45th Physiological Society of Thailand Annual Meeting 2017
6-8 Dec 2017
Avani Khon Kaen Hotel
Translational Physiology
Implications in Health and Disease

# CONFERENCE PROCEEDING

**45th PHYSIOLOGICAL SOCIETY OF THAILAND ANNUAL MEETING:**

**"Translational Physiology: Implications in Health and Disease"**

**6th – 8th December 2017**

The AVANI Khon Kaen Hotel and Convention Centre
Khon Kaen, Thailand

# 45th PHYSIOLOGICAL SOCIETY OF THAILAND ANNUAL MEETING:

# "Translational Physiology: Implications in Health and Disease"

## 6th – 8th December 2017

**The AVANI Khon Kaen Hotel and Convention Centre Room 1-2,**

**Khon Kaen, Thailand**

**Organized by**

**Department of Physiology, Faculty of Medicine at Khon Kaen University**

**and the Physiological Society of Thailand**

**Co-organized by**

**The Faculty of Medicine, Khon Kaen University, Thailand**

**Cardiovascular Research Group, Khon Kaen University, Thailand**

**The Northeastern Neuroscience Association, Thailand**

**The Integrative Complementary Research and Development Center,**
**Khon Kaen University, Thailand**

**Exercise and Sport Sciences Development and Research Group,**
**Khon Kaen University, Thailand**

## PREFACE

The Physiological Society of Thailand provides academic services to its members, personnel involved in physiological sciences, researchers, students, and the general public. The Society and member institutions from all over Thailand have co-hosted the Annual Meeting of the Physiological Society of Thailand since 1972.

This year, the Department of Physiology in the Faculty of Medicine at Khon Kaen University along with the Physiological Society of Thailand are co-hosting the 45th Physiological Society of Thailand Annual Meeting 2017 entitled "Translational Physiology: Implications in Health and Disease", which will be held from 6th-8th December 2017 at the AVANI Khon Kaen Hotel & Convention Centre.

In this meeting, attendees will receive the latest academic knowledge and technology from experts in the field. In addition, we will host various events to build relationships amongst member institutions and amongst international personnel. This will include a competition for best graduate student research presentation, as well as recreational activities and a ceremony to recognize retired teachers in the field of physiology.

On behalf of the Physiological Society of Thailand, it is my pleasure to invite Society members and all interested parties to participate in the 45th Physiological Society of Thailand Annual Meeting 2017. Meeting participants can submit payment and read more details about the meeting at http://physio-conf2017.com

Assoc. Prof. Upa Kukongviriyapan, PhD
President of the Physiological Society of Thailand

Asst. Prof. Supaporn Muchimapura, PhD
Chair of Physiological Society of Thailand Annual Meeting

## A Welcome Message from the PST President

It gives me great pleasure to welcome you to Khon Kaen for the 45th Physiological Society of Thailand Annual Meeting with the theme "Translational Physiology: Implications in Health and Disease" on 6th – 8th December 2017.

This meeting is gracefully organized by the Faculty of Medicine, Khon Kaen University, in collaboration with The Physiological Society of Thailand. The meeting integrates various scientific sessions of great interest delivered by several nationally and internationally renowned speakers. Attendees will receive the latest academic knowledge and technology from experts in the field. Opportunity is also available for graduate students to attend and contribute their work in the oral communication and poster sessions. The best oral and poster presentation awards supported by the "FAOPS 2015 Fund–PST" will be given to presenters who have shown their excellent performance in presenting their scientific work.

With outstanding educational and social programs, I would like to convey my sincere appreciation to the organizing committee who has worked very hard to make this meeting a joyful and memorable experience.

With my best wishes and personal regards,

Associate Professor Upa Kukongviriyapan, PhD

President of the Physiological Society of Thailand

## Conference Report

## Assistant Professor Supaporn Muchimapura

## Chair of Physiological Society of Thailand Annual Meeting

Mr. Chairman, the President of Khon Kaen University,
The President of the Medical Council of Thailand and Dean of Faculty of Medicine, Siriraj Hospital, Mahidol University
The Director of Thailand Research Fund,
Dean of the Faculty of Medicine, Khon Kaen University,
The President of the Physiological Association of Thailand,
Distinguished Delegates, Ladies and Gentlemen.

I am Assistant Professor Supaporn Muchimapura and on behalf of the Chair of the Organizing Committee and all the participants I would like to thank and to honor Associate Professor Dr. Kittichai Triratanasirichai, the president of Khon Kaen University for presiding over the opening ceremony of the 45th Physiological Society of Thailand Annual Meeting "Translational Physiology: Implications in Health and Disease" today.

The Physiological Association of Thailand decreed that the member institutes around the country should share the hosting of the annual meeting and conference between them. This has been ongoing for years. Now, it is our turn, the Department of Physiology, Faculty of Medicine, Khon Kaen University to host a conference in order to strengthen the membership of the Physiology Association of Thailand which consists of medical and public health staff, academic researchers, students and interested members of the public. Approximately 200 people will attend this conference over the next three days. The aims of this conference are:
1. To enhance up-to-date knowledge of human physiology related to health and disease.
2. To develop teaching and learning in the field of physiology among institutions throughout the country.
3. To promote and develop research by physiologists and to generate cooperation in the research network between institutes and with physiologists from abroad.

At this meeting, we are honored to have well-known, highly-qualified expert lecturers both domestic and international, Professor Dr. Suttiphan Jitpimolmard, Professor Dr. Prasit Watanapa, Professor Chia-Hua Kuo, Professor Gary Sweeney, Professor Cheng Hwee Ming, Professor Takafumi Ishida, Associate Professor Silvia Arribas, to name a few. We have also organized symposiums, lectures and activities to enhance relationships between member institutions and international organizations.

On behalf of the organizing committee, I would like to thank all concerned parties on this occasion.

Now it is time, I would like to invite Associate Professor Kittichai Triratanasirichai the president of Khon Kaen University to give the opening speech and to declare the 45th Physiological Society of Thailand Annual Meeting 2017 open.

## Opening Remark

### Associate Professor Kittichai Triratanasirichai.

### President, Khon Kaen University

The President of the Medical Council of Thailand and Dean of the Faculty of Medicine, Siriraj Hospital, Mahidol University
The Director of Thailand Research Fund
The President of the Physiological Society of Thailand
The Dean of the Faculty of Medicine, Khon Kaen University
The Chair of the organizing committee
Distinguished guests and participants
Ladies and gentlemen

I am very honored to be at this important event, and to deliver this welcome speech on behalf of the President of Khon Kaen University.

Thailand is currently moving forward into “the 4.0 era of Thailand” which has focused on the development of prosperity and sustainability. This is the beginning of a 20-year national strategy to deal with new opportunities and threats in the 21st century. Thailand will change economic structure to that of a “Value-Based Economy" or "Innovation-driven Economy" by complementing with technology, innovation, science and, research and development.

Physiology is one of the fields of medical sciences. The understanding of physiological phenomena and their mechanisms can explain the pathophysiologies of diseases. Therefore, research in medical physiology has progressed rapidly and constructed the new knowledge that benefits control, prevention and treatment of diseases, resulting in a better quality of life for people worldwide.

This year, the Department of Physiology in the Faculty of Medicine at Khon Kaen University, along with the Physiological Society of Thailand are co-hosting the 45th Physiological Society of Thailand Annual Meeting 2017 entitled "Translational Physiology: Implications in Health and Disease". Attendees will gain the latest technical knowledge and learn about technology from experts in the field. In addition, there is a growing relationship between member institutions and international organizations. The meeting will include a research presentation competition for graduate students as well as recreational activities.

I would like to thank you, Professor Dr. Prasit Watanapa, Professor Dr. Suthipun Jitphimolmard, all of the speakers, the organizers and the participants who kindly support and take part in the meeting.

Now it's time. I would like to open the 45th Physiological Society of Thailand Annual Meeting 2017 and I wish this meeting success in achieving the organizational goals.

## Advisory Committee

President of Khon Kaen University
Dean, Faculty of Medicine
President of the Physiological Society of Thailand
Professor Chumpol Pholpramool
Professor Pawinee Piyachaturawat
Professor Duangporn Werawatganon
Associate Professor Supatra Lohsiriwat
Associate Professsor Prasong Siriviriyakul

## Meeting Committee

Assistant Professor Supaporn Muchimapura — Meeting Chair
Associate Professor Upa Kukongviriyapan
Associate Professor Sanya Roysommuti
Associate Professor Dr. Paradee Auvichayapat
Associate Professor Wannapa Ishida
Associate Professor Dr.Supat Sinawat
Associate Professor Naruemon Leelayuwat
Associate Professor Jintanaporn Wattanathorn
Associate Professor Dr. Terdthai Tong-un
Associate Professor Poungrat Pakdeechote
Assistant Professor Dr. Orapin Phasurivong
Assistant Professor Dr. Panakaporn Wannanon
Assistant Professor Orathai Tunkamnerdthai
Assistant Professor Apiwan Manimmanakorn
Assistant Professor Dr. Wiyada Punjarak
Dr. Wipawee Thukhum-Mee
Dr. Weerapon Sangartit
Dr. Putcharawipa Maneesai

## Subcommittee on Program and Doccument

Assistant Professor Supaporn Muchimapura — Chair
Assistant Professor Dr.Wattana Watanapa
Associate Professor Upa Kukongviriyapan
Associate Professor Sanya Roysommuti
Associate Professor Wannapa Ishida
Associate Professor Naruemon Leelayuwat
Associate Professor Jintanaporn Wattanathorn
Dr. Wipawee Thukhum-Mee — Secretary

### Subcommittee on Registration

Associate Professor Dr. Paradee Auvichayapat Chair
Associate Professor Dr. Terdthai Tong-un
Assistant Professor Roongtawan Supabphol
Assistant Professor Orathai Tunkamnerdthai
Mr. Cherchsak Chareansakkchone
Miss Sumala Xiangqi
Miss Chanatda Phongyot
Miss Natcha Viboonyapakorn
Mrs. Marisa Champana
Mr. Thanin Inthaket

### Subcommittee on Protocol and Public relations

Associate Professor Poungrat Pakdeechote Chair
Assistant Professor Apiwan Manimmanakorn
Assistant Professor Dr. Wiyada Punjarak
Dr. Weerapon Sangartit
Dr. Kwanjit Apaijit
Dr. Putcharawipa Maneesai
Miss Kantiwa Saenprom

### Subcommittee on Reception, Logistic and Excursions

Assistant Professor Apiwan Manimmanakorn Chair
Assistant Professor Dr. Orapin Phasurivong
Assistant Professor Jinatta Jittiwat
Assistant Professor Pisit Suwannachote
Assistant Professor Patchanee Sringam
Assistant Professor Prapaporn Tungthanathanich
Dr. Ratikron Chatchanayuenyong
Dr. Sarawoot Bunbupha
Mr. Jakkrapong Rattagate
Mrs. Supawan Nantawang

### Subcommittee on Facility and Audiovisual

Associate Professor Dr. Terdthai Tong-un Chair
Assistant Professor Dr.Panakaporn Wannanon
Dr. Ladachart Taepongsorath
Mr. Anawat Singhara
Mr. Padungkiet Jutakanchana
Miss Adchara Jankrob

## Presentation Awards Committee

### Oral Presentation Awards for Ph.D. Students

1. Professor Varanuj Chatsudthipong
2. Associate Professor Suwattanee Kooptiwut
3. Associate Professor Poungrat Pakdeechote

### Oral Presentation Awards for M.Sc. Students

1. Assistant Professor Dr. Wattana Watanapa
2. Associate Professor Thamolwan Suanarunsawat
3. Associate Professor Dr.Terdthai Toung-un

### Poster Presentation Awards for Ph.D. Students

Associate Professor Penchom Peungvicha

Associate Professor Punnee Nusuetrong

3. Associate Professor Jintanaporn Wattanathorn

### Poster Presentation Awards for M.Sc. Students

1. Associate Professor Chatsri Deachapunya
2. Assistant Professor Krongkarn Chootip
3. Associate Professor Wannapa Ishida

**Scientific Program for the 45th Physiological Society of Thailand Annual Meeting 2017**
**"Translational Physiology: Implications in Health and Disease"**
**Venue: Convention Centre, AVANI Khon Kaen Hotel**

**Wednesday 6th December 2017**

**Venue: Convention Centre (Room I-II), AVANI Khon Kaen Hotel**

| | |
|---|---|
| 08:00-09:00 | Registration |
| 09:00-09:30 | **Welcome & Opening Remarks**<br>Associate Professor Upa Kukongviriyapan, PST President<br>Assistant Professor Supaporn Muchimapura, Meeting Chair<br>Associate Professor Kittichai Triratanasirichai, KKU President |
| 09:30-10:30 | **Distinguished Lecture I: Ouay Ketusingh Memorial Lecture: Translating Basic Science into Clinical Practice**<br>Professor Dr. Prasit Watanapa<br>Dean, Faculty of Medicine Siriraj Hospital, Mahidol University.<br>President, Medical Council of Thailand |
| 10:30-11:00 | **Exhibition/Refreshments** |
| 11:00-12:00 | **Distinguished Lecture II: Dithi Chungcharoen Memorial Lecture: Impact of Research on the Development of the Country**<br>Professor Dr. Suthipun Jitpimolmard<br>Director, the Thailand Research Fund |
| 12:00-13:00 | **Lunch** |
| 13:00-14:15 | **Symposium II: Novel Risk Factors for Cardiovascular Disease**<br>**Hemostatic Factors and the Risk of Coronary Artery Disease**<br>Associate Professor Nantarat Komanasin<br>Department of Clinical Microscopy, Faculty of Associated Medical Sciences and Cardiovascular Research Group, Khon Kaen University, Thailand<br>**Role of Gut Flora in Atherosclerosis**<br>Dr. Vichai Senthong<br>Department of Internal Medicine, Faculty of Medicine, Queen Sirikit Heart Center of the Northeast and Cardiovascular Research Group, Khon Kaen University, Thailand |

**Diagnosis and Management of Coronary Artery Disease**

Associate Professor Dr. Songsak Kiatchoosakun
Department of Internal Medicine, Faculty of Medicine, Queen Sirikit Heart Center of the Northeast and Cardiovascular Research Group, Khon Kaen University

14:15-15:15 **Symposium III: Substrate utilization and its Implications in Health and Sports**

Professor Chia-Hua Kuo
Dean for Research and Development at University of Taipei, Taiwan

Associate Professor Naruemon Leelayuwat
Head, Exercise and Sport Sciences Development and Research Group, Khon Kaen, Department of Physiology, Faculty of Medicine, Khon Kaen University, Thailand

15:15-15:45 **Poster Presentations/Exhibition/Refreshments**

15:45-16:30 **Oral Presentations**
**Chairperson: Professor Varanuj Chatsudthipong**
**Co-Chair: Assistant Professor Supaporn Puntheeranurak**

15.45-16.00 **O1: Alterations of Lung Development and Asporin Gene Expression in Newborn Mice after Recovery from Hyperoxia Exposure.**

Supitsara Thorsuwan. Department of Physiology, Faculty of Medicine Siriraj Hospital, Mahidol University

16.00-16.15 **O2: Modulating Effects of Wan Chak Motluk on Adipose Tissue in Rats.**

Nareerat Sutjarit. Toxicology Graduate Program, Faculty of Science, Mahidol University

16.15-16.30 **O3: Genistein Alleviated Hepatic Lipid and Inflammation in High-fat High fructose Diet-induced Non Alcoholic Steatohepatitis with Bilateral Ovariectomized Rats.**

Sudaporn Pummoung. Department of Physiology, Faculty of Medicine, Chulalongkorn University

16:30-17:30 **Physiological Society of Thailand Minutes of Meeting**

18:00-22:30 **Mú-Tí-DtaaJìt Ceremony and Welcome Reception**

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**Thursday 7th December 2017**

**Venue: Convention Centre (Room I-II), AVANI Khon Kaen Hotel**

08:00-08:30 Registration

08:30-09:00 **Special Lectures Lecture I: Heart failure: understanding pathophysiology and therapeutic opportunities.**

Professor Gary Sweeney
Department of Biology, York University, Canada

09:00-09:30 **Lecture II: How My Students Taught Me Physiology**

Professor Cheng Hwee Ming
Department of Physiology, Faculty of Medicine, University of Malaya, Malaysia

09:30-10:00 **Lecture III: Semen and Primate Society**

Professor Takafumi Ishida
Department of Biological Sciences, Graduate School of Science,
University of Tokyo, Japan

10:00-10:30 **Lecture IV: Sexual Dimorphism in Fetal Programming of Cardiovascular Diseases. Are Females Really Protected?**

Associate Professor Silvia Arribas
Department of Physiology, Faculty of Medicine,
Universidad Autónoma de Madrid, Madrid, Spain

10:30-11:00 **Poster Presentations/Exhibition/Refreshments**

11:00-12:00 Oral Presentations
**Chairperson: Professor Varanuj Chatsudthipong**
**Co-Chair: Associate Professor Suwattanee Kooptiwut**

11:00-11:15 **O4: Glutathione S-transferase Theta-1 (GSTT1) Polymorphism and Cervical Cancer Susceptibility in Relation to Partners' Smoking.**

Sophida Phuthong. Department of Physiology, Faculty of Medicine, Khon Kaen University

11:15-11:30 **O5: Effect of Testosterone on Ionic Currents in Human Coronary Artery Endothelial Cells.**

Katesirin Ruamyod. Department of Physiology, Faculty of Medicine Siriraj Hospital, Mahidol University

11:30-11:45 **O6: Antihypertensive Effects of Sung Yod Rice Bran Hydrolysates in LNAME-induced Hypertensive Rats.**

