National Institute of Technology, Gumi, Korea

- S 75** P03-26 Computational Analysis of cardiac electromechanical delay under normal and irregular heartbeat by using 3D ventricular model.  
Aulia Khamas Heikhmakhtiar, Ki Moo Lim  
Departments of IT Convergence Engineering, Kumoh National Institute of Technology, Gumi, Korea
- S 76** P03-27 Computational Analysis of Proarrhythmic Estimation under the Influence of Dofetilide, Quinidine, and Cisapride  
Aulia Khamas Heikhmakhtiar, Ki Moo Lim  
Departments of IT Convergence Engineering, Kumoh National Institute of Technology, Gumi, Korea
- S 76** P03-28 Kinetic analysis of activation process of Kv7.4 channel with novel pharmacological activators targeted for erectile dysfunction  
Hana Kang, Jung Eun Lee, Insuk So  
Department of Physiology, College of Medicine, Seoul National University, Seoul, Korea
- S 76** P03-29 Mutual interaction of high-order thalamic and top-down inputs on apical tuft dendrites of layer 5 pyramidal neurons  
Young-Eun Han, Joon Ho Choi, and Jong-Cheol Rah\*  
Korea Brain Research Institute, Deagu, Korea
- S 77** P03-30 STING-GABA transporters pathway and memory deficits  
Chiranjivi Neupane<sup>1, 2, 3</sup>, Ramesh Sharma<sup>1, 2, 3</sup>, Hyun Jin Shin<sup>1, 2, 3</sup>, Su Eun Park<sup>1, 2, 3</sup>, Jin Bong Park<sup>1, 2, 3</sup>  
<sup>1</sup>Department of Medical Sciences, <sup>2</sup>Department of BK21plus CNU Integrative Biomedical Education Initiative, <sup>3</sup>Department of physiology, School of Medicine and Brain Research Institute, Chungnam National University, Daejeon, Korea,
- S 77** P03-31 Sustained activity by cholinergic modulation in anterior cingulate and posterior parietal cortices  
Yoon-Sil Yang<sup>1</sup>, Joon Ho Choi<sup>1</sup> and Jong-Cheol Rah<sup>1,\*</sup>  
<sup>1</sup>Korea Brain Research Institute, Research Division, Deagu, Korea
- S 77** P03-32 Involvement of GluN2D subunits containing NMDA receptors in experimental models of Parkinson's disease  
Ramesh Sharma<sup>1, 2, 3</sup>, Chiranjivi Neupane<sup>1, 2, 3</sup>, Hyun Jin Shin<sup>1, 2, 3</sup>, Su Eun Park<sup>1, 2, 3</sup>, Miae Lee<sup>1</sup>, Jin Bong Park<sup>1, 2, 3</sup>  
<sup>1</sup>Department of Medical Sciences, School of Medicine, <sup>2</sup>Department of BK21plus CNU Integrative Biomedical Education Initiative, <sup>3</sup>Department of physiology, School of Medicine and Brain Research Institute, Chungnam National University, Daejeon, Korea
- S 78** P03-33 Ethanol elevates excitability of superior cervical ganglion neurons by inhibiting Kv7 channels in a cell type-specific and PI(4,5)P<sub>2</sub>-dependent manner  
Kwon-Woo Kim<sup>1</sup>, Keetae Kim<sup>2</sup>, Hyosang Lee<sup>1,\*</sup>, Byung-Chang Suh<sup>1,\*</sup>  
Department of <sup>1</sup>Brain and cognitive sciences and <sup>2</sup>New biology, Daegu Gyeongbuk Institute of Science and Technology (DGIST), Daegu, Korea
- S 78** P03-34 Mitochondrial Ca<sup>2+</sup> uptake relieves palmitate-induced cytosolic Ca<sup>2+</sup> overload and lipotoxicity in MIN-6 cells  
Luong Dai Ly<sup>1,2</sup>, Dat Da Ly<sup>1,2</sup>, Nhung Thi Nguyen<sup>1,2</sup>, Ji-Hee Kim<sup>2</sup>, Heesuk Yu<sup>3</sup>, Jongkyeong Chung<sup>3</sup>, Myung-Shik Lee<sup>4</sup>, Seung-Kuy Cha<sup>1,2</sup>, Kyu-Sang Park<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Mitohormesis Research Center, Yonsei University Wonju College of Medicine, Wonju, <sup>3</sup>Institute of Molecular Biology and Genetics and School of Biological Sciences, Seoul National University, <sup>4</sup>Severance Biomedical Science Institute, Seoul, Korea
- S 78** P03-35 Characterization of Molecular Mechanisms underlying Voltage-Gated Ca<sup>2+</sup> Channel Modulation by DREADD  
Yong-Seok Kim<sup>1</sup>, Woori Ko<sup>1</sup>, Yong-Seok Oh<sup>1</sup>, Jong-Cheol Rah<sup>2</sup>, Byung-Chang Suh<sup>1</sup>  
<sup>1</sup>Department of Brain & Cognitive Sciences, DGIST, <sup>2</sup>Laboratory of Cortical Neurophysiology, Korea Brain Research Institute, Daegu, Korea
- S 79** P03-36 Analysis of blocking mechanism and binding sites of intracellular spermine to TRPC4 ion channel  
Jinsung Kim<sup>1,c</sup>, Sang-Hui Moon<sup>2,3,\*</sup>, Tae-Wook Kim<sup>1,\*</sup>, Juyeon Ko<sup>1</sup>, Young Keul Jeon<sup>1</sup>, Young-cheul Shin<sup>4</sup>, Ju-Hong Jeon<sup>1</sup>, Insuk So<sup>1,\*</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Office of Medical Education, <sup>3</sup>Department of Surgery, College of Medicine, Seoul National University, Seoul, Korea, <sup>4</sup>Department of Cell Biology, Harvard Medical School, Boston, U.S.A.
- S 79** P03-37 Temperature-dependent increase in the calcium sensitivity and acceleration of activation of TMEM16F Variants  
Haiyue Lin<sup>1</sup>, Sung Joon Kim<sup>2</sup>, Joo Hyun Nam<sup>3,4</sup>  
<sup>1</sup>Department of Otorhinolaryngology, Yonsei University College of Medicine, <sup>2</sup>Department of Physiology, Seoul National University College of Medicine, <sup>3</sup>Department of Physiology, Dongguk University College of Medicine, <sup>4</sup>Channelopathy Research Center (CRC), Korea
- S 79** P03-38 Post-translational palmitoylation of voltage-gated calcium channels regulates their PI(4,5)P<sub>2</sub> sensitivity and inactivation  
Jun-Hee Yeon, Byeol-I Kim, and Byung-Chang Suh  
Department of Brain and Cognitive Sciences, DGIST, Daegu, Korea.
- S 79** P03-39 Gain of function mutation in the TM2 inner pore helices of TREK/TRAAK channels exhibits strong inward rectification  
Eun-Jin Kim<sup>1</sup>, Dong Kun Lee<sup>1</sup>, Seong-Geun Hong<sup>1</sup>, Jaehee Han<sup>1</sup>, Delphine Bichet<sup>2</sup>, and Dawon Kang<sup>1</sup>  
<sup>1</sup>Department of Physiology, College of Medicine and Institute of Health Sciences, Gyeongsang National University, Jinju, Korea, <sup>2</sup>Institut de Pharmacologie Moléculaire et Cellulaire, LabEx ICST, CNRS UMR 7275, Université de Nice Sophia Antipolis, Valbonne, France
- S 80** P03-40 Nortriptyline lowers basal calcium level of dopamine neurons through ion channels inhibition  
Sun Hee Jeon, Hyung Seo Park, Se Hoon Kim, Shin Hye Kim  
Department of Physiology, College of Medicine, Konyang University, Daejeon, Korea