Gulladawan Jan-on. Department of Physiology, Faculty of Medicine, Khon Kaen University

| | |
|---|---|
| 11:45-12:00 | **O7: An Andrographolide Analogue Suppresses the Proliferation and Wnt/bcatenin Signaling Pathway in Colorectal Cancer Cells.**<br>Somrudee Reabroi. Department of Physiology, Faculty of Science, Mahidol University |
| 12:00-13:00 | **Lunch Symposium IV (Room I): Two Hundred Seventy Minutes of Life**<br>Assistant Professor Dr. Kannikar Kongbunkiat<br>Department of Internal Medicine, Faculty of Medicine, Khon Kaen University |
| 13:00-14:00 | **Symposium V: Alternative Medicine in Epilepsy**<br>Associate Professor Dr. Somsak Tiamkao<br>Department of Internal Medicine, Faculty of Medicine.<br>Head, KKU Stroke Research Group.<br>President, Northeastern Neuroscience Association<br>Assistant Professor Supaporn Muchimapura.<br>Department of Physiology, Faculty of Medicine, Khon Kaen University.<br>Vice Director, the Integrative Complementary Alternative Medicine Research and Development Center, KKU |
| 14:00-15:00 | **Oral Presentations**<br>**Chairperson: Assistant Professor Wattana Watanapa**<br>**Co-Chair: Assistant Professor Warawan Kitphati** |
| 14:00-14:15 | **O8: The Effect of Exercise Training on Cardiac Function and Mast Cell Activation in Ovariectomized Rats with Angiotensin II Infusion.**<br>Rerknapat Jitmana. Department of Physiology, Faculty of Science, Mahidol University |
| 14:15-14:30 | **O9: Effect of Exercise Training on Age-induced Cerebral Endothelial Dysfunction and Oxidative Stress in Aging Rat Association with Nrf2.**<br>Channipa Chanpakdee. Inter-Department of Physiology, Graduate School, Chulalongkorn University |
| 14:30-14:45 | **O10: Correlation Between CYP1A1 Gene Polymorphism and The Risk for Cervical Cancer in Thai women.**<br>Mayuree Wongpratate. Department of Physiology, Faculty of Medicine, Khon Kaen University |
| 14:45-15:00 | **O11: Genistein Attenuated Severity of Acute Pancreatitis Induced by Larginine in Mice.**<br>Chamlongluk Sriko. Department of Physiology, Faculty of Medicine, Chulalongkorn University |
| 15:00-15:30 | **Poster Presentations/Exhibition/Refreshments** |

15:30-17:30 **Oral Presentations**
**Chair: Associate Professor Yuvadee Wongkrajang**
**Co-Chair: Associate Professor Thamolwan Suanarunsawat**

15:30-15:45 **O12: Estrogen Deprivation Aggravates Cardiometabolic Dysfunction in Obese-Insulin Resistant Rats.**

Wanitchaya Minta. Cardiac Electrophysiology Research and Training Center, Faculty of Medicine, Chiang Mai University

15:45-16:00 **O13: The Effects of Estrogen Deprivation on Hippocampal Synaptic Plasticity and Cognitive Function in Obese-Insulin Resistant Female Rats.**

Duangkamol Mantor. Neurophysiology Unit, Cardiac Electrophysiology Research and Training Center, Faculty of Medicine, Chiang Mai University

16:00-16:15 **O14: Estrogen Deprivation on Skeletal Muscle Function in Obese-Insulin Resistant Rats.**

Wissuta Sutham. Neurophysiology Unit, Cardiac Electrophysiology Research and Training Center, Faculty of Medicine, Chiang Mai University

18:30-22:30 **Awards Presentation and Closing Remarks**

**Friday 8th December 2017 Venue: Convention Centre, AVANI Khon Kaen Hotel**

08:30-09:00 Registration

09:00-10:15 Oral Presentations

10:15-10:45 Exhibition/Refreshments

10:45-12:00 Poster Presentations

12:00 Bon Voyage

## Moderated Poster Session I

**6th December 2017**

**15.15-15.25 P1: The Effects of Hesperidin on Blood Pressure, Renin-angiotensin System, Sympathoexcitation and Oxidative Stress in Renovascular Hypertensive Rats**

Chutamas Wunpathe , Putcharawipa Maneesai , Upa Kukongviriyapan , Parichat Prachaney , Poungrat Pakdeechote

**15.25-15.35 P2: Protective Effect of Genistein Against Dexamethasone-induced Pancreatic β-cell Apoptosis.**

Kanchana Suksr, Namoiy Semprasert , Supornpim Chearskul , Thawornchai Limjindaporn , Pathai Yenchitsomanus , Suwattanee Kooptiwut

**15.35-15.45 P3: The Memory Enhancing Effect of a Standardized Extract of *Centella asiatica* ECa 233 in the Normal Rat Study.**

Yingrak Boondam , Anchalee Vattarakor , Namphung Thongtha , Kanokwan Tilokskulchai , Mayuree Tantisira , Narawut Pakaprot

**7th December 2017**

**10.30-10.40 P4: *Moringa oleifera* Leaf Extract Causes Endothelium-dependent Vasodilatation Through NO-sGC and H2S-KATP Pathways**.

Direk Aekthammarat , Patchareewan Pannangpetch , Panot Tangsucharit

**10.40-10.50 P5: Female Sex Hormones Attenuated CCCP-Induced Mitochondrial Damage in the Rat Heart**. Theerachat Kampaengsri, Tepmanas Bupha-intr

**10.50-11.00 P6: Ameliorative Effect of Curcumin on Lead-induced Hypertension, Arterial Stiffness and Oxidative Stress in Rats**. Akarachai Tubsakul,

Weerapon Sangartit Poungrat Pakdeechote, Veerapol Kukongviriyapan, Praphassorn Surawattanawan, Upa Kukongviriyapan

## Moderated Poster Session II

**6th December 2017**

**15.15-15.25 P7:** **Effects of Kaempferia parviflora Extract on Glucose Transporters in Human Renal Proximal Tubular Cells**.

Natechanok Thipboonchoo and Sunhapas Soodvilai

**15.25-15.35 P8:** **Whole Body Vibration Training Reduces Body Weight and Blood Pressure in Obese Females**.

Wisutthida Saengjan, Orapin Pasurivong, Orathai Tunkamnerdthai, Nuttaset Manimmanakorn, Worrawut Thuwakam, Preetiwat Wonnabussapawich, Apiwan Manimmanakorn

**15.35-15.45 P9:** **Effect of Capsaicin and Resveratrol on Apoptosis Induction Through Suppressing of de novo Lipogenesis in Colon Cancer Xenograft Nude Mice Model.**

Sutthikan Srisawat, Sutida Chuaboon, Damratsamon Surangkul, Metawee Srikummool, Julinthorn Somran, Jiraporn Tocharus, and Piyarat Srisawang

**7th December 2017**

**10.30-10.40 P10:** **The Selective Anticancer Effect of Epistructured Catechins on Apoptosis Induction via Blocking de novo Lipogenesis Pathway and Activity of Carnitine Palmitoyl Transferase (CPT)-1 in HepG2 Cells**.

Phuriwat Khiewkamrop, Lysiane Richert, Dumrongsak Pekthong, Piyarat Srisawang

**10.40-10.50 P11:** **Citrate transport protein inhibitor inhibits de novo lipogenesis and induces apoptosis through activating ceramide synthesis in HCT116 xenograft nude mice models**.

Narinthorn Phakdeeto, Somrudee Suwankulanan, Wan-angkan Poolsri, Damratsamon Surangkul, Metawee Srikummool, Julintorn Somran, Jiraporn Tocharus and Piyarat Srisawang

**10.50-11.00 P12:** **Suppressing of de novo Lipogenesis by Citrate Transport Protein Inhibitors Induce Apoptosis in Colorectal Cancer Cell Lines**.

Somrudee Suwankulanan, Narinthorn Phakdeeto, Wan-angkan Poolsri, Damratsamon Surangkul, Metawee Srikummool, Julintorn Somran, Jiraporn Tocharus and Piyarat Srisawang

**10.50-11.10 P13:** **Combination of Capsaicin and Resveratrol Induces Apoptosis Mediated Through de novo Lipogenesis Inhibition in Hepatocellular Carcinoma Cell Line**. Sutida Chuaboon, Sutthikan Srisawat and Piyarat Srisawang

**15.00-15.10 P14:** **Effects of Prebiotic From Konjac Oligoglucomannan on Colonic Motility in Constipated Mice**.

Fittree Hayeeawaema, Santad Wichienchot, Pissared Khuituan

**15.10-15.20 P15:** **Effect of Oral Administration of Ginger Extract and Gingerol on Rat Small Intestinal Contraction and Histology**.

Usana Chatturong, Sakara Tunsophon, Tanwarat Kajsongkram and Krongkarn Chootip

**1 5.20-15.30 P16:** **Effects of Cultured Cordyceps militaris on the Improvement of Erectile Dysfunction in Diabetic Rats Induced by Steptozotocin**. Sureena Pohsa, Wanthanee Hanchang, Peerasak Chaiprasart, Pornnarin Taepavarapruk

**15.30-15.40 P17:** **Reduced Arterial Stiffness and Ankle Blood Pressure Following Stretching Exercise in Postmenopausal Women**.

Hataichanok Boonpim, Sawitri Wanpen, Raoyrin Chanavirut, Kwanjit Apaijit, Upa Kukongviriyapan, Saowanee Nakmareong

## TABLE OF CONTENT

# Professor Dr. Ouay Ketusingh

MD, DPhil, Diploma-Chemiker, Dr.rer.nat.
3 September 1908 - 20 December 1990

**Education**

1932 Doctor of Medicine, Chulalongkorn University
1935 Doctor of Philosophy in Medicine, Chulalongkorn University
1936 Diploma in Tropical Medicine, University of Hamburg
1939 Doctor of Sciences; Diplom-Chemiker, Dr.rer.nat.

**Governmental Services**

1933-1943 Lecturer, Faculty of Medicine Siriraj Hospital, University of Medicine
1946 Head of Physiology Department, Faculty of Medicine Siriraj Hospital, University of Medicine
1952 Professor of Physiology, Faculty of Medicine Siriraj Hospital, University of Medicine
1965 Vice Rector, University of Medicine
1966 Head of Pharmacology Department, Faculty of Medicine Siriraj Hospital, University of Medicine
1968 Director, Sports Science Centre, Organization for Sports Promotion of Thailand

**Distinguished Positions, Special Appointments and Honors**

The first Dean of the Faculty of Pharmacy, University of Medicine (1940-1943)
Expert Consultant to the Khon Kaen and Silpakorn University Councils
President of the Association of Thai Sports Medicine
President of Thai-German Association
President of the Thai-Indian Cultural Ashram
Honorary Research Committee, Federation of German Sports Medicine
President of the Federation of Asian Sports Medicine
President of the Foundation for the Promotion of Thai Traditional Medicine
Director of Ayurved Wittayalai (Shewakomalpat)
Member of the National Legislative Assembly Senator
Member of the Medical Council
Member of the Royal Institute (Medicine)
Honorary Doctorate in Medicine, University of Medicine
Honorary Doctorate in Pharmacy, University of Medicine
Honorary Doctorate in Science (Education), Kasetsart University
Honorary Doctorate in Education, Chulalongkorn University
Honorary Doctorate in Science (Physical Education), Srinakharinwirot University
Honorary Professor, Faculty of Education, Chulalongkorn University
Fellow, World Academy of Art and Science
Fellow, American College of Sports Medicine
Corresponding Member, German Pharmacological Society
Etc.

**Highest Accolades**

Knight Grand Cordon (Special Class) of the Most Exalted Order of the White Elephant
Knight Grand Cordon (Special Class) of the Most Noble Order of the Crown of Thailand
Knight Grand Commander (2nd Class, higher grade) of the Most Illustrious Order of Chula Chom Klao
The Dushdi Mala, for academic distinction
Das krase Faredeenkreust (Federation of Germany)

**Research and Publications**

Numerous publications in the fields of physiology, biology, sports medicine and biomedical electronics.

## Distinguished Lecture I: Ouay Ketusingh Memorial Lecture:

## Translating Basic Science into Clinical Practice

Professor Prasit Watanapa
Dean, Faculty of Medicine Siriraj Hospital,
Mahidol University.
President, Medical Council of Thailand

**Education**
Bachelor of Science with honors, Mahidol University, Bangkok, 1979.
Doctor of Medicine with honors, Mahidol University, Bangkok, 1981.
Doctor of Philosophy, University London, 1992.

**Career**
Resident in surgery Siriraj Hospital, Bangkok, 1985-1987
Consultant surgeon, since 1988
Associate Professor surgery, 1993-1996
Professor surgery, since 1996.

**Fellowship**
Fellow Royal College Surgeons (United Kingdom)
Royal College Surgeons (Edinburgh)
Royal College Surgeons Thailand (member board examination since 1992)
International College Surgeons (United States),
World Association Hepato-Pancreato-Biliary Surgery
Association Surgeons of Asia
American College Surgeons.

**Publication**

Tangjaroen, S., Watanapa, P. Unclosed fascial defect: Is it the risk to develop port-site hernia after laparoscopic cholecystectomy? (2014) Journal of the Medical Association of Thailand, 97 (2), pp. 191-194.

Tangjaroen, S., Watanapa, P. Mini-cholecystectomy under local anaesthesia. (2007) Asian Journal of Surgery, 30 (4), pp. 235-238.

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## Professor Dr. Dithi Chungcharoen

MD, DPhil, PhD
(22 November 1917 – 8 August 1993)

**Education**

1938 Doctor of Medicine, Chulalongkorn University
1947 Doctor of Philosophy in Medicine, Chulalongkorn University
1952 PhD, University of London, UK
1980 Honorary PhD in Sciences, Mahidol University

**Governmental Services**

1938 Lecturer in Department of Physiology, Siriraj Hospital School of Medicine
1961 Professor of Physiology, Siriraj Hospital School of Medicine
1966-1978 Head of Physiology, Siriraj Hospital School of Medicine

**Distinguished Positions, Special Appointments and Honors**

Chairman, Medical Curriculum Committee, Faculty of Medicine Siriraj Hospital
Chairman, Master Degree Curriculum Committee, Faculty of Medicine Siriraj Hospital
Chairman, Medical Technology Project (a two-year curriculum), Mahidol University
The National Research Council, Medical Science Branch (1960 onwards)
Founder and The first President, Physiological Society of Thailand (PST)
Chaopraya Prasadejsurentarathibodhi Award for outstanding lecturer, Faculty of Medicine Siriraj Hospital (academic year 1969)
Member of the Society of the Sigma Xi, Temple University Chapter, 1958 onwards
Pioneering biomedical electronics in Thailand
Founder, Electronic Equipment Unit, Faculty of Medicine Siriraj Hospital
Founder of various workshops for maintaining equipment used in research and teaching
Inventing, improving or modernizing techniques and instruments for physiological experiments
Pioneering the use of oscilloscope and physiograph, replacing older recording instruments
Establishing Experimental Animal Facility, Faculty of Medicine Siriraj Hospital
Initiating the inclusion of applied physiology and preclinical-clinical integration in teaching 1$^{st}$-3$^{rd}$ year medical students
Etc.

**Highest Accolades**

Knight Grand Cordon (Special Class) of the Most Noble Order of the Crown of Thailand

**Research and Publications**

Widely published in the fields of cardiovascular physiology, physiology of ageing and medical education.

## Distinguished Lecture II: Dithi Chungcharoen Memorial Lecture:

## Impact of Research on the Development of the Country

Professor Suthipun Jitpimolmard
Director, the Thailand Research Fund

**Education**

Bachelor of Science, Faculty of Medicine, Khon Kaen University, 1979
Doctor of Medicine with honors, Faculty of Medicine, Khon Kaen University, 1981
Certificate in Clinical Science, Ramathibodi Hospital School of Medicine, Mahidol University, 1983
Diploma, Thai Board of Internal Medicine, 1985
Diploma in Clinical Neurology, Institute of Neurology (Queen Square), University of London, England, 1988
Diploma, Thai Board of Neurology 1996

**Career**

1981-1982: Intern, Chulalongkorn Hospital, Chulalongkorn University
1982-1984: Resident, Department of Medicine Ramathibodi Hospital, Mahidol University
1986: Fellow, Neurology Unit , Ramathibodi Hospital Mahidol University (Professor Athasit Vejjajiva)
1986-1987: Honorary Neuromuscular Research Fellow
1987-1988: British Council Fellow, Department of Neurological Science, Royal Free Hospital School of Medicine London NW3 2PE, England (Professor P K Thomas)
1994-1996: Vice chairman, Department of Medicine
1988- present: Consultant neurologist, Srinagarind Hospital, Faculty of Medicine, Khon Kaen University
1999- present: Professor of Neurology
2002-2005 : Chairman, Department of Medicine, Faculty of Medicine
2002- 2008: President, North-Eastern Neuroscience Association
2003-2006 : Chairman, Research Committee, The Royal College of Physicians of Thailand
2011-2013: Chairman, Curriculum Development and Resident Training and Examination in Neurology Committee. The Neurological Society of Thailand
2007-2011: Director, Research for Social Development Institue (RDI), Khon Kaen University
2011-2013: Vice President Research and Technology Transfer Affairs, Khon Kaen University
2013-2015: Committee, Governing Board. The National Science and Technology Development.
2013-present: Director, the Thailand Research Fund
2013-present: Committee in the Subcommittee Broad of Research Promotion and Development, Office of the Higher Education Commission

**Membership**

The Medical Association of Thailand
The Royal College of Physicians of Thailand
The Neurological Society of Thailand
The American Academy of Neurology
The Queen Square Alumni Association
The Association of British Neurologists
North-Eastern Neuroscience Association
The Thai Neuroscience Society

**Publication**

Kongbunkiat, K., Tiamkao, S., Chotmongkol, V., Chieawthanakul, P., Kitcharoen, S., Jitpimolmard, S., Sawanyawisuth, K. A real life clinical practice of neurologists in the ambulatory setting in Thailand: A pragmatic study. (2015) Neurology International, 7 (1), art. no. 5840, pp. 19-21.

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Tiamkao, S., Pratipanawatr, T., Jitpimolmard, S. Abdominal epilepsy: An uncommon of non-convulsive status epilepticus. (2011) Journal of the Medical Association of Thailand, 94 (8), pp. 998-1001.