- S 80** P03-41 Nav beta3 promotes polarized trafficking of voltage-dependent potassium channel in neurons  
Ji Seon Shim<sup>1</sup>, Dong-Hyun Kim<sup>3</sup>, Young Wook Choi<sup>1</sup>, Min-Young Song<sup>1</sup>, Seok Kyo Shin<sup>1</sup>, Jin-Sung Choi<sup>4</sup>, Kang-Sik Park<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, School of Medicine, and <sup>2</sup>KHU-KIST Department of Converging Science and Technology, Kyung Hee University, Seoul, <sup>3</sup>College of Pharmacy, Catholic University of Korea, Bucheon, Korea

#### P04: Muscle physiology

- S 80** P04-01 Decreased inward-rectifier K<sup>+</sup> current of the septal coronary artery smooth muscle cells in pulmonary arterial hypertensive rats  
Sung Eun Kim, Ming Zhe Yin, Hae Jin Kim, Rany Vorn, Hae Young Yoo, Sung Joon Kim  
Department of Physiology, Department of Biomedical Sciences, Ischemic/Hypoxic Disease Institute<sup>3</sup>, Seoul National University College of Medicine, Seoul <sup>110-799</sup>, Republic of Korea.
- S 81** P04-02 PPAR $\delta$  protects muscle from EtOH induced insulin resistance by enhanced AMPK activation and mitochondrial function  
Jin-Ho Koh, Sol-Yi Park, Jong-Yeon Kim  
Department of <sup>1</sup>Physiology, College of Medicine, Yeungnam University, Daegu, Korea
- S 81** P04-03 Cardioprotective effects of Angiotensin-(1-5) by anti-apoptosis and anti-oxidant via MasR-PI3K-Akt-eNOS pathway in rats  
Byung Mun Park, Weijian Li, Suh Hee Kim  
Department of Physiology, Research Institute for Endocrine Sciences, Chonbuk National University Medical School, Jeonju, Korea
- S 81** P04-04 Mitochondrial biogenesis is increased by cyclic stretch in a mouse cardiac cell line  
Hyoung Kyu Kim<sup>1,2,†</sup>, Yun Gyeong Kang<sup>3,†</sup>, Seung Hun Jeong<sup>1</sup>, Nammi Park<sup>1</sup>, Jubert Marquez<sup>1</sup>, Sunwoo Kim<sup>1</sup>, Kyung Soo Ko<sup>1</sup>, Byoung Doo Rhee<sup>1</sup>, Jung-Woog Shin<sup>3</sup>, Jin Han<sup>1</sup>  
<sup>1</sup>Cardiovascular and Metabolic Disease Center, Department of Physiology, Department of Health Sciences and Technology, BK21 Plus Project Team, College of Medicine, <sup>2</sup>Department of Integrated Biomedical Science, College of Medicine, Inje University, Busan, <sup>3</sup>Department of Biomedical Engineering, Inje University, Gimhae, Korea
- S 82** P04-05 STIM1 affects intracellular Ca<sup>2+</sup> movement as well as extracellular Ca<sup>2+</sup> entry in skeletal muscle  
Jun Hee Choi<sup>1,2,†</sup>, Mei Huang<sup>1,2,†</sup>, Changdo Hyun<sup>1,2</sup>, Mi Ri Oh<sup>1,2</sup>, Keon Jin Lee<sup>1,2</sup>, Eun Hui Lee<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, College of Medicine, <sup>2</sup>Department of Biomedicine & Health Sciences, Graduate School, The Catholic University of Korea, Seoul, Korea
- S 82** P04-06 Involvement of TRPC4 channel in regulation of Spontaneous Myometrial Contraction in pregnant myometrium  
Young Hwan Kim<sup>1,3</sup>, Young Han Kim<sup>2</sup>, Duck-Sun Ahn<sup>1</sup>, Seungsoo Chung<sup>1</sup>  
<sup>1</sup>Department of Physiology, Brain Korea 21 Plus Project for Medical Science, Yonsei University College of Medicine, <sup>2</sup>Department of Obstetrics and Gynecology, Yonsei University College of Medicine, <sup>3</sup>Division of Research and Development, BnH Research co., Ltd
- S 82** P04-07 Involvement of autophagy in mesenteric artery dysfunction of angiotensin II-induced hypertensive mice  
Youngin Kwon, Soo-Kyoung Choi, Seonhee Byeon, Young-Ho Lee  
Department of Physiology, College of Medicine, Brain Korea 21 PLUS Project for Medical Science, Yonsei University, Seoul, Korea
- S 83** P04-08 Role of the 5-HT on pacemaker potentials in colonic interstitial cells of Cajal of mouse  
Wenhao Wu, Seok Choi  
Department of Physiology, College of Medicine, Chosun University, Gwangju, Korea
- S 83** P04-09 Action of fluoxetine on pacemaker activity in interstitial cells of Cajal from mouse large intestine  
Xingyou Huang, Seok Choi  
Department of Physiology, College of Medicine, Chosun University, Gwangju, Korea

#### P05: Organ physiology

- S 83** P05-01 Role of Rho-associated protein kinase in the vasorelaxation induced by linagliptin  
Mi Seon Seo, Won Sun Park  
Department of Physiology, Kangwon National University School of Medicine, Chuncheon, Korea
- S 83** P05-02 Vasorelaxant effect of dipeptidyl peptidase-4 inhibitor sitagliptin via the activation of Kv channels and PKA on aortic smooth muscle  
Mi Seon Seo, Won Sun Park  
Department of Physiology, Kangwon National University School of Medicine, Chuncheon, Korea
- S 84** P05-03 Role of SERCA pump and Kv channels on vildagliptin-induced vasorelaxation  
Hee Seok Jung, Won Sun Park  
Department of Physiology, Kangwon National University School of Medicine, Chuncheon, Korea
- S 84** P05-04 Roles of nNOS and eNOS in rat heart; comparison between the left and right ventricle myocytes  
Jae Won Kwon<sup>1</sup>, Young Keul Jeon<sup>1</sup>, Sung Joon Kim<sup>1,2</sup>  
Departments of <sup>1</sup>Physiology and <sup>2</sup>Ischemic/Hypoxic Disease Institute, Seoul National University College of Medicine, Seoul, Korea