Sawanyawisuth, K., Sawanyawisuth, K., Senthong, V., Limpawattana, P., Intapan, P.M., Tiamkao, S., Jitpimolmard, S., Chotmongkol, V., Barrett-Connor, E. Peripheral eosinophilia as an indicator of meningitic angiostrongyliasis in exposed individuals. (2010) Memorias do Instituto Oswaldo Cruz, 105 (7), pp. 942-944.

Tiamkao, S., Janon, C., Sawanyawisuth, K., Pratipanawatr, T., Jitpimolmard, S. Prediction of seizure control in non-ketotic hyperglycemic induced seizures. (2009) BMC Neurology, 9, art. no. 61,

Tiamkao, S., Sawanyawisuth, K., Asawavichienjinda, T., Yaudnopakao, P., Arunpongpaisal, S., Phuttharak, W., Auevitchayapat, N., Vannaprasaht, S., Tiamkao, S., Phunikhom, K., Chaiyakum, A., Saengsuwan, J., Jitpimolmard, S. Predictive risk factors of seizure-related injury in persons with epilepsy. (2009) Journal of the Neurological Sciences, 285 (1-2), pp. 59-61.

Sawanyawisuth, K., Takahashi, K., Hoshuyama, T., Sawanyawisuth, K., Senthong, V., Limpawattana, P., Intapan, P.M., Wilson, D., Tiamkao, S., Jitpimolmard, S., Chotmongkol, V. Clinical factors predictive of encephalitis caused by Angiostrongylus cantonensis. (2009) American Journal of Tropical Medicine and Hygiene, 81 (4), pp. 698-701.

## Symposium I: Novel Risk Factors for Cardiovascular Disease:

## Hemostatic Factors and the Risk of Coronary Artery Disease

Associate Professor Nantarat Komanasin
Department of Clinical Microscopy,
Faculty of Associated Medical Sciences
Cardiovascular Research Group, Khon Kaen University

**Abstract**

Coronary artery disease (CAD) results from the progression of coronary atherosclerosis and thrombosis of the ruptured atherosclerotic plaque consequently triggers acute coronary syndrome. Several studies have revealed the associations of coagulation factor activation and impaired fibrinolytic activity with risk of ischemic events. Therefore, examination of hemostatic markers that may predict the risk of thrombotic events is likely to be important for designing individual approaches to appropriate treatment. A number of parameters reflecting procoagulant and impaired fibrinolysis have been studied including a single marker and overall hemostatic potential. However, because of the tight interplay between inflammation and coagulation system, thus, whether high levels of procoagulant proteins indicate inflammation in the plaque or represent the risk factors for CAD need to be clarify. Since CAD is a multifactorial disease with the combined effects of genetic and environmental factors, several genetic loci have been demonstrated in association with myocardial infarction, CAD and thrombotic events including factor XIII, fibrinogen, plasminogen activator inhibitor-1.

**Keywords:** coronary artery disease, coagulation factor, fibrinolysis

## Symposium I: Novel Risk Factors for Cardiovascular Disease:

## Role of Gut Flora in Atherosclerosis

Dr. Vichai Senthong
Department of Internal Medicine,
Faculty of Medicine,
Queen Sirikit Heart Center of the Northeast
Cardiovascular Research Group, Khon Kaen University

**Abstract**

The incidence of cardiovascular diasese (CVD) has been increasing and remains a leading cause of death around the world. Despite the considerable attention to traditional risk factors and use of modern pharmacotherapies, including high potency statin therapy, at least 50% residual risk remains. Therefore, we are interested in identifying novel cardiovascular risk factors to improve both our understanding of the processes that contribute to CVD pathogenesis and the prevention and treatment of CVD.

Increasing data support a role of gut microbiota and dietary ingestion of phosphatidylcholine (PC or lecithin) in the pathogenesis of atherosclerosis. PC is the major dietary source of choline, which often is found in the Western diet, such as red meat, eggs and meat products. Production of trimethylamine *N*-oxide (TMAO) by gut microbiota metabolism of dietary PC has been associated with the development of atherosclerosis in animals and in humans. Increased levels of plasma TMAO are associated with enhanced number of diseased major coronary vessels, complexity, as well as increased risk of major adverse cardiac events in patients undergoing elective coronary angiography. An Improvement in understanding of the pathophysiology linking gut microbes, TMAO, and CVD development may serve to help improve selection of high-risk CVD patients who need more aggressive and specific treatment.

## Symposium I: Novel Risk Factors for Cardiovascular Disease: Diagnosis and Management of Coronary Artery Disease

Associate Professor Songsak Kiatchoosakun
Department of Internal Medicine,
Faculty of Medicine,
Queen Sirikit Heart Center of the Northeast
Cardiovascular Research Group, Khon Kaen University

**Abstract**

Coronary artery disease (CAD) is the leading cause of death worldwide and the developing countries. The evolution of medical treatment including aspirin, beta-blocker, renin angiotensin aldosterone system antagonist, and statins in past decades significantly reduce the mortality and morbidity rate in patients with CAD. However, the mortality rate remains high in high risk patients and there is still a gap of evidence in daily practice cardiology. The emerging of new treatment including percutaneous coronary intervention (PCI) and new medications improve the outcomes of patients with CAD. PCI is now the standard treatment in symptomatic patients despite maximal medical therapy and high risk patient with acute coronary syndrome.

## Symposium II: Substrate utilization and its Implications in Health and Sports

Professor Chia-Hua Kuo
Dean for Research and Development
University of Taipei, Taipei, Taiwan
e-mail: kuochiahua@gmail.com

**Abstract**

After meal, approximately 85% of postprandial glucose is disposed into skeletal muscle. More than 90% of them will be used to synthesize glycogen and less than 10% will be metabolized into lactate. Elevated glucose in circulation will gradually return to normal in 2-3 h after meal. However, the time required for this glucose return increases with advancing aging and weight growth, occurred in paralleled with increased plasma insulin levels. This metabolic shift has been termed as "compensatory hyperinsulinemia", as a sign of insulin resistance. Plasma glucose will eventually increases when the hyperinsulinemia cannot effectively compensate the insulin resistance due to further aging and weight increases. High extracellular glucose level is currently recognized as the major cause of low-grade persistent systemic inflammation, due to protein glycation. Such structural changes in extracellular proteins due to glycation attract innate immune attack (phagocytosis releases free radicals), which in turn, increases oxidative stress and protein oxidation (such as increased oxidized LDL). Such protein deformation further elevates baseline inflammation. Insulin resistance and its ramification have been shown to be the common denominator of diabetes, heart attack, hypertension, stroke, and cancer. Therefore, improving muscle insulin sensitivity is the key for human survival. A recent study has demonstrated that increasing physical activity (from low to high) among adults aged above 50 y increases their lifespan, suggesting that exercise intensity plays a critical role for the benefit of exercise training. Aerobic based endurance training is effective to improve insulin sensitivity and glucose metabolism only for adults aged below 40 y. Strength training that often increases muscle damage remains effective training modality to improve insulin sensitivity for elderly. The underlying mechanism for the benefit from such destructive event remains to be determined. After age 70 y, muscle loss becomes a major concern for metabolic health and quality of life. Resistance training can improve muscle strength and muscle mass only when meal is consumed immediately after training. A 2 h delay will kill the training effect in elderly. We must note that resistance training also causes muscle damage and acute inflammation. However, muscle regeneration during acute inflammation may be beneficial for tissue renewal against human aging.

## Symposium II: Substrate utilization and its Implications in Health and Sports

Associate Professor Naruemon Leelayuwat
Head, Exercise and Sport Sciences Development and Research Group
Director, Exercise and Sport Sciences Program, Graduate School
Department of Physiology, Faculty of Medicine, Khon Kaen University
e-mail: naruemon.leelayuwat@gmail.com

**Abstract**

Up-to-date, there are only six studies demonstrating the substrate utilization in Thai population. The topics involved two areas of research including exercise and diet. Most studies are performed in healthy subjects, only one study in patients with diabetes mellitus type 2. Among these studies, only one study compared the effects of sex and intensity on substrate at rest and during sub-maximal exercise in untrained subjects. The results showed that in these subjects, gender did not affect fuel utilization during exercise. The higher utilization of carbohydrate than fat at rest and during exercise in Thai individuals than seen previously in other populations may be due to the Thai's habitual higher dietary carbohydrate intake. Another study compared lipid and carbohydrate use during and after a high-intensity endurance exercise bout between lean and obese subjects. They found that substrate use during and after high-intensity exercise between healthy lean and obese subjects was not significantly different. Both groups used carbohydrates and lipids as the main substrate sources during and after high-intensity exercise, respectively. The other exercise study by Panyaek and coworkers (2017) investigated exercise intensity in healthy sedentary women using life-build-line device and measure their substrate utilization. They reported that fat and especially CHO utilization were increased by the exercise.

The other group explored substrate utilization in response to diet. Sridonpai et al (2016) showed that isomaltulose based breakfast tends to provide less postprandial glucose and insulin levels than sucrose SUC based breakfast, thereby increasing postprandial fat oxidation in type 2 diabetes mellitus subjects. Prasertsri et al (2013), investigated the effect of cashew apple juice (CAJ) supplementation on substrate utilization during high-intensity exercise in healthy trained and untrained subjects. They found that CAJ supplementation enhanced fat oxidation during exercise and it may enhance endurance performance, but specific studies are needed to assess this possibility. The other study evaluated the short term effect of coffee drinking on energy utilization in sedentary men. The result reported that short consumption of caffeinated coffee (5 mg/kg of caffeine), improves energy utilization and relates to glucose derivation and lipid oxidation.

In summary, these literature reviews showed that both exercise and diet play role in substrate utilization in Thai subjects. However, there is lack of research exploring this information though it is very important for health promotion and sport performance. Therefore, a huge of research is still needed to explore this topic.

## Special Lectures Lecture I: Heart failure: understanding pathophysiology and therapeutic opportunities.

Professor Gary Sweeney
Department of Biology York University, Canada

**Abstract**

Cardiovascular disease, including heart failure, incidence is increased in individuals with metabolic syndrome. However, the mechanisms responsible for this association are multifaceted and remain to be fully characterized. In this lecture I will give an overview on current knowledge on the mechanisms responsible for heart failure in metabolic syndrome. In particular, there is currently great research and clinical interest in the endocrine effects of adipokines on the myocardium. As a specific example, this lecture will focus mainly on adiponectin which we and others have shown previously to confer numerous cardioprotective effects, such as beneficial metabolic effects, anti-apoptotic effects and anti-fibrotic effects. Our most recent work examined the regulation of cardiomyocyte autophagy by adiponectin and its functional significance in protecting against heart failure. Another change which is prevalent in patients with metabolic syndrome is iron overload. Interestingly, cardiomyopathy is a major cause of death in thalassemia patients. Recent data from our lab on direct effects of iron on cardiomyocytes will be summarized. Finally, the strong potential for the use of adipokines, such as adiponectin, as biomarkers and therapeutic targets in heart failure will be shown.

## Lecture II: How My Students Taught Me Physiology

Professor Cheng Hwee Ming
Department of Physiology,
Faculty of Medicine
University of Malaya, Malaysia
E-mail: chenghm@ummc.edu.my

**Abstract**

"..*you then who teach others, do you not teach yourself*?" *Epistle to the Romans*

I have enjoyed teaching Physiology for three decades to a diverse spectrum of students reading Medicine, Dentistry, Pharmacy, Biomedical and Nursing. Much has been said about 'student-centered curriculum and learning'. Rightly implemented, this approach should not imply less teaching and preparation time for lecturers. Experientially, proper mentoring would mean that the student-directed learning, to be useful and meaningful, needs guidance to help students surf, sift through and extract key Physiology information. Really, the effective pathway is a teacher-directed, student learning.

I have had the privilege to teach in medical schools in Shanghai, Kunming, China and also at the Prince of Songkla University. Their specific physiology syllabus is embedded in medical curriculum that might differ from those in Malaysia (intra-Malaysian variety also exist!). The Medical Faculty in Universiti Malaya (UM) has also moved with the trend from the classical discipline-based lectures to partially and more fully integrated medical curriculum. Having journeyed with UM, with my physiology books in hand, along these curricular fluctuations, I would like to share some thoughts on teaching and learning Physiology.

We mostly associate 'learning' with our students, recipients of our teaching (good or bad!). I would make two personal observations from the start. One, that irrespective of curriculum style, good dedicated teachers will still be effective, deliver and impact their students' understanding and learning. Two, my focus in this brief narrative, there is much to learn from our students that can fine tune and better our own discernment and insight into teaching well.

## Lecture III: Semen and Primate Society

Professor Takafumi Ishida
Department of Biological Sciences,
Graduate School of Science, University of Tokyo, Japan

**Abstract**

The order Primates comprising humans harbors more than two hundred species, which exhibit a variety of physical and non-physical characteristics. Among them, species specific mating system of primates has been implicated in terms of social evolution of humans. It is still unknown why a primate species recruits a given mating system, such as monogamy (pair bond), polygyny, polyandry, multi-male multi-female, and Noyau. At the beginning of the 21st century, there was a report implicating primate mating system by semen agglutination. This prompted us to shed molecular light on the primate social structure and semen. I here report, gene structures of the major seminal proteins, semenogelins, in primates especially apes and humans.

**Key words**: primates, mating system, sperm competition, semenogelin

## Lecture IV: Sexual Dimorphism in Fetal Programming of Cardiovascular Diseases. Are Females Really Protected?

Associate Professor Silvia Arribas
Department of Physiology, Faculty of Medicine,
Universidad Autónoma de Madrid, Madrid, Spain

**Abstract**

Low birth weight is increasing worldwide; linked to maternal undernutrition in poor societies and in high income countries mainly due to obstetric complications associated with the delay in first pregnancy. Despite these differences in the origin, the common consequence is fetal undernutrition and deficient growth. In addition to the higher risk of perinatal mortality and morbidity, low birth weight has long-term health consequences, increasing the risk of cardiometabolic disease development. This process is known as fetal programming and is not only induced by undernutrition, but also by other stress factors during intrauterine life, such as exposure to toxic substances or maternal psychological stress. Experimental studies have demonstrated a sexual dimorphism in the cardiovascular responses to a fetal stress factor, particularly in the development of hypertension. Thus, it has been demonstrated that females exposed to fetal adverse conditions do not develop hypertension or develop milder forms, compared to males. The mechanisms for this adaptation are not completely elucidated. On one hand it has been proposed a better adaptation of female placenta to adverse environment. A second possible mechanism is the effect of estrogens, due to their cardiovascular protective actions. Despite the evidence in experimental animals, the sexual dimorphism of fetal programming is not so clearly demonstrated in humans. A possible reason is the differences in age points studied. In this sense we have evidence from experimental animals that females are protected from hypertension development and associated cardiovascular damage until adult age, but in ageing they exhibit similar alterations to males. A second aspect to be taken into account is gender, since social or cultural inequities might counteract the better biological adaptation of females. Sex and gender are often difficult to separate and their relative influence in fetal programming is still far from being understood. In order to reduce the burden of cardiometabolic diseases in future generations, specific policies are needed to avoid the key determinants of fetal programming taking into account gender aspects.

**Financial Support:** Ministerio de Economía y Competitividad (FEM2015-63631-R).

## Lunch/Noon Symposium III: Two Hundred Seventy Minutes of Life

Assistant Professor Kannikar Kongbunkiat
Department of Internal Medicine,
Faculty of Medicine, Khon Kaen University

**Education:**

2004 MD, Faculty of Medicine, Khon Kaen University
2006 Certificate in Clinical Science, Faculty of Medicine, Khon Kaen University
2008 Diploma, Thai Board of Internal Medicine
2012 Diploma, Thai Board of Neurology
2012 Master Degree in Midical Science (MSc), Faculty of Medicine, Chulalongkorn University, Thailand
2015 Postgraduate Diploma in Clinical Neurology, University College London, United Kingdom
2016 Research Fellowship in Stroke Research Centre, UCL institute of Neurology, London, United Kingdom

**Memberships**

1. The Royal College of Physicians of Thailand
2. The Neurological Society of Thailand
3. The Northeastern Neuroscience Association

**Publications**

1. Cumming, K., Tiamkao, S., Kongbunkiat, K., Clark, A.B., Bettencourt-Silva, J.H., Sawanyawisuth, K., Kasemsap, N., Mamas, M.A., Seeley, J.A., Myint, P.K.. Impact of HIV on inpatient mortality and complications in stroke in Thailand: A National Database Study (2017) Epidemiology and Infection, 145 (6), pp. 1285-1291.
2. Kongbunkiat, K., Wilson, D., Kasemsap, N., Tiamkao, S., Jichi, F., Palumbo, V., Hill, M.D., Buchan, A.M., Jung, S., Mattle, H.P., Henninger, N., Werring, D.J. Leukoaraiosis, intracerebral hemorrhage, and functional outcome after acute stroke thrombolysis. (2017) Neurology, 88 (7), pp. 638-645.
3. Kongbunkiat, K., Kasemsap, N., Tiamkao, S., Chotmongkol, V., Sawanyawisuth, K., Mekawichi, P., Pavakul, K., Soison, P., Jattawanin, J., Kaitchanon, P., Yaowapruek, W., Arayawichanon, A., Thanwiset, T., Northeastern Stroke Network Group. Thrombolysis in ischaemic stroke in rural North East Thailand by neurologist and non-neurologists (2016) Neurology Asia, 21 (4), pp. 325-331.
4. Wood, A.D., Mannu, G.S., Clark, A.B., Tiamkao, S., Kongbunkiat, K., Bettencourt-Silva, J.H., Sawanyawisuth, K., Kasemsap, N., Barlas, R.S., Mamas, M., Myint, P.K.. Rheumatic mitral valve disease is associated with worse outcomes in stroke: A Thailand national database study.(2016) Stroke, 47 (11), pp. 2695-2701.

5. Kasemsap, N., Onsanit, S., Chiewthanakul, P., Kongbunkiat, K., Tanking, C., Vorasoot, N., Sawanyawisuth, K., Tiamkao, S. Efficacy and motor complications of original and generic levodopa in Parkinson's disease treatment. (2016) Neuropsychiatric Disease and Treatment, 12, pp. 1185-1189.
6. Roongpiboonsopit, D., Kongbunkiat, K., Phanthumchinda, K. Reversible cerebral vasoconstriction syndrome: A report on three cases. (2016) Journal of the Medical Association of Thailand, 99 (1), pp. 97-105.
7. Kongbunkiat, K., Kasemsap, N., Thepsuthammarat, K., Tiamkao, S., Sawanyawisuth, K.
8. National data on stroke outcomes in Thailand. (2015) Journal of Clinical Neuroscience, 22 (3), pp. 493-497.
9. Limpawattana, P., Kongbunkiat, K., Sawanyawisuth, K., Sribenjalux, W. Help-seeking behaviour for urinary incontinence: Experience from a university community. (2015) International Journal of Urological Nursing, 9 (3), pp. 143-148.
10. Kongbunkiat, K., Tiamkao, S., Chotmongkol, V., Chieawthanakul, P., Kitcharoen, S., Jitpimolmard, S., Sawanyawisuth, K. A real life clinical practice of neurologists in the ambulatory setting in Thailand: A pragmatic study. (2015) Neurology International, 7 (1), art. no. 5840, pp. 19-21.
11. Phuttharak, W., Sawanyawisuth, K., Sangpetngam, B., Tiamkao, S., Kongbunkiat, K., Chotmongkol, V., Limpawattana, P., Thongkrau, T., Keeratikasikorn, C. Risk factors for intracerebral hemorrhage after treatment with recombinant tissue-type plasminogen activator for acute ischemic stroke. (2015) Asian Biomedicine, 9 (3), pp. 397-400.
12. Kongbunkiat, K., Kasemsap, N., Travanichakul, S., Thepsuthammarat, K., Tiamkao, S., Sawanyawisuth, K. Hospital mortality from atrial fibrillation associated with ischemic stroke: A national data report. (2015) International Journal of Neuroscience, 125 (12), pp. 924-928.
13. Kongbunkiat, K., Deesomsak, M., Sawanyawisuth, K., Chotmongkol, V., Tiamkao, S.. Clinical factors predictive of functional outcomes in tuberculous meningitis. (2014) The Southeast Asian journal of tropical medicine and public health, 45 (5), pp. 1114-1118.
14. Limpawattana, P., Choonhakarn, C., Kongbunkiat, K. Clinical profiles of Stevens-Johnson syndrome among Thai patients. (2014) Journal of Dermatology, 41 (7), pp. 634-637.
15. Kongbunkiat, K., Kasemsap, N., Tiamkao, S., Sawanyawisuth, K. Clinical manifestations and outcomes of Guillain- Barré syndrome after diphtheria and tetanus vaccine (dT) during a diphtheria outbreak in Thailand: A Case series. (2014) Neurology Asia, 19 (2), pp. 149-155.
16. Tiamkao, S., Thanasatirakul, P., Kongbunkiat, K., Sawanyawisuth, K., Tiamkao, S. Patient adherence to generic gabapentin: A pragmatic study. (2014) Journal of Generic Medicines, 11 (1-2), pp. 52-55.
17. Chindaprasirt, J., Limpawattana, P., Pakkaratho, P., Wirasorn, K., Sookprasert, A., Kongbunkiat, K., Sawanyawisuth, K. Burdens among caregivers of older adults with advanced cancer and risk factors. (2014) Asian Pacific Journal of Cancer Prevention, 15 (4), pp. 1643-1648.
18. Kasemsap, N., Kongbunkiat, K., Apiwattanakul, M., Sawanyawisuth, K., Tiamkao, S. Isolated bulbar palsy with anti-gm3 and gt1b antibodies. (2013) Neurology Asia, 18 (3), pp. 319-321.

## Symposium V: Alternative Medicine in Epilepsy

Associate Professor Somsak Tiamkao
Department of Internal Medicine, Faculty of Medicine
Head, KKU Stroke Research Group
President, Northeastern Neuroscience Association

**Education:**
1990 MD, Faculty of Medicine, Khon Kaen University
1991 Certificate in clinical science, Faculty of Medicine, Khon Kaen University
1994 Diploma, Thai Board of Internal Medicine
1999 Diploma, Thai Board of Neurology

**Previous Appointments :**
1991-1994 Resident, Department of Medicine,
Faculty of Medicine, Khon Kaen University
1994-1995 Clinical fellow, Division of Neurology, Faculty of Medicine, Khon Kaen University
1999-2000 Research Fellow in Epilepsy, Professor Shorvon SD, Institute of Neurology, Queen Square, London, UK

**Present Appointments:**
Attending Physician and Associate Professor of Internal Medicine and Neurology,
Department of Medicine,
Faculty of Medicine, Khon Kaen University

**Memberships:**
1. The Royal College of Physicians of Thailand
2. The Neurological Society of Thailand
3. The Epilepsy Society of Thailand
4. Northeastern Neuroscience Association

**Publication**

1. Cumming, K., Tiamkao, S., Kongbunkiat, K., Clark, A.B., Bettencourt-Silva, J.H., Sawanyawisuth, K., Kasemsap, N., Mamas, M.A., Seeley, J.A., Myint, P.K.. Impact of HIV on inpatient mortality and complications in stroke in Thailand: A National Database Study (2017) Epidemiology and Infection, 145 (6), pp. 1285-1291.
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## Symposium V: Alternative Medicine in Epilepsy

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**Abstract**

Nowadays, complementary therapies for example acupuncture homeopathy, herbal remedies, massage, aromatherapy and training therapies may help to improve epilepsy and to promote wellbeing of the epilepsy patients. However some complementary therapies can increase the risk of seizures. Thus any complementary therapy that the patients interested to use should be under approving of their GP to avoid undesired side effects or drugs interaction. People respond to complementary therapy differently, and some therapies may help reduce seizures for some people, and not others. There are some of complementary therapy that might be benefit to epilepsy patients and fewer side effects such as relaxation therapies, massage and aromatherapy, neurofeedback, training and psychological therapy.

# O1: Alterations of Lung Development and Asporin Gene Expression in Newborn Mice after Recovery from Hyperoxia Exposure

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## Abstract

Expression of asporin, an extracellular matrix molecule, is temporally associated with mouse postnatal airspace development or alveolarization. Hyperoxia exposure in newborn mouse results in arrested alveolarization and alveolar enlargement, the major characteristic of bronchopulmonary dysplasia found in preterm newborn. This study aimed to determine lung asporin gene expression in newborn mice during recovery after hyperoxia exposure. C57BL/6 mice on postnatal day 3 of hyperoxia group (H) were exposed to $FIo_2 \geq 0.90$ for 4 days whereas mice of recovery group (R) were moved to room air after 4-day hyperoxia exposure and harvested 1 and 2 weeks later. Mean alveolar linear intercept (MLI) was measured to assess the airspace size of H and age-matched control (44.9 ± 1.9 vs 33.5 ± 1.45, mean ± SEM, n = 3-5; P-value = 0.004). No significant difference in MLI was observed between R group and age-matched control groups after 2-week recovery (26.2 ± 0.9 vs 20.9 ± 0.8, n = 5; *P*-value = 0.40). Bronchoalveolar lavage fluid was analyzed for cellular infiltration in lung with increased neutrophil counts of H group compared with control (34.61 ± 0.7 vs 4.52 ± 0.7 [$x10^4$], n=6-7; P = 0.006). Lung inflammation was not identified after recovery. Asporin gene expression by real-time PCR analysis was increased after 1-week recovery (R) compared with H group (72.9 ± 8.8 vs 41.0 ± 3.7 [$x10^{-3}$], n=6-9; P = 0.005) but was significantly decreased compared with age-matched control (72.9 ± 8.8 vs 154.36 ± 5.9 [$x10^{-3}$], n=6; P < 0.001) Hence, postnatal alveolarization resumed with decreased MLI, subsided inflammation and increased asporin gene expression after hyperoxia exposure in newborn mice.

**Keywords:** asporin, alveolarization, lung recovery after hyperoxia, bronchopulmonary dysplasia

# O2: Modulating Effects of Wan Chak Motluk on Adipose Tissue in Rats

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**Abstract**

The prevalence of overweight and obesity is commonly found in menopausal women in which the decline of circulating estrogen is suggested to be one of the major causes. Obesity is a disorder of energy imbalance caused by the energy intake exceeds the expenditure, resulting in excessive expansion and metabolic dysfunction of adipose tissues. Apart from being the energy storage site, adipose tissue also acts as an important endocrine organ that secretes a spectrum of bioactive molecules such as adipokines and inflammatory cytokines, which play a critical role in regulation of lipid metabolism and insulin sensitivity. The manipulation of lipid metabolism and function of adipose tissue may be one possible mechanism to prevent overweight and obesity-related metabolic diseases in menopausal women. In the present study, we investigated the anti-adiposity effects of Wan Chak motluk (*Curcuma comosa* Roxb., *C. comosa*), an indigenous medicinal plant in ovariectomized (OVX) rats. After ovariectomy for 3 months, animals became obese and showed dyslipidemia. Both *C. comosa* extract and its isolated phytoestrogen, DPHD prevented the gain of body weight and alleviated dyslipidemia in treated-animals compared to OVX controls. The extract and DPHD also decreased adipose tissue mass and adipocyte size by suppressing the expression of lipogenic genes and proteins in adipose tissues, but did not alter genes involved in adipocyte differentiation. These effects were similar to those of estrogen treatment. Both *C. comosa* and estrogen modulated the expression and secretion of adipokines which are associated with hyperlipidemia and insulin resistance in OVX rats. These findings suggest the potential of *C. comosa* and DPHD on preventing excessive visceral adipose tissue accumulation and attenuating the alteration of adipokines. This information also supports the use of this plant for health promotion in the menopausal women and may be for the prevention and treatment of metabolic disorders occurring in menopause.

**Key words**: anti-adiposity, Wan Chak Motluk, phytoestrogen, ovariectomy

**Acknowledgement:** This work is supported by Mahidol University and Science Achievement Scholarship of Thailand (SAST).

## O3: Genistein Alleviated Hepatic Lipid and Inflammation in High-fat High-fructose Diet-induced Non Alcoholic Steatohepatitis with Bilateral Ovariectomized Rats

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**Abstract**

NASH is chronic form of nonalcoholic fatty liver disease which worsen with estrogen deficiency. Objective of this study was to investigate the anti-lipidemic and anti-inflammatory effects of genistein on estrogen deficiency and diet-induced NASH rats. Sprague-Dawley rats, 4 weeks of age, were randomly allocated into 2 groups; ovariectomized (OVX) and non-ovariectomized (non-OVX) group, then, rats divided into 3 subgroups (n = 8, each); rats fed with standard diet, rats fed with high-fat high-fructose (HFHF) diet, and rats fed with HFHF diet plus daily 16 mg/kg genistein. Liver tissues were used for histology, hepatic FFA using colorimetry and NFkB expression by IHC. Serum TNF-α level was evaluated by ELISA. Histopathology demonstrated the most severe fat accumulation and inflammation in OVX rats fed HFHF diet group. Non-OVX with HFHF diet group significantly increased serum TNF-α (171.62 ± 22.34 vs 58.47 ± 14.83 pg/mL), %NFkB positive cells (53.94 ± 11.89 vs 13.73 ± 3.40), and hepatic FFA (9.07 ± 2.27 vs 3.62 ± 0.77 nmol/mg tissue) when compared with non-OVX alone ($p < 0.01$). Genistein in both non-OVX and OVX diet-induced NASH groups significantly decreased serum TNF-α compared with NASH groups (105.84 ± 29.77 vs 171.62 ± 22.34 pg/mL; 73.07 ± 19.31 vs 124.12 ± 16.04 pg/mL, respectively ($p < 0.01$). Genistein significantly reduced %NFkB positive cells in non-OVX NASH rats (31.84 ± 10.60 vs 53.94 ± 11.89) and decreased hepatic FFA levels in OVX NASH rats (6.50 ± 0.60 vs 13.11 ± 1.65 nmol/mg tissue) when compare with non-OVX and OVX NASH group, respectively ($p < 0.01$). This study revealed that estrogen deficiency is the one of contributing factors that worsens pathogenesis of NASH. Genistein can improve NASH by reduce hepatic fat accumulation and inflammation. Moreover, genistein demonstrated more effective in estrogen deficiency NASH than intact ovaries rats.

**Keywords:** bilateral ovariectomized, non-alcoholic steatohepatitis, genistein, high-fat high-fructose diet

# O4: *Glutathione S-transferase Theta-1* (*GSTT1*) Polymorphism and Cervical Cancer Susceptibility in Relation to Partners' Smoking

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**Abstract**

Genetic polymorphism in *glutathione S-transferases theta-1* (*GSTT1*) gene has been considered as potential modifiers of individual cancer susceptibility due to involved in detoxification of carcinogens derived from tobacco smoke. The present study was performed to investigate the role of *GSTT1* polymorphism independently or in combination with partners' smoking status on cervical cancer susceptibility. The *GSTT1* polymorphism was determined by multiplex PCR analysis in 204 SCCA patients compared with 204 age-matched healthy controls. No significant difference was observed in the distributions of *GSTT1* genotypes in both patients and controls. Among subjects who had partners of 40 years and over of smoking duration, a significant increase in cervical cancer risk was observed in women carrying heterozygous (+/-) genotype with adjusted OR of 9.54 (95%CI = 1.19-76.51, p = 0.034). Therefore, this result demonstrates the interaction effect between *GSTT1* polymorphism and timing of tobacco smoke exposure on cervical cancer susceptibility among Thai population.

**Keywords:** *glutathione S-transferase theta-1 (GSTT1)*, polymorphism, cervical cancer, susceptibility, partners' smoking

## O5: Effect of Testosterone on Ionic Currents in Human Coronary Artery Endothelial Cells

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**Abstract**

Acute testosterone (T) exposure has been shown to enhance coronary perfusion in humans. In other species, it was found that T could induce endothelium-dependent coronary vasodilation, with some reports suggesting involvement of endothelial ion channels. This study aimed to investigate the effect of T on ion channels of human coronary artery endothelial cells (HCAECs) and its cellular mechanism using the whole-cell patch clamp technique. Results: 30-3,000 nM T induced a rapid (2-5 minutes), dose-dependent increase in total currents, with an $EC_{50}$ and maximum increase of 71.96±1.66 nM and 59.13±8.37% (mean±SEM). T at 1 μM significantly increased HCAEC $K^+$ currents, enhancing large- and small-conductance $Ca^{2+}$-activated $K^+$ currents, ($BK_{Ca}$ and $SK_{Ca}$) by 24.68±5.61 and 27.00±6.92% (n=11 and 8, respectively; p=0.0013 and p=0.0059). In addition, current-clamp experiments demonstrated that within minutes T could hyperpolarize HCAECs by -15.70±3.44 mV (n=9, p=0.0018); this effect was prevented by $SK_{Ca}$ and $BK_{Ca}$ current inhibitors apamin and iberiotoxin. Similar to T's effect, the non-permeant T-BSA (T conjugated with bovine serum albumin, 1 μM), significantly increased HCAEC currents (93.1±10.2%; n=17, p<0.05). Pretreatment with an androgen receptor antagonist flutamide prevented both T and T-BSA effects, while pretreatment with estrogen receptor antagonist fulvestrant did not. Dihydrotestosterone (DHT), a non-aromatizable androgen, stimulated HCAEC currents even more potently, an effect also prevented by flutamide pretreatment. Finally, incubating HCAECs with a $G_{i/o}$ inhibitor pertussis toxin (PTX) and a PKA inhibitor H-89 abolished the T-induced HCAEC currents, whereas pre-incubation with a PLC inhibitor U-73122, prostacyclin inhibitor indomethacin, nitric oxide synthase inhibitor L-NAME or cytochrome P450 inhibitor MS-PPOH did not significantly prevent the T effect. These data suggested that T non-genomicly enhanced HCAEC $BK_{Ca}$ and $SK_{Ca}$ currents via surface androgen receptors. This effect is mediated by $G_o$-protein and stimulation of PKA, but not PLC.

**Keywords:** androgen receptor, potassium channel, testosterone, endothelial cell, hyperpolarization

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## O6: Antihypertensive Effects of Sung Yod Rice Bran Hydrolysates in L-NAME-induced Hypertensive Rats

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### Abstract

Hypertension is one of the major risk factors for cardiovascular disease (CVD). Consumption of dietary antioxidants appears to reduce blood pressure and may help lower risk for CVD. Sung Yod rice is red-violet pigmented rice and grown mainly in southern part of Thailand. Rice bran hydrolysates contain highly nutritional proteins and antioxidant compounds which show benefits against hypertension. However, the antihypertensive effect of rice bran hydrolysates extracted from Sung Yod rice bran has not been investigated. Nitric oxide (NO) is a widespread biological mediator involved in many physiological and pathological processes, Inhibition of NO synthase by N$^{\omega}$-nitro-L-arginine methyl ester (L-NAME) results in the development of hypertension accompanied with increased oxidative stress. The present study aimed to evaluate the anti-hypertensive effect of Sung Yod rice bran hydrolysates in a rat model of hypertension. Hypertension was induced in male Sprague-Dawley rats by administration of L-NAME (50 mg/kg/day) in their drinking water for 3 weeks. Sung Yod rice bran hydrolysates (SY) were orally administered daily at doses of 250 and 500 mg/kg. Rats received tap water as drinking water and orally administered with deionized water were served as normotensive controls. Results showed that L-NAME-treated rats exhibited an increase in blood pressure and peripheral vascular resistance compared with control rats, and SY treatment significantly restored these parameters ($P$<0.05). Increased markers of oxidative stress (superoxide anion, MDA, protein carbonyl) and decreased NO metabolites level were found in L-NAME hypertensive rats, and SY significantly mitigated these deleterious effects ($P$<0.05). The present study reported for the first time that Sung Yod rice bran hydrolysates may be useful for prevention and treatment of hypertension. Its antihypertensive effect might be due to the ability to increase the production of NO and antioxidant properties.