- S 84** P05-05 Interventricular difference in calcium sensitivity with lower expression of calcium binding proteins  
Young Keul Jeon<sup>1,2,3</sup>, Ji Hyun Jang<sup>1,2,3</sup>, Juhan Woo<sup>1,2,3</sup>, Ming Zhe Yin<sup>1,2,3</sup>, Jae Won Kwon<sup>1,2,3</sup>, Yin Hua Zhang<sup>1,2,3</sup>, Sung Joon Kim<sup>1,2,3</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Department of Biomedical Sciences, <sup>3</sup>Ischemic/Hypoxic Disease Institute, Seoul National University College of Medicine, Seoul, Korea
- S 84** P05-06 Dipeptidyl peptidase-4 inhibition with evogliptin improves cardiac functions and fibrosis in type 2 diabetic *db/db* mice  
Pham Trong Kha<sup>1</sup>, Hyoung Kyu Kim<sup>1</sup>, Ji Young Moon<sup>1</sup>, Joon Young Noh<sup>1</sup>, Jin Han<sup>1,\*</sup>  
<sup>1</sup>National Research Laboratory for Mitochondrial Signaling, Department of Physiology, Department of Health Sciences and Technology, BK21 Plus Project Team, and Cardiovascular and Metabolic Disease Center, Inje University College of Medicine, Busan, Korea
- S 85** P05-07 Mitochondrial ROS and TRPC6-mediated Ca<sup>2+</sup> signaling nexus contributes to hepatic stellate cell activation and fibrosis  
Kyu-Hee Hwang<sup>1-5</sup>, Phan Anh Nguyen<sup>1-5</sup>, Ji-Hee Kim<sup>1-5</sup>, Soo-Jim Kim<sup>1-5</sup>, Bao Thi Ngoc Dang<sup>1-5</sup>, Kyu-Sang Park<sup>1-5</sup> and Seung-Kuy Cha<sup>1-5</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Department of Global Medical Science, <sup>3</sup>Mitohormesis Research Center, <sup>4</sup>Institute of Mitochondrial Medicine, and <sup>5</sup>Institute of Lifestyle Medicine, Yonsei University Wonju College of Medicine, Wonju, Korea
- S 85** P05-08  $\alpha$ Klotho as a negative regulator of store-operated Ca<sup>2+</sup> entry  
Ji-Hee Kim<sup>1-5</sup>, Kyu-Hee Hwang<sup>1-5</sup>, Bao Thi Ngoc Dang<sup>1-5</sup>, Phan Anh Nguyen<sup>1-5</sup>, Kyu-Sang Park<sup>1-5</sup>, Seung-Kuy Cha<sup>1-5</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Department of Global Medical Science, <sup>3</sup>Mitohormesis Research Center, <sup>4</sup>Institute of Mitochondrial Medicine, and <sup>5</sup>Institute of Lifestyle Medicine, Yonsei University Wonju College of Medicine, Wonju, Korea

## P06: Endocrine and Energy Metabolism

- S 85** P06-01 Pine needle extract activates POMC neurons in the hypothalamus  
Eun A Kim<sup>1</sup>, Eun Hye Byeon<sup>1</sup>, Dawon Kang<sup>1,2</sup>, Sung-Geun Hong<sup>1,2</sup>, Jae Hee Han<sup>1,2</sup>, Dong Kun Lee<sup>1,2\*</sup>  
<sup>1</sup>Department of Physiology and Convergence Medical Sciences, School of Medicine, <sup>2</sup>Institute of Health Sciences, School of Medicine, Gyeongsang National University, Jinju, Korea
- S 86** P06-02 Effects of octanoic acid on glucose-stimulated insulin secretion and expression of glucokinase through the olfactory receptor in pancreatic beta-cells  
Jung-A Jung<sup>1</sup>, Hye-Jeong Kim<sup>1</sup>, Jae-Hyung Park<sup>1</sup>  
<sup>1</sup>Departments of Physiology, Keimyung University School of Medicine, Daegu, Korea
- S 86** P06-03 Effect of endoplasmic reticulum stress on expression of adipisin in adipocytes  
Hye-Jeong Kim<sup>1</sup>, Jung-A Jung<sup>1</sup>, Jae-Hyung Park<sup>1</sup>  
<sup>1</sup>Departments of Physiology, Keimyung University School of Medicine, Daegu, Korea
- S 86** P06-04 The role of MsrB3 on high-fat diet induced insulin resistance  
Hye-Na Cha<sup>1</sup>, Soyoung Park<sup>1</sup>, Hwa-Young Kim<sup>2</sup>, So-Young Park<sup>1</sup>  
<sup>1</sup>Department of Physiology and Smart-Aging Convergence Research Center, <sup>2</sup>Department of Biochemistry and Molecular Biology, College of Medicine, Yeungnam University, Daegu, Korea
- S 86** P06-05 Lactate shifts mitochondrial bioenergetics in skeletal muscle and adipose tissue mitochondria and increases metabolic rate  
Jin-Ho Koh, Jong-Yeon Kim, Kyung-Oh Doh  
Department of Physiology, College of Medicine, Yeungnam University, Daegu, Korea
- S 87** P06-06 The Effect of CORM-2 on ANP Secretion  
Weijian Li, Byung Mun Park, Sunn Hee Kim  
Department of Physiology, Research Institute for Endocrine Sciences, Chonbuk National University Medical School, Jeonju, Korea,
- S 87** P06-07 Tetrahydrobiopterin enhanced mitochondria biogenesis and cardiac contractility via stimulation of PGC-1 $\alpha$  signaling pathway  
Hyoung Kyu Kim, Sung Ryul Lee, Nari Kim, Jin Han  
Cardiovascular and Metabolic Disease Center, Inje University, Busan, Korea;
- S 87** P06-08 Melatonin regulates gonadotropin releasing hormone neurons excitability via kainate receptors and kisspeptin signaling in immature mice  
Santosh Rijal<sup>1</sup>, Seon Hui Jang<sup>1</sup>, Dong Hyu Cho<sup>2</sup>, Seong Kyu Han<sup>1</sup>  
<sup>1</sup>Department of Oral Physiology, School of Dentistry & Institute of Oral Bioscience, Chonbuk National University, <sup>2</sup>Department of Obstetrics and Gynecology, Chonbuk National University Hospital and School of Medicine, Jeonju, Korea
- S 88** P06-09 N-terminal pro-B-type natriuretic peptide as an index in patients with obesity and Acute Coronary Syndrome  
Lan Hong<sup>1</sup>, Larry F Lemanski<sup>2</sup>, Zhengshan Zhao<sup>2</sup>, Xiaoxuan Cao<sup>3</sup>, Honghua Chi<sup>3</sup>, Honghua Jin<sup>3</sup>  
<sup>1</sup>Department of Physiology and Pathophysiology, College of Medicine, Yanbian University, Yanji, China, <sup>2</sup>Biomedical institute for Regenerative Research, Texas A&M University-Commerce, Texas, USA, <sup>3</sup>Department of Pharmacy, Yanbian University Hospital, Yanji, China.