**Keywords:** hypertension, Sung Yod rice bran hydrolysates, antioxidant, L-NAME

## O7: An Andrographolide Analogue Suppresses the Proliferation and Wnt/β-catenin Signaling Pathway in Colorectal Cancer Cells

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**Abstract**

Hyperactivation of the canonical Wnt/β-catenin pathway plays the pivotal role in the initiation and progression of human colorectal cancer (CRC). RS-PP-050, a semi-synthetic andrographolide analogue, has previously been reported to exhibit potent cytotoxic activity to a panel of cancer cell lines with unknown mechanism. In the current study, we reveal anticancer effects and mechanism of RS-PP-050 in a CRC cell line, HT-29. The compound effectively suppressed HT-29 cell viability and proliferation in dose- and time-related manners. It induced cell cycle arrest and promoted apoptotic cell death. RS-PP-050 inhibited Wnt/β-catenin signaling by causing a decrease in the luciferase activity in TCF/LEF luciferase reporter (TOPflash) HEK293T cells, which, in turn, down-regulated the expression of Wnt downstream target genes. The protein level of active β-catenin was also found to be reduced, but not the level of total β-catenin protein. RS-PP-050 did not affect the activity of GSK-3β, a Wnt negative regulator. Interestingly, RS-PP-050 exerted the activity on Wnt downstream by blocking the expression and nuclear localization of β-catenin with a phosphorylation at Serine675 which is essential for activating Wnt signaling in nucleus. Collectively, the underlying anticancer mechanism of RS-PP-050 is by inhibition of Wnt/β-catenin signaling which are related to the reduction of β-catenin/TCF-mediated transcriptional activity as well as suppression on β-catenin nuclear translocation. The results suggest that RS-PP-050 may be a promising chemotherapeutic agent for targeting CRC cells with aberrant activation of Wnt/β-catenin signaling.

**Keywords:** andrographolide analogue, anticancer, colorectal cancer, Wnt/β-catenin signalling

# O8: The Effect of Exercise Training on Cardiac Function and Mast Cell Activation in Ovariectomized Rats with Angiotensin II Infusion

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**Abstract**

Regular exercise has been recommended to prevent many diseases especially heart disease; however, the mechanism underlying cardioprotection of regular exercise is still unclear. Previously, we demonstrated that aerobic exercise training could prevent cardiac contractile function in ovariectomized rats by partly attenuating cardiac mast cell activation. Since mast cells play a major role in controlling local angiotensin II production, angiotensin II regulation might be a part of cardioprotective mechanism of exercise training. To test whether cardioprotective mechanism of exercise training is associated with angiotensin II, effect of exercise training was challenged by exaggerating the activation of angiotensin II during exercise program. The experiment was additionally performed in both sham-operated and ovariectomized rats. Echocardiography demonstrated that four-week angiotensin II infusion induced cardiac hypertrophy toward concentric hypertrophy with increased cardiac contractility in both sham and ovariectomized rats. Unfortunately exercise training had no additional effect of contractility but further increased concentric hypertrophy in both angiotensin II-infused sham and ovariectomized groups. To find the possible mechanism, cardiac mast cell activation was also evaluated. Ovariectomized rat heart had a lower cardiac mast cell density than that in sham control, in which exercise training could partially attenuate the difference. Chronic angiotensin II infusion decreased mast cell density in ovariectomized rat heart but not in sham-operated group. Exercise training had no effect on mast cell density in angiotensin II infused rats. On the other hand, an increase in % mast cell degranulation in ovariectomized rat heart was further enhanced by chronic angiotensin II infusion, without any effect on sham-operated rats. Luckily, exercise training could suppress the upregulation of mast cell degranulation in both non-infused and angiotensin II-infused ovariectomized rats. Results suggest that exercise training loss some protective function on cardiac hypertrophy under angiotensin II over stimulation, but it can still attenuate mast cell overreaction.

**Keywords:** angiotensin II, exercise training, female sex hormones deprivation, mast cells, cardiac

# O9: Effect of Exercise Training on Age-induced Cerebral Endothelial Dysfunction and Oxidative Stress in Aging Rat Association with Nrf2

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**Abstract**

Introduction The number of elderly progressively rises comparing to the past. Several evidences shown that aging induced oxidative stress in the vascular system. Nrf2, a redoxsensitive transcription factor nuclear factor-E2-related factor 2, is a key role to maintain a healthy blood vessel by regulating transcription of antioxidant enzyme genes. Importantly, several studies demonstrated that aging could dysregulate Nrf2 by downregulating protein and mRNA expression of Nrf2. However, it has been reported that exercise training could improve Nrf2 nuclear levels along with its target antioxidants in the aging heart to protect against age associated oxidative stress. The role of exercise training in the regulation of Nrf2 has not been investigated in the aging brain. The goal of this study is to investigate whether exercise training can prevent age-induced cerebral endothelial dysfunction in aging rat via activate Nrf2 and the regulation of VEGF. Methods Male Wistar rats were divided into 3 groups: Sedentary-young (SE-young, 4 months), sedentary-aged (SE-aged, 22-24 months), and exercise trained-aged (ET-aged, 22-24 months). The ET-aged warm 1 hour/day, 5 days/week for 8 weeks. Brains were used for determining of Nrf2 by immunohistochemistry. Vascular growth factor (VEGF) and malondialdehyde (MDA) levels in the brain tissue were measured by immunoassay. Results The study suggested that when compared to the young group, aged rats' physiological characteristics, including resting mean arterial blood pressure, tended to increase. However, ETaged rats showed significant improvement in cerebral vasculature and reduced resting mean arterial blood pressure. This study also showed that exercise could upregulate VEGF level in ET-aged. Furthermore, tissue MDA in ET-aged rats was reduced, which indicated the decrease in oxidative damage. It can be implied that exercise training could protect age-induced cerebral endothelial dysfunction. Nrf2 in ET-aged rats is expected to be increased. These findings suggested that exercise training could improve cerebral degeneration associated to oxidative stress in aging rat.

**Key words:** oxidative stress, aging, cerebral endothelial dysfunction, exercise training, Nrf2

## O10: Correlation between *CYP1A1* Gene Polymorphism and The Risk for Cervical Cancer in Thai women

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**Abstract**

Cervical cancer remains health problem in Thai women. *CYP1A1* gene encoding CYP1A1 enzyme plays an important role in carcinogen detoxification especially, polycyclic aromatic hydrocarbon from tobacco smoke as well as hormonal contraceptives. Polymorphism of *CYP1A1* may be associated with the risk for cancer. The present study aimed to investigate the association between *CYP1A1* (2455A>G) polymorphism and cervical cancer risk and association between *CYP1A1* (2455A>G) polymorphism and cervical cancer risk among passive smokers, contraceptive users, and HPV carriers. A case-control study, subjects were divided into cervical cancer patients (n=204) and controls (n=204). DNA was extracted from buffy coat then *CYP1A1* (2455A>G) genotype was detected by using real-time PCR method. The associations between *CYP1A1* (2455A>G) polymorphism and cervical cancer risk were analyzed by uni-multi variate logistic regression. Association between *CYP1A1* (2455A>G) polymorphism and the risk for cervical cancer was not observed ($p>0.05$). Among partner' smoking, women carrying GG genotype of *CYP1A1* (2455A>G) were increased risk for cervical cancer with adjusted OR= 4.26 (95%CI= 1.05-17.28, $p<0.05$). Association between *CYP1A1* (2455A>G) polymorphism and cervical cancer risk among contraceptive users and HPV carriers had no evidence of association ($p>0.05$). This study indicates that *CYP1A1* (2455A>G) polymorphism may affect CYP1A1 enzyme activity result in cervical cancer susceptibility among passive smokers. *CYP1A1* (2455A>G) polymorphism is associated with an increased risk for cervical cancer among partner's smoking women. Therefore, investigation of genetic risk factor may be a useful method for screening at risk of cervical cancer.

**Keywords:** *CYP1A1* (2455A>G), cervical cancer, risk

## O11: Genistein Attenuated Severity of Acute Pancreatitis Induced by L-arginine in Mice

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**Abstract**

The roles of genistein on acute pancreatitis are not yet clear. This study was conducted to determine the effects of genistein on anti-inflammatory and improved histopathology of acute pancreatitis in mice. ICR mice were divided into 3 groups (n=6, each). Control group (Con): mice were received intraperitoneal (i.p.) injection of dimethyl sulfoxide (DMSO) once daily for 4 days. Acute pancreatitis group (AP): mice were received two i.p. injection of 350 mg/100 g body weight of L-arg dissolved in normal saline, at an interval of 1 h. Genistein group (Gen): mice were received 100 mg/kg genistein in 2% DMSO by i.p. injection 2 hours before induced with L- arg and once daily for 3 days. Mice were sacrificed 72 hrs after L-arg induced acute pancreatitis. Δ Body weight loss, serum amylase, serum IL-6, serum CRP and histopathology score were collected. Levels of Δ body weight loss, serum amylase, serum IL-6, and serum CRP in AP group were significantly higher than control group (AP:-1.46±0.37g vs. Con: 1.75±0.19g, AP: 13,860.00±5,918.26 U/L vs. Con: 5,714.00±201.11 U/L, AP: 124.68±106.27 pg/ml vs. Con: 18.59±18.90 pg/ml, and AP: 11,687.07±3691.95 ng/ml vs. Con: 8,068.63±3,065.24 ng/ml, respectively; $p<0.05$). Genistein resulted in significantly decreased Δ body weight loss, serum amylase, serum IL-6, and serum CRP compared with AP group (Gen: 0.41±0.54g vs. AP: -1.46±0.37g, Gen: 8,728.33±3,213.61 U/L vs. AP: 13,860.00±5,918.26 U/L, Gen: 52.58±42.70 pg/ml vs. AP: 124.68±106.27 pg/ml, and Gen: 7,607.77±2757.94 ng/ml vs. AP: 11,687.07±3691.95 ng/ml, respectively; $p<0.05$). Moreover, genistein group had improved inflammation and histopathology score. Genistein can attenuate severity of acute pancreatitis via the mechanism of reduced inflammatory cytokine (IL-6, CRP) and improved histopathology.

**Keywords:** acute pancreatitis, genistein, oxidative stress, inflammation

# O12: Estrogen Deprivation Aggravates Cardiometabolic Dysfunction in Obese-Insulin Resistant Rats

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**Abstract**

Incidence of cardiovascular disease in obese subjects is increased after the onset of menopause, suggesting the vital role of estrogen. Cardiac mitochondria plays an important role for left ventricular (LV) contractile function. Although either estrogen deprivation or obesity has been shown to strongly affect metabolic status and LV function, the combined effects of estrogen deprivation and obese-insulin resistance on cardiometabolic status and cardiac mitochondrial function has never been investigated. We hypothesized that estrogen deprivation aggravates LV dysfunction through the increased impairment of cardiac mitochondrial function in obese-insulin resistant rats. Female rats were fed with either high fat (HFD) or normal (ND) diet for 13 weeks. Then, rats were divided to sham (HFS and NDS) operated or ovariectomized (HFO and NDO) groups. Six weeks after surgery, metabolic status, %LV fractional shortening (%LVFS) and cardiac mitochondrial function were determined. NDO, HFS and HFO rats had obese-insulin resistance. Although both NDO and HFS had markedly reduced %LVFS and impaired mitochondrial function, HFO had the most severe impairments, indicating that estrogen deprivation had aggravated the impairment of LV function through mitochondrial function. In obese-insulin resistant rats, estrogen deprivation severely aggravates LV dysfunction via increasing an impairment of cardiac mitochondrial function.

**Keywords:** estrogen, metabolic parameters, mitochondrial function, cardiac function

## O13: The Effects of Estrogen Deprivation on Hippocampal Synaptic Plasticity and Cognitive Function in Obese-Insulin Resistant Female Rats

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**Abstract**

Our previous study demonstrated that obesity aggravated peripheral insulin resistance and brain dysfunction in ovariectomized condition. However, the effect of estrogen deprivation following obese condition on brain ROS production, synaptic function, cognitive function, particularly hippocampal-dependent and hippocampal-independent memory, has not been investigated. We hypothesized that estrogen deprivation aggravated metabolic impairment, brain ROS production, synaptic dysfunction and cognitive impairment in obese rats. Twenty-four female rats were divided into two groups. Rats in each group were fed with either normal diet (ND) or high-fat diet (HFD) for 13 weeks. Then, rats in each group were subdivided into sham and ovariectomized subgroups (n=6/subgroup). At week 20, all rats were tested for hippocampal-dependent and hippocampal-independent memory by using MWM test and NOR test, respectively. Then, blood and brain were collected for metabolic and brain analysis. We found that obese-insulin resistant condition occurred in sham-HFD-fed rats (HFS), ovariectomized-ND-fed rats (NDO) and ovariectomized-HFD-fed rats (HFO). Increased hippocampal ROS production, hippocampal synaptic dysfunction and impaired hippocampal-dependent memory were observed in NDO, HFS and HFO rats. However, the hippocampal-independent memory and cortical ROS production did not alter in those rats. These findings suggested that either estrogen deprivation or obesity impaired only hippocampal-dependent memory, possibly via increased hippocampal ROS production and impaired hippocampal synaptic function. However, estrogen deprivation did not aggravate these deleterious effects under an obese condition.

**Keywords:** estrogen deprivation; obesity; hippocampal dependent memory; hippocampal synaptic function; hippocampal ROS production

## O14: Estrogen Deprivation on Skeletal Muscle Function in Obese-Insulin Resistant Rats

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**Abstract**

Several studies have shown that obese-insulin resistance damages several tissues, particularly skeletal muscles by decreasing performance of muscle contraction. In addition to obesity, estrogen plays the important roles in the normal function of skeletal muscles via regulating the cellular metabolisms. Then, loss of estrogen through either menopause or ovariectomy (OVX) affects the biochemical processes and function in the skeletal muscles. However, the effects of estrogen deprivation on skeletal muscle function and biochemical process following obese-insulin resistant condition have not yet been determined. We hypothesized that 1) estrogen deprivation alone caused metabolic impairment, skeletal muscle dysfunction as well as impaired the biochemical processes in skeletal muscle and 2) the estrogen deprivation aggravated these impairments in obese-insulin resistant rats. In the present study, twenty-four female rats were divided into two groups and were fed with either normal diet (ND) or high-fat diet (HFD) for consecutive 13 weeks. After that, all rats in each group were subdivided into either sham or ovariectomized subgroups (n=6/subgroup). At the end of experiment, the contraction of gastrocnemius muscles was tested. Then, all rats were sacrificed and vastus lateralis muscle was collected for determining mitochondrial function and oxidative stress. Moreover, blood was collected for metabolic analysis. We found that obese-insulin resistant condition was observed in sham-HFD-fed rats (HFS), ovariectomized-rats fed with either ND (NDO) or HFD (HFO). Skeletal muscle contractile dysfunction, skeletal muscle mitochondrial dysfunction and oxidative stress, were found in NDO, HFS and HFO rats. However, the combined estrogen deprivation with obese-insulin resistance did not increase the severity of these impairments. These findings suggested that either estrogen deprivation alone or obesity alone impaired skeletal muscle function and induced biochemical alterations in skeletal muscles. However, estrogen deprivation did not aggravate these effects in an obese-insulin resistance condition.

**Keywords:** estrogen deprivation, obesity, muscle contraction, mitochondrial function, oxidative stress

# P1: The Effects of Hesperidin on Blood Pressure, Renin-angiotensin System, Sympathoexcitation and Oxidative Stress in Renovascular Hypertensive Rats

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**Abstract**

Hesperidin, a flavonoid derived from citrus fruits, has been reported to show the potential effect in anti-inflammatory and antioxidant activity. The aim of this study was to investigate the effect of hesperidin on blood pressure, renin-angiotensin system (RAS), sympathetic nerve activity and oxidative stress in two-kidney, one-clip (2K-1C) hypertensive rats. Hypertension were induced by clipping a left renal artery. Hypertensive rats were treated with hesperidin (20 or 40 mg/kg/day) or losartan (10 mg/kg/day) for four weeks while sham-operated control group and 2K-1C untreated group received vehicle. Systolic blood pressure (SP) was measured once a week using tail cuff method. Contractile responses to electrical field stimulation (5-40 Hz, 1ms for 30s at 5-min intervals) and NE (0.15 nmol-15 nmol) were tested in mesenteric vascular beds. Relaxing responses to ACh were tested in aorta. In addition, plasma NE, angiotensin II, ACE activity, and oxidative stress markers were measured. After clipping the left renal artery for three weeks, the 2K-1C rats had higher SP than the value in the sham rats ($p<0.05$). Hesperidin and losartan significantly decreased blood pressure comparing to 2K-1C rats ($p<0.05$). The augmentation of contractile response to nerve stimulation was found in 2K-1C hypertensive rats ($p<0.05$), while the contractile response to NE did not differ among groups, indicating the enhancement of pre-synaptic sites. This was consistent with the elevation of plasma NE ($p<0.05$). In addition, increases in plasma angiotensin II, ACE activity, oxidative stress and decrease in relaxing responses to ACh were found in hypertensive rats ($p<0.05$). These alterations were alleviated with hesperidin or losartan treatment ($p<0.05$). These data suggested that hesperidin has an antihypertensive effect. This effect is likely to be mediated by reducing RAS activity, sympathoexcitation, and oxidative stress in 2K-1C hypertensive rats.