- S 88 P06-10** Non-cell autonomous modulation of tyrosine hydroxylase by HMGB1 released from astrocytes in an acute MPTP toxin-induced mouse model  
Soo Jeong Kim<sup>1,2,8</sup>, Min Jeong Ryu<sup>1,4,8</sup>, Jeongsu Han<sup>1,2</sup>, Yunseon Jang<sup>1,2,3</sup>, Min Joung Lee<sup>1,2,3</sup>, Xianshu Ju<sup>1,2,3</sup>, Ilhwan Ryu<sup>1,2,3</sup>, Yu Lim Lee<sup>1,2,3</sup>, Eungseok Oh<sup>5</sup>, Woosuk Chung<sup>6,7</sup>, Jun Young Heo<sup>1,2,3,7</sup>, Gi Ryang Kweon<sup>1,3,4</sup>  
<sup>1</sup>Department of Biochemistry, <sup>2</sup>Infection Control Convergence Research Center, <sup>3</sup>Department of Medical science, <sup>4</sup>Research Institute for Medical Science, Chungnam National University School of Medicine, <sup>5</sup>Department of Neurology, <sup>6</sup>Department of Anesthesiology and Pain Medicine, Chungnam National University Hospital, <sup>7</sup>Brain research Institute, Chungnam National University School of Medicine, Daejeon, Korea <sup>8</sup>Co-first author.
- S 88 P06-11** Effects of thermotherapy on irisin and orexin levels metabolic of glucose regulating factors in middle-aged obese women  
Hye-Jin Lee<sup>1</sup>, Tae-Wook Kim<sup>1</sup>, Young-Ki Min<sup>1</sup>, Won-Jun Lee<sup>2</sup>, Yun Su Eun<sup>2</sup>, Tae-Hwan Pak<sup>2</sup>, Seon Ah Jeon<sup>1</sup>, Hee-Kyoung Kim<sup>1</sup>, Mi-Young Lee<sup>3</sup>, Jeong-Beom Lee<sup>1</sup> \*  
<sup>1</sup>Department of Physiology, College of Medicine, <sup>2</sup>A student at the College of Medicine, Soonchunhyang University, Cheonan, <sup>3</sup>Global Graduate School of Healthcare, Soonchunhyang University, Asan, Korea
- S 88 P06-12** Effects of acute ingestion of caffeine on dopamine release and serotonin in a human with thermotherapy  
Seon Ah-Jeon<sup>1</sup>, Hye-Jin Lee<sup>1</sup>, Young-Ki Min<sup>1</sup>, Won-Jun Lee<sup>2</sup>, Yun Su Eun<sup>2</sup>, Tae-Hwan Pak<sup>2</sup>, Hee-Kyoung Kim<sup>1</sup>, Mi-Young Lee<sup>3</sup>, Jeong-Beom Lee<sup>1</sup> \*  
<sup>1</sup>Department of Physiology, College of Medicine, <sup>2</sup>A student at the College of Medicine, Soonchunhyang University, Cheonan, <sup>3</sup>Global Graduate School of Healthcare, Soonchunhyang University, Asan, Korea
- S 89 P06-13** Seasonal acclimation in sudomotor function evaluated by acetylcholine in healthy humans  
Hee-Kyoung Kim<sup>1</sup>, Hye-Jin Lee<sup>1</sup>, Young-Ki Min<sup>1</sup>, Won-Jun Lee<sup>2</sup>, Yun Su Eun<sup>2</sup>, Tae-Hwan Pak<sup>2</sup>, Mi-Young Lee<sup>3</sup>, Seon Ah Jeon<sup>1</sup>, Jeong-Beom Lee<sup>1</sup> \*  
<sup>1</sup>Department of Physiology, College of Medicine, <sup>2</sup>A student at the College of Medicine, Soonchunhyang University, Cheonan, <sup>3</sup>Global Graduate School of Healthcare, Soonchunhyang University, Asan, Korea
- S 89 P06-14** Investigating the mechanism of the cell-nonautonomous roles of the nuclear hormone receptor NHR-49 in the nervous system of *Caenorhabditis elegans*  
Saebom Kwon, Jessica Antonio, Kyoung-hye Yoon  
Department of Physiology, Mitohormesis Research Center, Yonsei University Wonju College of Medicine, Wonju, Korea
- S 89 P06-15** Role of mitochondrial phosphate transporters in vascular calcification  
Nhung Thi Nguyen, Tuyet Thi Nguyen, Soo-Jin Kim, Luong Dai Ly, Dat Da Ly, Ha Thu Nguyen, Hanh Minh Nguyen, Seung-Kuy Cha, Kyu-Sang Park  
Department of Physiology, Mitohormesis Research Center, Yonsei University Wonju College of Medicine, Wonju, Korea
- S 89 P06-16** High phosphate diet upregulates antioxidant enzymes and FGF21 leading to metabolic stress resistance in mouse models  
Nhung Thi Nguyen, Ha Thu Nguyen, Tuyet Thi Nguyen, Soo-Jin Kim, Luong Dai Ly, Dat Da Ly, Hanh Minh Nguyen, Seung-Kuy Cha, Kyu-Sang Park  
Department of Physiology, Mitohormesis Research Center, Yonsei University Wonju College of Medicine, Wonju, Korea
- S 90 P06-17** Interaction between cardiac nNOS and mitochondrial complex I and its regulation of mitochondrial activity in sham and hypertensive hearts  
Yu Na Wu<sup>1</sup>, Ying Li<sup>2</sup>, Yin Hua Zhang<sup>\*</sup>  
Department of Physiology & Biomedical Sciences, Seoul National University, College of Medicine, Seoul, Korea

## P07: Epithelium and Exocrine Physiology

- S 90 P07-01** Prediction of itching diagnostic marker through RNA sequencing of contact hypersensitivity and skin scratching stimulation mice models  
Seongtae Kim<sup>1</sup>, Young-Won Kim<sup>1</sup>, Donghee Lee<sup>1</sup>, Yelim Seo<sup>1</sup>, Jeongyoon Choi<sup>1</sup>, Hyemi Bae<sup>1</sup>, Inja Lim<sup>1</sup>, Hyoweon Bang<sup>1</sup>, Jung-Ha Kim<sup>2</sup>, Jae-Hong Ko<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, Chung-Ang university, College of Medicine, <sup>2</sup>Department of Family Medicine, College of Medicine, Chung-Ang University Hospital, Seoul, Korea
- S 90 P07-02** Role of ERK1/2-mTORC1-NOX4 axis on epithelial-mesenchymal transition of retinal pigment epithelial cells  
Soo-Jin Kim<sup>1,2</sup>, Yoon-Sang Kim<sup>1</sup>, Nhung Thi Nguyen<sup>1,2</sup>, Luong Dai Ly<sup>1,2</sup>, Seung-Kuy Cha<sup>1,2</sup>, Ranjan Das<sup>3</sup>, Kyu-Sang Park<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Mitohormesis Research Center, Yonsei University Wonju College of Medicine, Wonju, Korea, <sup>3</sup>Department of Internal Medicine, Rush University Medical Center, Chicago, USA
- S 91 P07-03** Expression of organic cation and anion transporters in 3D-cultured human kidney proximal tubular epithelial cell line  
Chae Young Lee, Seo Min Jun, Hae-Rahn Bae  
Department of Physiology, College of Medicine, Dong-A University, Busan, Korea

## P08: Inflammation and Immune Physiology

- S 91 P08-01** Novel function of Jumonji C(JmjC) domain – containing protein in osteoclastogenesis  
Seon-Young Kim, Hye-Jin Kim, Joo Seung Lee<sup>\*</sup>, Do Won Jung<sup>\*</sup>, Jong-Wan Park<sup>\*</sup>, Yang-Sook Chun<sup>\*</sup>  
Department of Biomedical Sciences, Seoul National University College of Medicine, Seoul, Korea<sup>\*</sup>

- S 91** P08-02 CR1F1 deficiency mediated tetrahydrobiopterin biosynthesis regulation induced eNOS uncoupling  
Ikjun Lee<sup>1,3</sup>, Shuyu Piao<sup>1,2,3</sup>, Seonhee Kim<sup>1,2,3</sup>, Harsha Nagar<sup>1,2,3</sup>, Su-Jeong Choi<sup>1,2,3</sup>, Sung-min Kim<sup>1,3</sup>, Saet-byel Jung<sup>1,4</sup>, Byeong Hwa Jeon<sup>1,3</sup>, Hee-Jung Song<sup>1,5</sup>, Cuk-Seong Kim<sup>1,2,3\*</sup>  
<sup>1</sup>Department of Medical Science, <sup>2</sup>Department of BK21Plus CNU Integrative Biomedical Education Initiative, <sup>3</sup>Department of Physiology, School of Medicine, Chungnam National University, <sup>4</sup>Department of Endocrinology, <sup>5</sup>Department of Neurology, School of Medicine, Chungnam National University Hospital, Daejeon, Korea
- S 92** P08-03 *Alnus Sibirica* extracts suppress the inflammatory response in vitro and skin inflammation in vivo  
Jeongyoon Choi, Sunghee Moon, Hyemi Bae, Young-Won Kim, Seongtae Kim, Yelim Seo, Jae-Hong Ko, Inja Lim, Hyoweon Bang  
Department of Physiology, College of Medicine, Chung-Ang University, Seoul, Korea
- S 92** P08-04 IL-10 suppresses caspase-1-dependent IL-1 $\beta$  secretion via production of apoptosis inhibitor of macrophage protein (AIM)  
Kyungwon Yang<sup>1,2</sup>, Taehyun Kim<sup>1,2</sup>, Jihee Lee<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Tissue Injury Defense Research Center, College of Medicine, Ewha Womans University, Seoul, Korea
- S 92** P08-05 Secretory Ref-1 exhibited protective effects against inflammatory responses in lipopolysaccharide-induced septic mice  
Hee Kyoung Joo, Yu Ran Lee, Eun-Ok Lee, Sung Min Kim, Hao Jin, Byeong Hwa Jeon  
Research Institute for Medical Sciences, Department of Physiology, School of Medicine, Chungnam National University, Daejeon, Korea
- S 92** P08-06 The reducing APE1/Ref-1 inhibits an inflammatory reaction by inducing a reduction of inflammation mediated receptor  
Sungmin Kim<sup>1,2,3</sup>, Hao Jin<sup>1,2,3</sup>, Yu Ran Lee<sup>2</sup>, Eun Ok Lee<sup>2</sup>, Hee Kyoung Joo<sup>2</sup>, Byeong Hwa Jeon<sup>1,2,3</sup>  
<sup>1</sup>Department of Medical Science, <sup>2</sup>Research Institute of Medical Science, Department of Physiology, <sup>3</sup>Department of BK21Plus CNU Integrative Biomedical Education Initiative, College of Medicine, Chungnam National University, Daejeon, Korea
- S 93** P08-07 Analysis of systemic inflammation on organ dysfunction in pre-eclampsia patients  
Hui Xing Cui, Chun Yu Dong, Yin Hua Zhang  
Department of Physiology & Biomedical Sciences, Ischemic/Hypoxic Disease Institute, Seoul National University College of Medicine, Seoul, Korea; Department of Obstetrics, Yanbian University Hospital, Yanji, China
- S 93** P08-08 Macrophage-specific deletion of SCAP induces inflammation by promoting M1 macrophage polarization  
Sun Hee Lee, Dae-Kyu Song, Jae-Hoon Bae, Seung-Soon Im  
Department of Physiology, Keimyung University School of Medicine, Daegu, Korea

## P09: Cellular Physiology and Cancer

- S 93** P09-01 Nitric oxide level regulates lipocalin-2 expression and the viability of RINm5F insulinoma cells in response to cytokines  
Seo-Yoon Chang, Myung-Jun Kim  
Department of Physiology, College of Medicine, The Catholic University of Korea, Seoul, Korea
- S 94** P09-02 Upregulation of thioredoxin and its reductase attenuates arsenic trioxide-induced growth suppression in human pulmonary artery smooth muscle cells by reducing oxidative stress  
Woo Hyun Park, Sun Hyang Park  
Department of Physiology, Medical School, Research Institute for Endocrine Sciences, Chonbuk National University, Jeonju, Korea
- S 94** P09-03 Role of Jumonji-C Histone Demethylase in the Development of Hepatocellular Carcinoma  
Do-Won Jeong<sup>1</sup>, Yang-Sook Chun<sup>1\*</sup>  
<sup>1</sup>Department of Biomedical Sciences, Seoul National University College of Medicine, Seoul, Korea.
- S 94** P09-04 Auranofin induces cell death in lung cancer cells via oxidative stress  
Xia Ying Cui, Woo Hyun Park  
Department of Physiology, Medical School, Research Institute for Endocrine Sciences, Chonbuk National University, Jeonju, Korea
- S 94** P09-05 Ginsenosides enhanced the Irinotecan- induced cell death against colon cancer HCT116 and SW620 cells.  
Arulkumar Nagappan, Sungkun Chun  
Department of Physiology, Chonbuk National University Medical School, Jeonju, Korea
- S 95** P09-06 Ginsenoside compound K increases adult hippocampal neurogenesis in aged-mice  
Jae Hoon Jeong, Sun Young Park, Sungkun Chun  
Department of Physiology, Chonbuk National University Medical School, Jeonju, Korea
- S 95** P09-07 Exosomal PTEN from macrophages exposed to apoptotic cancer cells inhibits EMT and invasion of cancer cells  
Yong-Bae Kim<sup>1,2</sup>, Ye-Ji Lee<sup>1,2</sup>, Young-Ho Ahn<sup>2,3</sup>, Jihae Jung<sup>1</sup>, Jihee Lee<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Tissue Injury Defense Research Center, <sup>3</sup>Department of Molecular Medicine, College of Medicine, Ewha Womans University, Seoul, Korea