**Keywords:** hesperidin, sympathoexcitation, 2K-1C.

## P2: Protective Effect of Genistein Against Dexamethasone-induced Pancreatic β-cell Apoptosis

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**Abstract**

Dexamethasone (Dex) is a synthetic glucocorticoid drug using for treatment autoimmune diseases. Long term dexamethasone usage ensure to diabetes development which is known as steroid induced diabetes. Dex has been shown to induce pancreatic β-cell apoptosis. Genistein is a phytoestrogen, which has been shown to protect against nutrient and cytokine-induced pancreatic β-cell apoptosis. Whether genistein protects pancreatic β-cell apoptosis from Dex has not been studied. Thus, this study aims to examine the cytoprotective effect of genistein on Dex-induced pancreatic β-cell apoptosis. INS-1cell line was treated with Dex with or without genistein. After treatment, apoptotic cells were examined by annexin V/PI staining, cleaved-caspase 3 and 8 activities. To determine whether genistein exerts to protect cell apoptosis through its estrogenic effect, estrogen receptor inhibitors were co-cultured in experimental conditions to evaluate cell apoptosis. To compare tyrosine kinase inhibitory effect of genistein, INS-1 cell was cultured with genistein or tyrosine kinase inhibitor drug, imatinib with or without Dex, then apoptotic assays were performed. To examine antioxidant effect of genistein, NBT assay was perfumed to determine intracellular superoxide production. We found that Dex significantly increased the percentage of INS-1 apoptosis, superoxide level as well as cleaved-caspase 3 and 8 activities when compared to control. Genistein co-cultured with Dex significantly restored cell apoptosis, superoxide level and cleaved-caspase 3 and 8 activities to similar levels to control. The protective effect of genistein against Dex-induced cell apoptosis was abolished by estrogen receptor inhibitors. The reduction of cleaved-caspase 3 activity in INS-1-cultured with genistein or imatinib in the presence of Dex was comparable. Our results suggested that genistein protected pancreatic β-cell apoptosis from Dex via estrogenic, anti-oxidant and tyrosine kinase inhibitory effects.

**Keyword(s):** dexamethasone, genistein, apoptosis, pancreatic β-cell.

# P3: The Memory Enhancing Effect of a Standardized Extract of *Centella asiatica* ECa 233 in the Normal Rat Study

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**Abstract**

ECa 233 is the standardized extract of Centella asiatica (CA) that already proposed the neuroprotective effect and anxiolytic effect in in *vivo* model. However, the memory enhancing effect of ECa 233 in a physiological condition has not been elucidated yet. The objective of this study was to investigate the potential memory enhancing effect of ECa 233 on the learning and memory performance and on the cellular levels (long-term potentiation; a long-lasting increase of synapses strengthening) in the normal rats. The objective of this study was to investigate the potential memory enhancing effect of ECa 233 on the learning and memory performance and on the cellular levels (long-term potentiation; a long-lasting increase of synapses strengthening) in the normal rats. Fifty-six male Wistar rats (8 weeks old) were divided into 4 groups as a dose response study (0, 10, 30 and 100 mg/kg groups) and received reagent twice a day via intragastric gavage for 4 weeks. All rats were performed the Morris water maze task for behavioral study and collected the hippocampus for electrophysiology study. The result showed that all rats had ability to learn the information about a position of the platform by using visual cues and they had ability to acquire a direct path to the targeted quadrant. However, the rat were received only ECa 233 in dose 30 mg/kg increased the time spend in the target quadrant when compared with the sham group. Moreover, they showed the robust long-term potentiation significantly throughout 3 hours when compared with the sham, 10 and 100 mg/kg group. The present study suggested that the ECa 233 in dose 30 mg/kg can enhance learning and memory performance which accompanied with the increase of synaptic plasticity in the hippocampus; a core brain region for memory formation. Therefore, ECa 233 might be a potential candidate for therapeutic agents in neurodegenerative disorders.

**Keywords:** ECa 233, long-term potentiation, hippocampus, learning, memory

## P4: *Moringa oleifera* Leaf Extract Causes Endothelium-dependent Vasodilatation Through NO-sGC and $H_2S$-$K_{ATP}$ Pathways

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**Abstract**

Hypotensive effect of aqueous extract of *Moringa oleifera* leaf extract (MOE) has been reported, although little is known regarding its effect on resistance arterioles. The objectives of this study was to investigate the vasorelaxant activity of MOE on resistance arteries isolated from male Wistar rats, and to gain insight into its mechanism(s) focusing on endothelium-dependent vasodilatory action. *In vitro* experiments on perfused mesenteric arterial beds precontracted by methoxamine revealed that injection of MOE (0.001-0.3 mg) into the perfusate caused a concentration-dependent vasorelaxation which was abolished by endothelium denudation. The endothelium-dependent vasorelaxation of MOE was partially, but significantly inhibited by non-selective nitric oxide (NO) synthase inhibitor $N^{\omega}$-Nitro-L-arginine methyl ester hydrochloride (L-NAME), as well as the soluble guanylate cyclase (sGC) inhibitor 1*H*-[1,2,3]oxadiazolo[4,4-a] quinoxalin-1-one (ODQ). Moreover, inhibition of the hydrogen sulfide ($H_2S$) producing enzyme cystathionine-gamma-lyase (CSE) by DL-propargylglycine (PAG) significantly abolished MOE endothelium-dependent response. On the other hand, vasodilatory effect was not significantly affected by the cyclooxygenase (COX) inhibitor indomethacin (INDO). In presence of co-application of L-NAME and INDO, the persisting MOE endothelium-dependent relaxation was completely inhibited by the ATP-dependent potassium channel ($K_{ATP}$) blocker glibenclamide comparable to MOE response in denuded preparations. This study provided the first evidence of *in vitro* vasorelaxant action of MOE indicating that the relaxant activity of MOE on rat mesenteric artery predominantly relies on endothelium-dependent signaling likely through NO-sGC and $H_2S$-$K_{ATP}$ pathways. Additional mechanisms underlying endothelium-independent vasorelaxation of MOE await further investigations. MOE has the potential for developing as a medicinal natural substance in the treatment of cardiovascular diseases through its vasodilatory and antihypertensive action.

**Keywords:** hydrogen sulfide, Moringa oleifera, nitric oxide, vasorelaxation

# P5: Female Sex Hormones Attenuated CCCP-Induced Mitochondrial Damage in the Rat Heart

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**Abstract**

High incidence of heart disease in postmenopausal women manifests the beneficial effect of female sex hormones on cardiac function. We previously demonstrated that lack of female sex hormones caused deterioration of cardiac mitochondria. To understand the protective role of female sex hormones in controlling mitochondrial quality, we hypothesized that deprivation of female sex hormones might decrease mitochondrial autophagy (mitophagy) in the heart leading to high accumulation of damaged mitochondria. Cardiac autophagy and mitophagy were then examined in the heart of 10-week ovariectomized rats. Result demonstrated that expression of LC3-II in the whole heart preparation which indicates the amount of autophagy was not significantly different between sham-operated and ovariectomized rats. However, by challenging the heart with mitochondrial uncoupling agent (CCCP), LC3-II expression significantly decreased in ovariectomized rat but not in sham-operated control. By using isolated mitochondria, LC3-II expression was also significantly decreased in ovariectomized rat with CCCP stress. This result suggests that lack of female sex hormones causes a reduction of mitophagic activity. Additionally we observed the expression of Parkin which is mitophagy-mediated protein in the heart of ovariectomized rat. Interestingly, result showed trend to increase in the expression of Parkin in the whole heart preparation after CCCP-injection of sham controls, but not in ovariectomized rat heart. The finding supports the ability of female sex hormones in sustaining cardiac mitochondrial homeostasis. Taken together, results indicate that female sex hormones play role in modulating cardiac mitopahgy which then mediate mitochondria quality and consequently cardiac performance.

**Keywords**: female sex hormones, cardiac mitophagy, cardiac autophagy

## P6: Ameliorative Effect of Curcumin on Lead-induced Hypertension, Arterial Stiffness and Oxidative Stress in Rats

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### Abstract

Lead (Pb) is a common environmental contaminant that affects all the organs and systems of the body and causes numerous acute and chronic illnesses. Pb is considered as an environmental risk factor for cardiovascular disease (CVD). Exposure to Pb might contribute to the onset or aggravation of CVD. Curcumin (CUR), a strong antioxidant and metal chelator, is a well-known herb for its therapeutic uses and having wide spectrum of its beneficial properties against several adverse effects. Therefore, the present study was aimed to evaluate whether CUR could protect against hypertension, arterial stiffness and oxidative stress in rats with chronic Pb exposure. Young male Sprague-Dawley rats were divided into control and Pb exposure groups. Exposure was performed via the drinking water: the control group was given deionized water (DI), while the Pb-treated group was given DI with lead acetate (100 mg/L) for 16 weeks. CUR (50 or 100 mg/kg) was intragastrically administered once daily for the last 4 weeks of Pb exposure. Blood pressure was monitored every 2 weeks throughout the experiments. Hemodynamic, pulse wave velocity (PWV), oxidative stress markers and eNOS expression were measured at the end of experiments. Results revealed that Pb induced hypertension by increasing arterial blood pressure, peripheral vascular resistance and PWV. CUR in a dose-dependent manner reduced hypertension by improving hemodynamic, reducing arterial stiffening and increasing nitric oxide bioavailability. CUR significantly alleviated oxidative stress by decreasing vascular superoxide production and reducing plasma molonaldehyde of Pb exposed rats compared to controls ($P$<0.05). Moreover, CUR also reduced the blood Pb levels in Pb exposure rats. Overall results suggest the beneficial effects of CUR as a potent antioxidant and chelating agent against Pb-intoxication.

**Keywords:** arterial stiffness, curcumin, hypertension, lead, oxidative stress

# P7: Effects of *Kaempferia parviflora* Extract on Glucose Transporters in Human Renal Proximal Tubular Cells

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**Abstract**

*Kaempferia parviflora* Wall. Ex. Baker is the one herb widely used as food supplements and therapeutic purposes; including antioxidant, anti-inflammation, and anti-obesity. Recently, the ethanol extract of *K. parviflora* has been shown to have an anti-diabetic effect. Kidney plays a crucial role in glucose reabsorption which is mediated by function of glucose transporters named sodium glucose co-transporters (SGLTs). Since, ninety percentages of filtered glucose is reabsorbed by SGLT2, therefore, blocking of SGLT2 is shown to be a target for treatment of diabetes. This study was performed to determine whether *K. parviflora* extract (KPE) and its active compound (5, 7-dimethoxyflavone; DMF) inhibited SGLT2 in human renal proximal tubular cells (HK-2 cells). In addition, effect of KPE and DMF on glucose transporter (GLUT) was also determined. Effects of KPE and DMF on SGLT2- and GLUT-mediated [$^3$H]-2-deoxyglucose (2DG) uptake were measured. The results showed that KPE inhibited SGLT2- and GLUT-mediated [$^3$H]-2-DG uptake with half maximal inhibition concentrations ($IC_{50}$) of 124 µg/ml and 62 µg/ml, respectively. In addition, DMF 50 µM significantly inhibited SGLT2 and GLUT transport functions. Treatment the cells with KPE for 24 hours inhibited of SGLT2 and GLUT activity. The inhibitory effects of KPE and DMF were not the results from cytotoxicity as the evident showed that KPE and DMF did not reduce cell viability. In conclusion, SGLT2 inhibition could be underlying mechanism of KPE reducing plasma glucose. DMF might be the candidate agent to be developed as anti-diabetic agent.

**Keywords:** anti-diabetes, *Kaempferia parviflora* extract, sodium glucose co-transporter 2, 5,7 dimethoxy flavone, glucose transporter.

# P8: Whole Body Vibration Training Reduces Body Weight and Blood Pressure in Obese Females

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**Abstract**

Obesity-associated with many chronic conditions. Exercise is used in term of control body weight which aims to prevent diseases. Generally, obese may not exercise to the target heart rate which aims to decrease weight. Whole body vibration is a new exercises modality that has an effect on decrease blood pressure, improve arterial properties and elasticity. This study investigated the effect of whole body vibration (WBV) training on body weight and blood pressure in obese females. Ten obese females (age average = 24.6- 25.6 years, BMI > 30 kg/ $m^2$) were assigned into 2 groups: control (CT, n=5) and whole body vibration (WBV, n=5). The participants in the WBV group were performed 5 exercise postures with frequency 40 Hz and low amplitude during vibration, 3 days a week for 8 weeks. Control group (CT) did not performed vibration training. Body composition, blood pressure and heart rate at rest were measured before and after training. Compared between CT and WBV groups, WBV showed significant decreased in body weight (89.4 ± 9.8 vs 86.4 ± 6.2 kg; $p < 0.05$) and body mass index (31.6 ± 2.8 vs 30.7 ± 2.8 kg/$m^2$; $p < 0.05$). Compared with CT group, WBV significantly decreased blood pressure (114.8 ± 9.39 vs 109.6 ± 8.76 mm Hg: $p < 0.05$) and heart rate at rest (78.9 ± 9.56 vs 76.2 ± 9.49 mm Hg; $p < 0.05$) after training. The present study reported that WBV training reduced body weight, body mass index, blood pressure and heart rate at rest in obese females after 8 weeks whole body vibration training.

**Keywords:** body composition, resting heart rate, resting blood pressure and platform vibration

# P9: Effect of Capsaicin and Resveratrol on Apoptosis Induction Through Suppressing of *de novo* Lipogenesis in Colon Cancer Xenograft Nude Mice Model

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**Abstract**

Capsaicin and resveratrol known as extracted natural products are well recognized to have variety of biological beneficial effects including selectively induce apoptosis in many cancer cells. However, apoptotic induction mechanisms of capsaicin or resveratrol are not entirely understood. Upregulation of de novo lipogenesis (DNL) pathway positively regulated cancer development has considerably focused as target of anticancer therapeutic approaches in recent years. The aim of this study was to investigate mechanism of combined capsaicin and resveratrol on apoptotic induction both *in vitro* HCT-116 cancer cells and *in vivo* HCT-116 xenograft nude mice. Combination treatment for 24 h showed decreased cell viability, mitochondrial membrane potential (MMP), and increased apoptosis rate in HCT-116 cancer cells. Also, the expression of PI3K, Akt, mTOR pathways and key enzymes in DNL pathway were reduced in HCT-116 cells following combined capsaicin and resveratrol treatment. We suggest that capsaicin combined with resveratrol suppresses DNL pathway by inhibiting PI3K/Akt/mTOR pathways leading to inducing apoptosis in HCT-116 cells. Moreover, supporting these suggestions are obtained from *in vivo* experiments. Combined capsaicin and resveratrol retarded the growth of tumor implanted in nude mice. Apoptotic rate was enhanced in tumor tissues as confirmed by increased level of apoptotic protein caspase-3 and decreased anti-apoptotic protein Bcl-2 following combined treatment. We also found depleted expression of key enzymes in DNL pathway by this combined treatment. Thus, these results conclude that combined capsaicin and resveratrol targets PI3K/Akt/mTOR pathway contributing to suppression DNL pathway, consequently leading to induction apoptosis.

**Keywords:** *de novo* lipogenesis (DNL), capsaicin, resveratrol, apoptosis, HCT-116

# P10: The Selective Anticancer Effect of Epistructured Catechins on Apoptosis Induction via Blocking de novo Lipogenesis Pathway and Activity of Carnitine Palmitoyl Transferase (CPT)-1 in HepG2 Cells

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## Abstract

Increments of the mammalian de novo lipogenesis (DNL) pathway in various cancer cells have been promoted cell over-proliferation and resistance to apoptosis. Inhibition of acetyl-CoA carboxylase (ACC) and fatty acid synthase (FASN) as key enzymes in DNL pathway can increase apoptosis without cytotoxicity to non-cancerous cells. Thus, DNL pathway is considered the selective anticancer therapeutic approach. The current study investigated the effect of epigallocatechin gallate (EGCG) and epicatechin (EC) active polyphenol compounds in green tea dry leaves, on the inhibition of DNL pathway. Consequently, depletion of DNL pathway might trigger apoptosis in HepG2 cells. We found that EGCG and EC decreased cell viability, triggered cell cycle arrest, and induced apoptosis in HepG2 cells. EGCG and EC showed a loss of mitochondrial membrane potential (MMP) with inducing apoptosis. Moreover, we observed EGCG and EC inhibited expression of FASN protein which accompanied with decreased level of fatty acid. Suppression of either malonyl CoA synthesis by ACC inhibitor or fatty acid synthesis alone had no apoptosis induction effect. Thus, elevating level of malonyl-CoA following decrease of fatty acid synthesis could be a major cause of apoptosis cell death in HepG2 cells. Carnitine palmitoyl transferase 1 (CPT-1) were suppressed as a consequence of a depletion of fatty acid level following EGCG and EC treatment. We suggest that inhibition of CPT-1 activity by EGCG and EC suppressed DNL pathway contributes to apoptosis in HepG2 cells. In addition, we demonstrate that apoptosis induction following inhibition of DNL pathway by EGCG and EC is associated with increased ROS production. Finally, our results suggest that EGCG and EC targets DNL pathway to exhibit a potent alternative treatment in cancer cells.

**Keywords:** epistructured catechins, apoptosis, *de novo* lipogenesis, carnitine palmitoyl transferase-1 (cpt-1)

## P11: Citrate transport protein inhibitor inhibits *de novo* lipogenesis and induces apoptosis through activating ceramide synthesis in HCT116 xenograft nude mice models

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### Abstract

Upregulated *de novo* lipogenesis(DNL) pathway is one hallmark characteristics of various cancer cells contributing to regulating growth and survival of cancer cells. Targeting this pathway of several chemical inhibitors have been considered as effective anticancer therapies. Citrate, the first substrate of DNL pathway, is catalyzed to generate long chain fatty acids (LCFAs) which play key roles in the formation of cellular signaling pathways and biosynthesis of cell membrane during cellular proliferation processes. Citrate is transported from two sources including the mitochondrial citrate transport protein(CTP) and plasma membrane citrate transporter(PMCT). This study aimed to investigate effect of a combined CTP inhibitor(CTPi) and PMCT inhibitor(PMCTi) on reduction of intracellular citrate level, leading to inhibiting the DNL pathway. This will result in reducing cell proliferation and inducing apoptosis. *In vitro* studies, colorectal cancer HCT116 cells were treated with CTPi, PMCTi and a combination of CTPi and PMCTi to determine cell viability and apoptosis. The results showed that combined CTPi and PMCTi treatment with lower concentration exerts a potent cell cytotoxicity as compared to individual inhibitor in HCT116 cell line. Moreover, combined treatment led to apoptosis induction. Furthermore, cytotoxic effect of combined CTPi and PMCTi treatment were also observed on HCT116 transplanted in nude mice. Suppression of tumor volume and tumor weight by combined treatment further confirmed the cytotoxic effect of these inhibitors. Intracellular levels of citrate and fatty acid in tumor tissues decreased after combined treatment, suggesting suppression of DNL pathway. We also confirmed that suppression of DNL pathway following combination treatment resulted in apoptosis through increased levels of pro-apoptotic proteins, BNIP3, Bak, and cleaved caspase-3 and decreased levels of anti-apoptotic protein, Bcl-2 in tumor tissues of HCT116 transplanted animals. In conclusion, our results demonstrate that combination of CTPi and PMCTi is a potential anticancer therapy though suppression of DNL pathway.