- S 95** P09-08 IDH2 mediates mitophagy through changes in mtUPR in endothelial cells  
Su-Jeong Choi<sup>1,2,3</sup>, Harsha Nagar<sup>1,2,3</sup>, Shuyu Piao<sup>1,2,3</sup>, Seonhee Kim<sup>1,2,3</sup>, Ikjun Lee<sup>1,3</sup>, Sung-min Kim<sup>1,3</sup>, Jeen-Woo Park<sup>4</sup>, Byeong Hwa Jeon<sup>1,3</sup>, Hee-Jung Song<sup>1,5</sup>, Cuk-Seong Kim<sup>1,2,3\*</sup>  
<sup>1</sup>Department of Medical Science, <sup>2</sup>Department of BK21Plus CNU Integrative Biomedical Education Initiative, <sup>3</sup>Department of Physiology, School of Medicine, Kyungnam National University, Daejeon, <sup>4</sup>Department of Thoracic and Cardiovascular Surgery, School of Life Sciences, College of Natural Science, Kyungbook National University, Daegu, <sup>5</sup>Department of Neurology, School of Medicine, Chungnam National University Hospital, Daejeon, Korea
- S 96** P09-09 The effect of neddylation blockade on cancer metastasis depends on p53 status  
Ye Lee Kim<sup>\*</sup>, Jun Bum Park<sup>\*</sup>, Yang-Sook Chun<sup>\*</sup>  
Department of Biomedical Sciences, Seoul National University College of Medicine, Seoul, Korea<sup>\*</sup>
- S 96** P09-10 Overcoming drug resistance in multiple myeloma by targeting cereblon  
Jubert Marquez<sup>1</sup>, Nam-Mi Park<sup>1</sup>, Bayalagmaa Nyamaa<sup>1</sup>, Hyoung Kyu Kim<sup>1</sup>, Jin Han<sup>1</sup>  
<sup>1</sup>National Research Laboratory for Mitochondrial Signaling, Department of Physiology, College of Medicine, Cardiovascular and Metabolic Disease Center, Inje University, Busan, Korea
- S 96** P09-11 Induction of FABP by fatty acid is crucial for switching on HIF-driven lipid accumulation and cell growth in hepatocellular carcinoma  
Jieun Seo<sup>1</sup>, Do-Won Jeong<sup>1</sup>, Yang-Sook Chun<sup>1</sup>  
<sup>1</sup>Department of Physiology and Biomedical Science, Seoul National University College of Medicine, Seoul, Korea
- S 96** P09-12 The role of Kv3 channels in regulating epithelial mesenchymal transition  
Hun Ju Sim, So Yeong Lee  
Laboratory of Veterinary Pharmacology, College of Veterinary Medicine and Research Institute for Veterinary Science, Seoul National University, Seoul, Korea
- S 97** P09-13 Evaluation of functional integrity of human dopaminergic organoid iPSC neurons with electro physiological methods  
Eunhee Yang<sup>1</sup>, YunSu Bang<sup>2</sup>, Juhyun Choi<sup>2</sup>, Zewon Park<sup>2</sup>, Jong Gu Lee<sup>2</sup>, Young-Ho Jin<sup>1</sup>  
<sup>1</sup>Departments of Physiology, School of Medicine, Kyung Hee University, Seoul, <sup>2</sup>Clinical Research Division, National Institute of Food and Drug Safety Evaluation, Osong, Korea
- S 97** P09-14 CR6-interacting factor 1 Deficiency Induces vascular senescence through SIRT3 inhibition in endothelial cells  
Seonhee Kim<sup>1,2,3</sup>, Shuyu Piao<sup>1,2,3</sup>, Ikjun Lee<sup>1,2,3</sup>, Harsha Nagar<sup>1,2,3</sup>, Su-jeong Choi<sup>1,2,3</sup>, Byeong Hwa Jeon<sup>1,2,3</sup>, Cuk-seong Kim<sup>1,2,3\*</sup>  
<sup>1</sup>Department of Medical Science, <sup>2</sup>Department of BK21Plus CNU Integrative Biomedical Education Initiative, <sup>3</sup>Department of Physiology, <sup>4</sup>Department of Neurology, School of Medicine, Chungnam National University, Daejeon, Korea
- S 97** P09-15 Dopamine D2 blockade inhibits cell growth of neuroblastoma cell lines in vitro and in vivo.  
Seo-Hyun Yu<sup>1,2</sup>, Sungkun Chun<sup>1,2</sup>  
Department of <sup>1</sup>Physiology, <sup>2</sup>Brain Korea 21 Plus Program, Chonbuk National University Medical School, Jeonju, Korea
- S 98** P09-16 Internalization and transportation of endothelial cell surface K<sub>Ca</sub>2.3 and K<sub>Ca</sub>3.1 in normal pregnancy and preeclampsia  
Shinkyu Choi, Ji Aee Kim, Hai-yan Li, Suk Hyo Suh<sup>\*</sup>  
Department of Physiology, Medical School, Ewha Womans University, Seoul, Korea
- S 98** P09-17 Differential effect of PML on OSM-induced STAT-3 activity depending on p53 status  
Jiwoo Lim, Seulgi Lee, Youn-Hee Choi  
Department of Physiology, Tissue Injury Defense Research Center, College of Medicine, Ewha Womans University, Seoul, Korea
- S 98** P09-18 Ursolic acid plus paclitaxel induced anti-cancer efficacy through Akt/FOXO1 signaling cascade in esophageal cancer cells  
Ruo Yu Meng, Soo Mi Kim<sup>\*</sup>  
Department of Physiology, Institute for Medical Sciences, Chonbuk National University Medical School, Jeonju, Korea
- S 98** P09-19 UA plus 3,3-diindolyl-methane enhanced anti-tumor activity in esophageal cancer cells  
Ruo Yu Meng, Soo Mi Kim<sup>\*</sup>  
Department of Physiology, Institute for Medical Sciences, Chonbuk National University Medical School, Jeonju, Korea
- S 99** P09-20 Combined treatment of 3,3-diindolylmethane and 5-fluorouracil leads to apoptosis of gastric cancer cells  
Li CongShan, Soo Mi Kim<sup>\*</sup>  
Department of Physiology, Institute for Medical Sciences, Chonbuk National University Medical School, Jeonju, Korea
- S 99** P09-21 Panobinostat inhibit gastric cancer cells through cell cycle arrest  
Da-Yeah Kim, Soo Mi Kim  
Department of Physiology, Institute for Medical Science, Chonbuk National University Medical School, Jeonju, Korea
- S 99** P09-22 Anti-cancer effect of SIRT6 in hepatocellular carcinoma  
Da-Yeah Kim, Soo Mi Kim<sup>\*</sup>  
Department of Physiology, Institute for Medical Science, Chonbuk National University Medical School, Jeonju, Korea

- S 99** P09-23 Recombinant human BMP-2 suppresses the proliferation of Human colorectal cancer cells by activation of Hippo signaling  
Yu Chuan Liu, Soo Mi Kim\*  
Department of Physiology, Institute for Medical Sciences, Chonbuk National University Medical School, Jeonju, Korea
- S 100** P09-24 Knockdown of hematopoietic- and neurologic-expressed 1 induces autophagy in colorectal cancer  
Yu Chuan Liu, Soo Mi Kim\*  
Department of Physiology, Institute for Medical Sciences, Chonbuk National University Medical School, Jeonju, Korea
- S 100** P09-25 Effects of ursodeoxycholic acid on lipopolysaccharide-stimulated signals in biliary epithelial cells (BECs)  
Yangmi Kim  
Departments of Physiology, Chungbuk National University College of Medicine, Cheongju, Korea
- S 100** P09-26 ATP Binding Cassette Transporter A1 is Involved in Extracellular Secretion of Acetylated APE1/Ref-1  
Yu Ran Lee<sup>2</sup>, Hee Kyoung Joo<sup>2</sup>, Eun Ok Lee<sup>2</sup>, Sung Min Kim<sup>1,2</sup>, Hao Jin<sup>1,2</sup>, Byeong Hwa Jeon<sup>1,2\*</sup>  
<sup>1</sup>Research Institute of Medical Sciences, Department of Physiology, <sup>2</sup>Department of BK21Plus CNU Integrative Biomedical Education Initiative, College of Medicine, Chungnam National University, Daejeon, Korea.
- S 100** P09-27 Recombinant Ac-APE1/Ref-1 induces apoptotic cell death in hyperacetylated TNBC cells  
Hao Jin<sup>1,2,3</sup>, Yu Ran Lee<sup>3</sup>, Hee Kyoung Joo<sup>3</sup>, Eun Ok Lee<sup>3</sup>, Sung Min Kim<sup>1,2,3</sup>, Byeong Hwa Jeon<sup>1,2,3</sup>  
<sup>1</sup>Department of Medical Science, <sup>2</sup>Research Institute of Medical Sciences, Department of Physiology, <sup>3</sup>Department of BK21Plus CNU Integrative Biomedical Education Initiative, College of Medicine, Chungnam National University, Daejeon, Korea.
- S 101** P09-28 Effect of histone deacetylase inhibitors on differentiation of human bone marrow-derived stem cells into neuron-like cells  
Sujeong Jang<sup>1</sup>, Han-Seong Jeong<sup>1,\*</sup>, Hyong-Ho Cho<sup>2</sup>, Seokho Park<sup>1</sup>, Ung Yang<sup>3</sup>, Maru Kang<sup>4</sup>, Jong-Seong Park<sup>1</sup>, Sah-Hoon Park<sup>1</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Department of Otolaryngology-Head and Neck Surgery, Chonnam National University Medical School, <sup>3</sup>Department of Horticulture, Asian Pear Research Institute, College of Agriculture and Life Sciences, Chonnam National University, <sup>4</sup>Department of Defense Science & Technology, Gwangju University, Gwangju, Korea
- S 101** P09-29 The APE1/Ref-1 inhibits vascular calcification and loss of the smooth muscle phenotype in vascular smooth muscle cells  
Eun Ok Lee<sup>1</sup>, Ki Mo Lee<sup>1</sup>, Yu Ran Lee<sup>1</sup>, Hee Kyoung Joo<sup>1</sup>, Sung Min Kim<sup>1</sup>, Hao Jin<sup>1</sup>, Cuk-Seong Kim<sup>1</sup>, Jin Ok Jeong<sup>2</sup>, Byeong Hwa Jeon<sup>1\*</sup>  
<sup>1</sup>Research Institute of Medical Sciences, Department of Physiology, School of Medicine, <sup>2</sup>Division of Cardiology, Department of Internal Medicine, Chungnam National University, Daejeon, Korea
- S 101** P09-30 HB-EGF Mediates A549 Cell Migration  
Hee Ju Song, Taehee Kim, YHST wickramasinghe, Sang Do Lee  
Department of Physiology, Chungnam National University School of Medicine, Daejeon, Korea

## P10: Exercise and Integrative physiology

- S 101** P10-01 Resistance exercise in the heart of diabetic rats improves cardiac function and mitochondrial efficiency  
Hamin Choi<sup>1</sup>, Tae Hee Ko<sup>1</sup>, Jubert C. Marquez<sup>1</sup>, Hyoung Kyu Kim<sup>1,2</sup>, Seung Hun Jeong<sup>1</sup>, SungRyul Lee<sup>1,2</sup>, Jae Boum Youm<sup>1</sup>, In Sung Song<sup>1</sup>, Dae Yun Seo<sup>1</sup>, Hye Jin Kim<sup>3</sup>, Du Nam Won<sup>3</sup>, Kyoung Im Cho<sup>4</sup>, Mun Gi Choi<sup>5</sup>, Byoung Doo Rhee<sup>6</sup>, Kyung Soo Ko<sup>6</sup>, Nari Kim<sup>1</sup>, Jong Chul Won<sup>6</sup>, Jin Han<sup>1\*</sup>  
Department of <sup>1</sup>National Research Laboratory for Mitochondrial Signaling, Department of Physiology, Department of Health Sciences and Technology, BK21 plus Project Team, College of Medicine, Cardiovascular and Metabolic Disease Center, <sup>2</sup> Department of Integrated Biomedical Science, College of Medicine, Inje University, <sup>3</sup> GE Healthcare Ultrasound Applications, <sup>4</sup> Division of Cardiology, Department of Internal Medicine, College of Medicine, Kosin University, Busan, <sup>5</sup> Departments of Sports and Leisure Study, Inje University, Gimhae, <sup>6</sup> Department of Internal Medicine, College of Medicine, Sanggye Paik Hospital, Cardiovascular and Metabolic Disease Center, Inje University, Seoul, Korea
- S 102** P10-02 Aerobic Exercise Training Decreases Hepatic Asprosin in Diabetic Rats  
JeongRim Ko<sup>1</sup>, DaeYun Seo<sup>1</sup>, HyunSeok Bang<sup>2</sup>, Jin Han<sup>1</sup>  
<sup>1</sup>National Research Laboratory for Mitochondrial Signaling, Department of Physiology, BK21 Plus Project Team, College of Medicine, Cardiovascular and Metabolic Disease Center, Inje University, <sup>2</sup>Department of Physical Education, College of Health, Social Welfare and Education, Tong Myong University, Busan, Korea

## P11: Physiomes and Systems Biology

- S 102** P11-01 Effects of virtual inhibition of Na<sup>+</sup>/Ca<sup>2+</sup> exchanger on the pacemaker mechanisms in the computational model of human sinoatrial cell; a case of pre-med students' research program in SNU  
Seong Won Jo<sup>1</sup>, Seung June Yoo<sup>1</sup>, Chang Hyun Lee<sup>2</sup>, Young-Keul Jeon<sup>3</sup>, Sung Joon Kim<sup>3</sup>  
<sup>1</sup>Premedicine Course (Gr<sup>2</sup>) and <sup>2</sup>Medicine Course (Gr<sup>1</sup>), <sup>3</sup>Department of Physiology and Department of Biomedical Sciences, Seoul National University College of Medicine, Seoul, Korea
- S 102** P11-02 A computational study on the interatrial difference of rat in the arrhythmogenicity on sympathetic stimulation  
Jieun An<sup>1</sup>, Ami Kim<sup>1</sup>, Sun Hwa Park<sup>1</sup>, Hyun Bin Choi<sup>1</sup>, Tong Mook Kang<sup>1</sup>, Jae Boum Youm<sup>2</sup>  
<sup>1</sup>Department of Physiology, Sungkyunkwan University School of Medicine, Suwon, <sup>2</sup>Department of Physiology, College of Medicine, Cardiovascular and Metabolic Disease Center, Inje University, Busan, Korea

- S 103 P11-03** Investigation of hemodynamic behavior using computational fluid dynamics in the human coronary arteries  
Jung Joo Kim, John Mark Matulac, Nazatul Nurzazlin Zakariah, Nari Kim  
NLRL for Innovative Cardiovascular Engineering, Department of Physiology, College of Medicine, Cardiovascular and Metabolic Disease Center, Inje University, Busan, Korea
- S 103 P11-04** Teaching Cardiac Excitation-Contraction Coupling Using a Mathematical Computer Simulation Model of Human Ventricular Myocytes  
Young Keul Jeon<sup>1</sup>, Jae Boum Youm<sup>2</sup>, Chae Hun Leem<sup>3</sup>, Sung Joon Kim<sup>1,4</sup>  
<sup>1</sup>Department of Physiology, <sup>4</sup>Ischemic/Hypoxic Disease Institute, Seoul National University College of Medicine, Seoul, <sup>2</sup>Cardiovascular and Metabolic Disease Center, Department of Physiology, College of Medicine, Inje University, Busan, <sup>3</sup>Department of Physiology, University of Ulsan College of Medicine, Seoul, Korea
- S 103 P11-05** Lessons from Artificial Neural Network for studying coding principles of Biological Neural Network  
Hyojin Bae, Chang-Eop Kim  
Departments of Physiology, Gachon University College of Korean Medicine, Korea
- S 103 P11-06** Long-range projectome from and to the mouse posterior parietal cortex with bioinformatic analysis  
Sook Jin Son<sup>1,2</sup>, Seung Wook Oh<sup>2,3</sup>, John A. Morris<sup>2</sup>, Changkyu Lee<sup>3</sup>, Jong-Cheol Rah<sup>1,4</sup>  
<sup>1</sup>Korea Brain Research Institute, Daegu, Korea, <sup>2</sup>Grace Medical Institute, Lynnwood, Washington, <sup>3</sup>Allen Institute for Brain Science, Seattle, <sup>4</sup>Daegu Gyeongbuk Institute of Science & Technology, Daegu, Korea
- S 104 P11-07** Feature selection models for the survival of human pancreatic cancer patients using deep learning algorithms  
Han-Jun Cho, Sangcheol Lee, Dong Hyeon Lee  
Department of Physiology, CHA University School of Medicine, Gyeonggi, Republic of Korea