**Keywords:** citrate transport protein inhibitor, *de novo* lipogenesis, apoptosis

## P12: Suppressing of *de novo* Lipogenesis by Citrate Transport Protein Inhibitors Induce Apoptosis in Colorectal Cancer Cell Lines

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**Abstract**

Several previous studies have reported that many cancer cells have upregulated *de novo* lipogenesis (DNL) pathway to synthesize long-chain fatty acids (LCFAs) providing cancer cell ATP and biomolecule building blocks for a high rate of cellular proliferation. Inhibition of lipogenic enzymes in DNL pathway, fatty acid synthase (FASN), ATP-citrate lyase (ACLY) and acetyl-coA carboxylase (ACC), can reduce cell proliferation and induce apoptotic cell death in cancer cells. Citrate is an important substrate in DNL pathway and derived from two sources. The first source brings citrate from mitochondrial matrix to cytosol via mitochondrial citrate transport protein (CTP) and the second source transports extracellular citrate to cytosol by the plasma membrane citrate transporter (PMCT). This study aimed to examine the effect of CTP inhibitor (CTPi) and PMCT inhibitor (PMCTi) on inhibition of DNL pathway that induces apoptosis in colorectal cancer cell lines, HCT116 and HT29. Cells were treated with CTPi, PMCTi and the combination of CTPi and PMCTi for 24 h and determined cell viability by MTT assay. Then, CTPi combined with PMCTi were use to evaluate apoptosis by flow cytometry. The results showed that combination of CTPi and PMCTi significantly inhibited cell proliferation and increased apoptotic rate in HCT116 cell line, while apoptosis was not observed in HT29 cell line. In addition, the combined treatment exerted reduced citrate and fatty acid levels, suggesting this combined inhibitor targets DNL pathway. Taken together, these findings conclude that suppressing of DNL pathway following inhibition of citrate transport by combined CTPi and PMCTi leads to induction apoptosis in HCT116 cell line.

**Keywords:** *de novo* lipogenesis, citrate transport protein inhibitor, apoptosis, colorectal cancer

# P13: Combination of Capsaicin and Resveratrol Induces Apoptosis Mediated Through de novo Lipogenesis Inhibition in Hepatocellular Carcinoma Cell Line

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**Abstract**

Various combination of chemotherapeutic drugs have been used for treatment of cancers in order to reduce toxicity in non-cancer cells. However, these therapeutic approaches still have nonspecific effect to cancer cell. New anticancer agents with selective to cancer cells have been remarkably considered. Many cancers exhibit overexpressed de novo lipogenesis (DNL) pathway while normal cell shows relatively less expression. DNL pathway exerts an important function for cancer growth and proliferation. Capsaicin and resveratrol, phenolic compounds from natural plant extracts, have strong anticarcinoma effects with lack of cytotoxic to normal cell. Therefore, present study aimed to focus on effects of combined capsaicin and resveratrol on promoted DNL inhibition leading to apoptosis in HepG2 cells. Exposure of combination treatment inhibited cell proliferation than single treatment. Combined treatment increased cell apoptosis via reduction of mitochondrial membrane potential ($\Delta\Psi m$). This cytotoxic effect was undetectable in normal human hepatocytes. Furthermore, combined treatment decreased fatty acid synthase (FASN) expression and fatty acid level. We therefore suggest that DNL pathway appears to target for apoptosis induction of combined treatment in HepG2 cells. Decreased fatty acid level showed a correlation with inhibition of CPT-1 activity. It demonstrates that suppressed DNL pathway targets CPT-1 activity leading to apoptosis induction. We also conclude that combined capsaicin and resveratrol may result in direct inhibiting CPT-1 activity. Taken together, combination of capsaicin and resveratrol exerts a potential and selective effect on cancer therapy though inducing apoptosis mediated via DNL pathway inhibition.

**Keyword:** capsaicin, resveratrol, apoptosis, *de novo* lipogenesis, HepG2 cells

## P14: Effects of Prebiotic From Konjac Oligoglucomannan on Colonic Motility in Constipated Mice

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**Abstract**

Constipation is a common gastrointestinal disorder which is mainly caused by inadequate of water and dietary fiber. Konjac oligoglucomannan (KOG) has prebiotic properties which may affect gut motility and prevent constipation. The aim of this study was to investigate whether KOG affect colonic smooth muscle contractility and colonic motility in constipated mice. Constipated ICR mice were administered by oral gavage with 100, 500 and 1000 mg/kg KOG, 1000 mg/kg fructo-oligosaccharide (FOS), 500 mg/kg lactulose and $10^9$ CFU bifidobacteria once a day for 14 days. Constipation was induced by 5 mg/kg loperamide by oral gavage on day 12-14 once a day for 3 days. Colonic transit time was monitored by Evan blue meal. Number and weight of feces were counted as frequency of defecation and fecal water content, respectively. The results showed that KOG significantly decreased colonic transit time and increased frequency of defecation when compare with loperamide-treated group. Administration with KOG can restore the contractility of both circular and longitudinal muscle in constipated mice when compare with control group. Moreover, KOG significantly increased the number of propagation pattern of colonic motility (peristaltic movement) as well as velocity of fecal pellet propulsion when compare with loperamide-treated group. These results suggested that KOG have potential effects on gastrointestinal health to promote gut motility and prevent constipation.

**Keywords:** constipation, colonic motility, loperamide, konjac oligoglucomannan

## P15: Effect of Oral Administration of Ginger Extract and Gingerol on Rat Small Intestinal Contraction and Histology

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**Abstract**

Ginger (*Zingiber officinale* Roscoe) is commonly known as a food spice or herbal medicine used for various symptoms such as anti-nausea vomiting and antidiarrheal. Its activity is likely due to the inhibitory action on the intestine as shown by several *in vitro* studies. However, the effect of oral administration of ginger extract and its active component i.e., [6]-gingerol on contraction of all parts of small intestine has never been explored. Therefore, the present study aimed to investigate the effect of oral administration of ginger extract and [6]-gingerol on contraction and histological changes of rat duodenum, jejunum and ileum. Standardized ethanolic ginger extract containing 11.91%w/w of [6]-gingerol was used. The male Wistar rats were orally administrated with 10, 20 and 100mg/kg/d ginger extract or 2mg/kg/d [6]-gingerol or an equal volume of propylene glycol (control) for 7 days. At day 8, three parts of small intestine were isolated and placed into organ bath for the measurement of contractions induced by 0.01-30μM acetylcholine (ACh) and their histological changes were also studied. All isolated small intestines from rats treated with ginger extract or [6]-gingerol showed a significant reduction of the contractions compared with control group. Their $E_{max}$ were decreased 15-36%, while $EC_{50}$ increased 1.15-3.15 folds compared to control. The histological structures of all segments of small intestine were not altered. We concluded that the oral administration of ginger extract or [6]-gingerol for 7 days could inhibit the contraction of all segments of small intestine but had no effect on histological changes. Thus, our results supported the use of ginger for the treatment of nausea vomiting and diarrhea.

**Keywords**: ginger extract, gingerol, small intestine, contraction

## P16: Effects of Cultured *Cordyceps militaris* on the Improvement of Erectile Dysfunction in Diabetic Rats Induced by Steptozotocin

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**Abstract**

The medicinal mushroom, *Cordyceps millitaris* (CM), has been widely used for maintenance health and for prevention of a variety of diseases for centuries. Due to its highly prized and its scarcity of this natural fungus, the cultured CM (CCM) has been developed and increasingly consumed for health-promoting effects. In this study, CM were cultured in the cereal grain culture medium and its aphrodisiac effect was investigated in streptozotocin (STZ) induced diabetic rats, an animal model of erectile dysfunction. Sixty male Sprague-Dawley rats were divided into six groups; 1) young control group, 2) diabetic+vehicle group, 3) diabetic+sildenafil group fed with sildenafil 5 mg/kg BW. 4) diabetic+0.1g CCM group fed 5) diabetic +0.5 CCM group, 6) diabetic +1.0g CCM group. All rats were orally fed with water or CCM (0.1, 0.5, or 1.0 g/kg BW) once a day for 21 consecutive days before subjected to mating behavior testing and the intracavernous pressure (ICP) measurement. The results showed that diabetic+vehicle rats performed poor mating performance in which lower intromission and ejaculatory frequencies and higher intromission and ejaculation latencies were observed. In addition, a significant reduction in ICP response to cavernous nerve stimulation was also observed in diabetic+vehicle rats as compared to young control group. Following CCM administration, diabetic rats treated with CCM (0.1, 0.5, or 1.0 g/kg BW) for 21 days exhibited significant improvements in their mating behavior and ICP responses to cavernous nerve stimulation. Serum testosterone level of diabetic+vehicle group was significantly lower than young control group. Diabetic rats treated with CCM at all doses or sildenafil demonstrated increased serum testosterone. Therefore, it is possible that improvement of erectile dysfunction observed in this study may result from increased serum testosterone level and antioxidant activities of CCM.

**Keywords:** erectile dysfunction, *Cordyceps militaris*, diabetes mellitus, mating behavior, intracavernous pressure

## P17: Reduced Arterial Stiffness and Ankle Blood Pressure Following Stretching Exercise in Postmenopausal Women

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**Abstract**

An association between muscle flexibility and arterial elasticity has previously reported. Therefore, this study aimed to investigate the effects of stretching training for 6 weeks on arterial stiffness in postmenopausal women. Forty postmenopausal women (mean age 55.00 ± 3.70 years) were randomly allocated to control group (n = 20) or stretching group (n = 20). Six weeks of stretching exercise was done in major muscle groups (neck, trunk, upper and lower extremities) 30 minutes a day for 5 days a week. Arterial stiffness was assessed by brachial-ankle pulse wave velocity (baPWV). In addition, ankle blood pressure was measured pre and post-training. After 6 weeks, baPWV significantly improved in the stretching group ($p < 0.05$). Moreover, ankle systolic blood pressure significantly decreased in the training group compared with control participants ($p < 0.05$). A positive and significant correlation between ankle systolic blood pressure and baPWV was found ($r = 0.454$, $p = 0.003$). This study shows that stretching training was effective to reduce arterial stiffness and ankle blood pressure in postmenopausal women. Overall findings provided the therapeutic efficacy of stretching exercise improve arterial elasticity and blood pressure in postmenopausal women.

**Keywords**: arterial stiffness, ankle blood pressure, stretching exercise, postmenopausal women

## P18: Early Cardiac Hypertrophy, Fibrosis and Renin-Angiotensin-System Receptor Alterations Induced by Fetal Undernutrition.

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**Abstract**.

Intrauterine growth retardation (IUGR) is associated with hypertension and heart disease development in adult life. A potential mechanism implicated is an alteration in the Renin-Angiotensin-System (RAS). In a rat model of IUGR we evidenced left ventricular hypertrophy (LVH) at weaning followed by cardiac dysfunction in ageing. We aimed to evaluate if this dysfunction has an early origin, assessing at weaning: 1) blood pressure, 2) cardiac interstitial or perivascular fibrosis and 3) RAS receptors in myocardium and intramyocardial arteries. IUGR was induced by maternal undernutrition (MUN; 50% nutrient restriction during second half of gestation); control rats were fed ad libitum during entire gestational period. Male MUN and control offspring were used at the age of 21days. Blood pressure was measured in rats under Ketamine-Medetomidine anesthesia; the rats were euthanized and the heart was dissected and paraffin-embedded for immunohistochemistry. Collagen content was assessed with Sirius red and polarized light or Masson Trichromic staining and quantified with Metamorph software (binary images, relative collagen content). Expression of AT receptors ($AT_1$, $AT_2$, Mas and MrgD) was evaluated with specific antibodies and quantified with PAQI software (specifically developed, CEMUP). Blood pressure was not significantly different between MUN and control rats. Interstitial and perivascular collagen content was significantly larger in MUN rats. Immunoreactivity was observed for all AT receptors. In the myocardium no statistical differences were detected in any of the AT receptors studied between MUN and control rats. Intramyocardial arteries from MUN rats exhibited a significantly higher AT1 and Mas and a lower AT2 and MrgD receptor expression compared to control rats. We suggest that IUGR induces early alterations in cardiac AT receptors, which could be implicated in the development of heart dysfunction through fibrotic process. Early LVH is not related to hypertension. Funding: EU-FEDER-COMPETE; Pest-C/EQB/LA0006/2013, Portugal; FEM2015-63631R, Spain.

**Key words:** fetal programming, fetal undernutrition, renin-angiotensin-system receptors, cardiac hypertrophy.

## P19: EW-7197 Alleviates Diabetic Nephropathy in Diabetic Mice

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**Abstract**

Diabetic nephropathy (DN) is one of the most important long-term complications of diabetes. Activation of transforming growth factor-β1 (TGF-β1) and its downstream pathway promotes excessive synthesis of extracellular matrix (ECM) in glomeruli and microalbuminuria which are the characteristics of DN. This study aimed to investigate the effects of EW-7197, an inhibitor of TGF-β type 1 receptor kinase, on DN. Eight-week-old C57BLKS/J male db/db mice were administered with EW-7197 at dose 5 mg/kg or 20 mg/kg for 10 weeks. Body weight, food intake, 24 h urinary albumin/creatinine ratio (ACR) and fasting blood glucose were monitored. At the end of the experiment, serum and urine were subjected to biochemical assays, glomerular ultrastructure and histomorphology, and renal protein expressions related fibrosis and inflammation were evaluated. The results indicated that db/db mice exhibited the clinical features of type 2 diabetes and developed DN as the evidences of increased urinary ACR. H&E stained-diabetic glomeruli exhibited glomerular hypertrophy which was associated with increased accumulation of collagen type IV and fibronectin. Transmission electron microscopy revealed glomerular basement membrane thickening accompany with podocyte effacement in diabetic glomeruli. Treatment with EW-7197, especially at high dose, alleviated these renal alterations. TGF-β1, pSmad2/3, VEGF, MCP-1, pNF-kB, collagen type IV and, fibronectin protein expressions were reduced in db/db mice treated with EW-7197. However, EW-7197 treatment did not change body weight gain, food intake, and glucose levels in diabetic mice. This study indicates that EW-7197 exhibits renoprotective effect in DN via suppressing TGF-β1 and its downstream pathways leading to reduced renal fibrosis and inflammation in diabetic condition.

**Keywords**: diabetic nephropathy, EW-7197, TGF-β1 inhibitor, diabetic mice

## P20: Antihypertensive and Antioxidative Effects of *Syzygium Gratum* (SG) in a Rat Model of Hypertension

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**Abstract**

L-NAME is a NO synthase inhibitor that induces hypertension, oxidative stress and vascular dysfunction. *Syzygium Gratum* (SG) is an eatable plant grown in Southeast Asia. It has been reported to have strong anti-oxidation. This study investigated whether SG extract could reduce blood pressure, vascular dysfunction and oxidative stress in L-NAME-induced hypertensive rats. Male Sprague-Dawley rats were daily treated with L-NAME (40 mg/kg/day) in drinking water for five weeks and orally administered SG (100,300,500 mg/kg/day) for the last two weeks. Systolic blood pressure (SBP) was measured using a tail cuff method once a week. Contractile response to electrical field stimulation (5-40Hz, 1 ms for 30s at 5 min intervals) and exogenous norepinephrine (NE) were applied in the mesenteric vascular bed. Vasorelaxation responses to acetylcholine (ACh) and sodium nitroprusside (SNP) were tested in the mesenteric vascular bed and aortic rings. Vascular superoxide production and plasma malondialdehyde (MDA) were measured. Rats received L-NAME showed high SBP and heart rate (HR) compared with control ($p<0.05$). Contractile response to nerve stimulation was enhanced in hypertensive rats, while the response to NE was not different among groups. Vasorelaxation responses to ACh were blunted in L-NAME treated rats ($p<0.05$), while the response to SNP did not differ. SG significantly decreased SBP and HR and improved vascular function in hypertensive rats. These were associated with reducing oxidative stress markers in SG-treated group. These findings indicated that SG exhibits an antihypertensive effect through suppressing sympathetic nerve activation and improving endothelium-dependent vasorelaxation. This is likely to involve its antioxidant property.

**Keyword:** hypertension, L-NAME, syzygium Gratum, oxidative stress

## P21: *Carthamus tinctorius* L. Extract Alleviates Left Ventricular Remodeling in Nitric Oxide-Deficient Hypertensive Rats

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**Abstract**

*Carthamus tinctorius* L. (CT) has been widely used in Asian countries as a beverage and in folk medicine. This study aims to investigate whether CT extract could alleviate left ventricular (LV) hypertrophy and myocardial fibrosis in $N_{\omega}$-nitro-L-arginine methyl ester hydrochloride (L-NAME)-induced hypertensive rats. Male Sprague–Dawley rats were administrated with L-NAME (40 mg/kg/day) for 5 weeks in order to induce hypertension. Hypertensive rats were treated with CT extract (300 mg/kg/day) or vehicle for a further 2 weeks. Indirect systolic blood pressure (SBP) was determined once a week during 5 weeks. At the end of experimental day, left ventricular weight/body weight (LVW/BW), left ventricular (LV) hypertrophy and fibrosis, plasma nitric oxide metabolites (NOx) and angiotensin II (Ang II), were evaluated. It was found that hypertensive rats showed high SBP and LVW/BW ratio, LV hypertrophy, and increases in LV fibrosis ($p < 0.05$). Additionally, there were significant reduction in plasma NOx level and high plasma Ang II level in hypertensive rats ($p < 0.05$). These abnormalities were alleviated by treatment with CT extract ($p < 0.05$). In conclusion, this study suggests that CT extract reduced blood pressure and alleviated LV remodeling in LNAME-induced hypertensive rats, the possible mechanism might relate to an increase in NOx level and a decrease in Ang II level.