## P12: Others: Drugs, Phytochemicals, Miscellaneous

- S 104 P12-01** Melatonin attenuates cisplatin-induced acute kidney injury through dual suppression of apoptosis and necroptosis  
Jung-A Jung, Hye-Jeong Kim, Jae-Hyung Park  
Departments of Physiology, Keimyung University School of Medicine, Daegu, Korea
- S 104 P12-02** CRIF1 deficiency induced p66shc-regulated mitophagy in endothelial cells  
Shuyi Piao<sup>1,3</sup>, Harsha Nagar<sup>1,2,3</sup>, Seonhee Kim<sup>1,2,3</sup>, Su-Jeong Choi<sup>1,2,3</sup>, Ikjun Lee<sup>1,3</sup>, Byeong Hwa Jeon<sup>1,3</sup>, Cuk-Seong Kim<sup>1,2,3\*</sup>  
<sup>1</sup>Department of Medical Science, <sup>2</sup>Department of BK21Plus CNU Integrative Biomedical Education Initiative, <sup>3</sup>Department of Physiology, School of Medicine, Chungnam National University, Daejeon, Korea
- S 105 P12-03** Profiling of remote skeletal muscle gene changes resulting from stimulation of atopic dermatitis disease in NC/Nga mouse model  
Yelim Seo<sup>1</sup>, Young-Won Kim<sup>1</sup>, Seongtae Kim<sup>1</sup>, Jeongyoon Choi<sup>1</sup>, Hyemi Bae<sup>1</sup>, Inja Lim<sup>1</sup>, Hyoweon Bang<sup>1</sup>, Jung-Ha Kim<sup>2,\*</sup>, Jae-Hong Ko<sup>1,\*</sup>  
Departments of <sup>1</sup>Physiology, Chung-Ang University College of Medicine, <sup>2</sup>Department of Family Medicine, Chung-Ang University Hospital, Chung-Ang University College of Medicine, Seoul, Korea
- S 105 P12-04** Functional characterization of the bitter taste receptor *Tas2r108*  
Su-Young Ki, Ki-Myung Chung, Young-Kyung Cho, Kyung-Nyun Kim  
Department of Physiology and Neuroscience, College of Dentistry and Research Institute of Oral Sciences, Gangneung-Wonju National University, Gangneung, Korea
- S 105 P12-05** Varying blood glucose level affects atherosclerosis progression in streptozotocin-induced diabetic ApoE knockout mice  
John Mark Matulac, Nazatul Nurzazlin, Jungjoo Kim, Nari Kim  
NLRL for Innovative Cardiovascular Engineering, Department of Physiology, College of Medicine, Cardiovascular and Metabolic Disease Center, Inje University
- S 106 P12-06** Osteopontin expression of streptozotocin-induced diabetic ApoE knockout mice model  
Nazatul Nurzazlin Zakariah, John Mark Matulac, Jung Joo Kim, Nari Kim  
NLRL for Innovative Cardiovascular Engineering, Department of Physiology, College of Medicine, Cardiovascular and Metabolic Disease Center, Inje University
- S 106 P12-07** Sympathetic activity mediates hypertrophic morphological changes in the primo vascular system of heart failure rats  
Yiming Shen, Pan-Dong Ryu  
Departments of Veterinary Pharmacology, College of Veterinary Medicine and Research Institute for Veterinary Science, Seoul National University, Seoul, Korea
- S 106 P12-08** Cationic oligopeptide-functionalized mitochondria targeting sequence show mitochondria targeting and anticancer activity  
Jessa Flores<sup>1</sup>, Yoonhee Bae<sup>2</sup>, Kyung Soo Ko<sup>3</sup>, Jin Han<sup>1</sup>, Joon Sig Choi<sup>2</sup>  
<sup>1</sup>Department of Physiology, College of Medicine, Cardiovascular and Metabolic Diseases Center, Inje University, Busan, <sup>2</sup>Department of Biochemistry, College of Natural Sciences, Chungnam National University, Daejeon, <sup>3</sup>Department of Internal Medicine, Sanggye Paik Hospital, Cardiovascular and Metabolic Diseases Center, Inje University, Seoul, Korea

- S 106** P12-09      Functional Nanosome for Enhanced Mitochondria-targeted Gene Delivery and Expression  
Amy H. Kim<sup>2</sup>, Yoonhee Bae<sup>2</sup>, Min Kyo Jung<sup>6</sup>, Su Jeong Song, <sup>1</sup>Eric S. Green<sup>7</sup>, Seulgi Lee<sup>1</sup>, Hyun-Sook Park<sup>8</sup>, Seung Hun Jeong<sup>2</sup>, Jin Han<sup>2</sup>, Ji Young Mun<sup>4,5\*</sup>, Kyung Soo Ko<sup>3\*</sup>, Joon Sig Choi<sup>1\*</sup>  
<sup>1</sup>Department of Biochemistry, College of Natural Sciences, Chungnam National University, Daejeon, <sup>2</sup>Department of Physiology, College of Medicine, Cardiovascular and Metabolic Disease Center, Inje University, Busan, <sup>3</sup>Department of Internal Medicine, Sanggye Paik Hospital, Cardiovascular and Metabolic Disease Center, Inje University, Seoul, <sup>4</sup>Department of Biomedical Laboratory Science, College of Health Science, Eulji University, <sup>5</sup>BK21 Plus Program, Department of Senior Healthcare, Graduate School, Eulji University, Seongnam, <sup>6</sup>Department of Life Sciences, Korea University, Seoul, Korea, <sup>7</sup>Salt Lake Community College, Salt Lake City, USA, <sup>8</sup>Cell engineering for origin Research Center, Seoul, Korea
- S 107** P12-10      Effects of energy metabolism of astrocytes on neural activities in the medial vestibular nucleus of rats  
Ho Koo<sup>1,2</sup>, Xiaorong Zhang<sup>1</sup>, Se Jin Moon<sup>1</sup>, Myung Ae Choi<sup>1</sup>, Min Sun Kim<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, Wonkwang University School of Medicine, <sup>2</sup>Brain Science Institute, Wonkwang University, Iksan, Korea
- S 107** P12-11      Chronic exposure of ethylenethiourea induces nephrotoxicity and poly-cysts in mice  
Hyeyun Kim<sup>1</sup>, Jiyeon Moon<sup>2</sup>, Seungeun Lee<sup>2</sup>, Minchae kim<sup>2</sup>, Yein Choi<sup>2</sup>, Byong-Gon Park<sup>2</sup>  
Departments of <sup>1</sup>Neurology and <sup>2</sup>Physiology, College of Medicine, Catholic Kwandong University, Gangneung, Korea
- S 107** P12-12      Fluorescence size-exclusion chromatography (FSEC) for studying mammalian membrane proteins  
Kunwoong Park, Hyun-Ho Lim  
Neurovascular Unit Research Group, Korea Brain Research Institute (KBRI), Daegu, Korea
- S 108** P12-13      *Flos Magnoliae* and its constituent linoleic acid suppress T lymphocyte activation via store-operated calcium entry  
Hyun Jong Kim<sup>1,2</sup>, Joo Hyun Nam<sup>1,2</sup>  
<sup>1</sup>Department of Physiology, <sup>2</sup>Channelopathy Research Center (CRC), Dongguk University College of Medicine, Korea
- S 108** P12-14      Cytotoxicity of hair dye ingredients on human conjunctival epithelial cells and fibroblasts  
Chae Young Lee<sup>1</sup>, Bae Jeong Bum<sup>2</sup>, Hae-Rahn Bae<sup>1</sup>  
<sup>1</sup>Department of Physiology, College of Medicine, Dong-A University, <sup>2</sup>Lee Eye Hospital, Busan, Korea