**Keywords:** hypertension, left ventricular remodeling, CT extract

# P22: The Effects of 5-minute Jumping Rope Exercise on Oxygen Uptake and Energy Expenditure

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**Abstract**

Jumping rope is a simple sport that can improve physical fitness level. It is known that jumping rope can improve balance, strength, power, endurance, and coordination. There were few studies regarding the physiological characteristics in jumping rope exercise. The aim of this study was to investigate the possible differences in both single leg (SL) and double leg (DL) jumping rope on oxygen uptake and energy expenditure. We hypothesized that the effects of the short time jumping rope exercise in SL would be greater in both oxygen uptake and energy expenditure than DL. Nine healthy males performed jumping rope exercise either a SL or DL jumping conditions at the frequency of 1.2 Hz with a digital metronome controls jumping cadence for 5 minutes. The sequence of each jumping rope was randomly assigned. Participants were allowed to have a 15-minute rest between each condition. Prior to the testing, anthropometric data including body weight, height, BMI and resting heart rate were observed. An Oxycon Mobile System was used to collect cardiorespiratory performance in both volume of oxygen ($VO_2$) and volume of carbondioxide ($VCO_2$) and energy expenditure (EE). Dependent t-tests were used to determine the differences between two jumping styles. $VO_2$ of SL (1,970.2±304.1 ml/min) was significantly lower than DL (2,150.7±403.6 ml/min) ($p<0.05$). There were no statistically significant differences in $VCO_2$ between SL (2,199.4±314.9 ml/min) and DL (2,453.3±584.1 ml/min) ($p=0.07$). In addition, EE of DL (165.1±23.2 cal) was significantly greater than SL (151.3±13.7 cal) ($p<0.05$). Our results showed that DL used in both $VO_2$ and EE than SL during jumping rope exercise. These results suggest that the differences in the number of muscles utilization to jumping rope exercise have an effect on $VO_2$ and EE requirement.

**Keywords:** jumping rope; oxygen uptake; energy expenditure

## P23: Interaction of Compounds Isolated from *Boesenbergia rotunda* with Human Renal Organic Anion and Cation Transporters.

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**Abstract**

*Boesenbergia rotunda* extract (BPE) is used as a dietary supplement and therapeutic purposes such as antioxidant activity, antibacterial, anticancer and anti-obesity. Therefore, co-use of this herb and therapeutic drug possibly causes herb-drug interaction and lead to altering drug efficiency and toxicity. Organic anion transporters (OAT1 and OAT3) and organic cation transporters (OCT2) play an importance role in renal excretion of anionic and cationic drugs. Inhibition of these transporters influences the plasma level of the drugs. Thus, the study was set up to determine the interaction of extract and pure compounds isolated from *Boesenbergia rotunda* with OAT1, OAT3 and OCT2 in human renal proximal tubular cells (RPTEC/TERT1) by measurement uptake of $^{3}$H-PAH, $^{3}$H-ES and $^{3}$H-MPP$^{+}$ which is a prototypical substrate of OAT1, OAT3 and OCT2, respectively. The results showed that BPE did not inhibit OAT1-mediated $^{3}$H-PAH uptake and OAT3- mediated $^{3}$H-ES uptake. BPE inhibited OCT2- mediated $^{3}$H-MPP$^{+}$ uptake with the half maximal inhibitory concentration ($IC_{50}$) of 44.17 ± 0.09 µg/ml. The effect of major compounds isolated from *Boesenbergia rotunda*, panduratin A, pinocembrin and pinostrobin, on OCT2 function was determined. Pinocembrin and high concentration pinostrobin but not panduratin A inhibited OCT2-mediated $^{3}$H-MPP$^{+}$ uptake with $IC_{50}$ of 33.50±0.16 µM. These data suggest that using of *Boesenbergia rotunda* as dietary supplement or therapeutic purposes may cause herb-drug interaction and subsequently alter renal cationic drug clearance.

**Keywords:** organic anion transporters, organic cation transporters, *Boesenbergia rotunda*, drug interaction, renal basolateral transporter

## P24: Can a Selective Beta-blocker Produce Regression of Aorta Remodelling?

M.C González[*1], L Pazó-Sayós[2], MJ Delgado-Martos[2], PY Gutierrez-Arzapalo[1], R Martín-Oropesa[2], R.H Böger[3], N Lüneburg[3], E Delgado-Baeza[2], B Quintana-Villamandos[2]

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**Abstract**

Our group previously proved that short intravenous beta-blocker therapy produces regression of arteries coronaryby increasing nitric oxide (NO) bioavailability, in an experimental model of arterial hypertension. Asymmetric dimetilarginine (ADMA), inhibitor of nitric oxide synthesis, is a novel independent cardiovascular risk factor. However, esmolol effects on aorta remodeling have not been studied yet, as well as the role of ADMA in this process. Adult male spontaneously hypertensive rats (SHR) were randomly divided into therapy group (SHR-E, n=8) and placebo group (SHR, n=8). Wistar Kyoto rats were used as normotensive controls (WKY n=8). After 48 hours of intervention, ascending thoracic aorta was dissected to study vascular structure by confocal microscopy, volume density of elastic fibers (VD) using optical microscopy and passive mechanical properties (B parameter) by organ bath. ADMA levels and carbonyls were determined as biomarkers at aortic tissue. Comparisons among groups were made by ANOVA test of one factor. B parameter was calculated using non-linear regression analysis. After treatment with esmolol, a decrease in aortic cross-sectional área and wall thickness were observed at the expense of media layer, as well as lower volume density of elastic fibers and changes in mechanical properties that meant less stiffness in SHR-E compared to SHR. Moreover, SHR-E showed lower levels of ADMA and carbonyls than SHR. Surprisingly, no differences were observed between SHR-E and WKY in all studied variables. Esmolol produces an early regression of aortic remodelling after just 48h of treatment. This effect could be associated to its action on oxidative stress and ADMA/NO pathway.

**Keywords:** aorta, arterial hypertension, beta-blocker, esmolol, ADMA

**Acknowledgements:** This work was supported by a grant from FIS 13/01261 and Fondos FEDER, Spain

## P25: Regression of Cardiac Remodelling with a Multichannel Antiarrhythmic in Spontaneously Hypertensive Rats

Begoña Quintana-Villamandos[*1], Jose Juan Gómez de Diego[2], María Jesús Delgado-Martos[1], Carmen Fernández-Criado[3], David Muñoz-Valverde[3], Emilio Delgado-Baeza[1]

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**Abstract**

Arterial hypertension is the main cause for the most frequent sustained arrhythmia in clinical practice, atrial fibrillation. Dronedarone is an antiarrhythmic agent that was recently approved for the treatment of atrial fibrillation. However, its effect on early regression of left ventricular hypertrophy (LVH) has not been reported. We tested the hypothesis that short-term administration of dronedarone induces early regression of LVH in spontaneously hypertensive rats ($SHR_s$). Ten-month-old male $SHR_s$ were randomly assigned to an intervention group (SHR-D), where animals received dronedarone treatment for a period of 14 days, or to a control group (SHR) where rats were given vehicle. A third group with normotensive control rats (WKY) was also added. At the end of the treatment with dronedarone we studied the cardiac anatomy and function in all the rats using transthoracic echocardiogram, cardiac metabolism using the PET/CT study (2-deoxy-2[18F]fluoro-D-glucose) and cardiac structure by histological analysis of myocyte size and collagen content. The hypertensive untreated SHR rats developed an increase in left ventricular wall thickness, a metabolic shift towards an increase in glucose use and increases in myocyte and collagen content. However, the SHR-D rats showed statistically significant lower values in comparison to SHR group for septal wall thickness, posterior wall thickness, ventricular mass, glucose myocardial uptake, size of left ventricular cardiomyocytes and collagen content. All these values obtained in SHR-D rats were similar to the values measured in the normotensive WKY control group. The results suggest by three alternative and complementary ways (analysis of anatomy and cardiac function, metabolism and histological structure) that dronedarone has the potential to reverse the LVH induced by arterial hypertension in the SHR model of compensated ventricular hypertrophy.
This study was supported by Spanish Health Ministry FIS 13/01261and Fondos Feder.

**Keywords:** cardiac remodeling, dronedarone, echocardiography, spontaneously hypertensive rats

## P26: *Aloe Vera* Decreases Apoptosis, Modulates Cell Regulation and Improves Pathology in Diet-induced Non-alcoholic Steatohepatitis

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**Abstract**

Non-alcoholic steatohepatitis (NASH) is a common liver disease that increased hepatic fat accumulate resulting to hepatocyte inflammation, oxidative stress, and apoptosis. This study was to examine the effects of *Aloe vera* attenuated apoptosis, modulated cell regulation and improved NASH pathology in rat. All rats were randomly divided into three groups. Group 1 (control group, *n = 6*) rat fed ad libitum with standard diet containing 35% of energy from fat, 47% from carbohydrate, and 18% from protein for eight weeks. Group 2 (NASH group, *n = 6*) rats will be fed ad libitum with high-fat high-fructose diet (HFHFD) containing 55% of energy from fat, 35% from carbohydrate, and 10% from protein for eight weeks. Group 3 (*Aloe vera* group, n = 6) rats will be fed ad libitum with high-fat high-fructose diet (HFHFD) plus *Aloe vera* in DMSO (50 mg/kg) by gavage feeding daily for eight weeks. All rats were sacrificed and liver samples were taken for caspase3, NFkB, cytochrome C, apoptosis and histopathology analysis by immunohistochemistry technique. The caspase3, NFkB, cytochrome C, apoptosis were increased significantly in the NASH group as compared with the control group. The *Aloe vera* group were decreased significantly levels of caspase3, NFkB, cytochrome C, apoptosis compared with the NASH group The NASH group showed macrovesicular steatosis, microvesicular steatosis, cellular ballooning, and lobular inflammation in paraffin section. The *Aloe vera* group demonstrated the improvement of liver histopathology. *Aloe Vera* attenuated NASH histopathology via the mechanism of decreasing apoptosis and modulating cell regulation**.**

**Key words:** *Aloe vera,* non-alcoholic steatohepatitis (NASH), apoptosis, cell regulation

# P27: Cardiac Autonomic Functions in Overweight Young Adults in Response to Low-Intensity Exercise Training

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**Abstract**

Excess weight is related to cardiac autonomic dysfunction. Exercise training has been proven to be effective for restoring cardiac autonomic function. The present study aimed to evaluate cardiac autonomic function in response to incremental exercise in overweight young adults and to study the effects of low-intensity exercise training. Forty sedentary young adults were classified into two groups controlling for age and sex: (1) overweight [N = 20; 4 males and 16 females, aged 20 ± 0.36 yrs, BMI 27.5 ± 1.52 kg/m$^2$]; and (2) normal weight [N = 20; 4 males and 16 females, aged 20 ± 0.66 yrs, BMI 20.5 ± 1.75 kg/m$^2$]. All subjects took part in an arm swing exercise (ASE) training program for 2 months, 30 minutes a day, 3 days a week. Before and after the training, all participants' cardiac autonomic function was evaluated using heart rate variability analysis during the incremental exercise and during recovery from the exercise, for 5 min for each period. During incremental exercise, the longitudinal diameters of the Poincaré plot (SD2) value and maximal HR were significantly lower in the overweight group compared to those of the normal weight group ($P<0.05$). However, these differences disappeared after the ASE training period. During recovery from the exercise, mean duration of all normal to normal RR intervals (mean RR values) were significantly higher, and LF/HF ratios were significantly lower, in the overweight group compared to those of the normal weight group ($P<0.05$). The results note that a higher mean RR values in the overweight group were maintained after the ASE training period ($P<0.05$). In response to an incremental exercise test, parasympathetic nerve activity is predominant in overweight young adults. ASE training for 2 months improves cardiac autonomic activity in response to incremental exercise in overweight young adults.

**Keywords:** heart rate variability, overweight, exercise

# P28: The Correlations Between Insulin Resistance and Serum Lipid Profile in Thai Dyslipidemic Participants

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## Abstract

Insulin resistance is a pathological condition in which cells fail to respond normally to the hormone insulin. The correlation of insulin resistance and blood lipid profile are controversial. This study was set to test the relationship between insulin resistances and serum lipid profile in Thai dyslipidemic participants. Fifteen dyslipidemic participants (13 women and 2 men, aged 49±4.35 yr, body mass index 27.2±3.55, waist-to-hip ratio 0.88±0.04, percent of body fat 39.01±8.05 % and mean arterial pressure 93.42±7.96 mmHg.) were studied. Blood samples were collected after overnight fasting 8 hours to measure lipid profile, glucose, and insulin level. Serum lipid profiles were analyzed using a Reflotron (Reflotron®Plus, Boehringer Mannheim, Germany). Blood glucose concentration was measured using a glucose analyzers (YSI 2300 STAT PLUS™). The concentration of serum insulin was analyzed using a radio immunoassay kit. Insulin resistance index was calculated using Homeostatic Model Assessment of Insulin Resistance, HOMA-IR (Fasting insulin (mIU/L)xfasting glucose(mg/dL)] /405). These participants had abnormal lipid profile and lipid ratio (total cholesterol (TC) 200.5±29.6 mg/dL,triglycerides (TG) 175.9±78.00 mg/dL, low density lipoprotein cholesterol (LDL-c) 126.4±28.2 mg/dL, high density lipoprotein cholesterol (HDL-c) 50.41±16.23 mg/dL. ,TC/HDL-c ratio 4.27±1.10 and TG/HDL-c ratio 4.12±2.59). They also had high fasting serum insulin level (15.3±10.6 uIU/ml), and HOMA-IR score (3.59±3.01), but normal fasting blood glucose (90.6±19.5 mg/dL).They had positive correlation between HOMA-IR and serum insulin and (r =0.95,$p$<0.01) and fasting blood glucose (r=0.6, $p$<0.05). However, we do not find the correlation between lipid profile and insulin resistancein these patients. The results of this study suggest that lipid profile and insulin resistance are independently affected in dyslipidemic patients. However, fasting blood glucose concentration shows normal. This could be due to moderate insulin resistance and middle age.

**Key word:** HOMA-IR, dyslipidemia, lipid profile**,** serum insulin

## P29: Regression of Cardiac Remodelling with a Multichannel Antiarrhythmic in Spontaneously Hypertensive rats

Begoña Quintana-Villamandos*[1], Jose Juan Gómez de Diego[2], María Jesús Delgado-Martos[1], Carmen Fernández-Criado[3], David Muñoz-Valverde[3], Emilio Delgado-Baeza[1]

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**Abstract**

Arterial hypertension is the main cause for the most frequent sustained arrhythmia in clinical practice, atrial fibrillation. Dronedarone is an antiarrhythmic agent that was recently approved for the treatment of atrial fibrillation. However, its effect on early regression of left ventricular hypertrophy (LVH) has not been reported. We tested the hypothesis that short-term administration of dronedarone induces early regression of LVH in spontaneously hypertensive rats ($SHR_s$). Ten-month-old male $SHR_s$ were randomly assigned to an intervention group (SHR-D), where animals received dronedarone treatment for a period of 14 days, or to a control group (SHR) where rats were given vehicle. A third group with normotensive control rats (WKY) was also added. At the end of the treatment with dronedarone we studied the cardiac anatomy and function in all the rats using transthoracic echocardiogram, cardiac metabolism using the PET/CT study (2-deoxy-2[18F]fluoro-D-glucose) and cardiac structure by histological analysis of myocyte size and collagen content. The hypertensive untreated SHR rats developed an increase in left ventricular wall thickness, a metabolic shift towards an increase in glucose use and increases in myocyte and collagen content. However, the SHR-D rats showed statistically significant lower values in comparison to SHR group for septal wall thickness, posterior wall thickness, ventricular mass, glucose myocardial uptake, size of left ventricular cardiomyocytes and collagen content. All these values obtained in SHR-D rats were similar to the values measured in the normotensive WKY control group. The results suggest by three alternative and complementary ways (analysis of anatomy and cardiac function, metabolism and histological structure) that dronedarone has the potential to reverse the LVH induced by arterial hypertension in the SHR model of compensated ventricular hypertrophy.

**Keywords:** cardiac remodeling, dronedarone, echocardiography, spontaneously hypertensive rats

This study was supported by Spanish Health Ministry FIS 13/01261and Fondos Feder.

## P30: Impact of Multichannel Blocker in Attenuating Intramiocardial Artery Remodeling After Arterial Hypertension

Begoña Quintana-Villamandos[*1], González MC[2], Laia Pazó-Sayós[1], Raquel Martín-Oropesa[1], Pilar Rodríguez-Rodríguez[2], María Jesús Delgado-Martos[1], Emilio Delgado-Baeza[1]

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**Abstract**

Dronedarone is a multichannel blocker that was recently approved for the treatment of arrhythmias. However, its effect on regression of vascular remodeling has not yet been studied. This study was designed to assess if dronedarone has the potential to reverse the intramyocardial artery remodeling induced by chronic hypertension in the spontaneously hypertensive rats ($SHR_s$). Ten-month-old male $SHR_s$ were randomly assigned to an intervention group (SHR-D), where animals received dronedarone treatment for a period of 14 days, or to a control group (SHR) where rats were given vehicle. A third group with normotensive control rats (WKY) was also added. We studied structure (geometry and fibrosis) of the intramyocardial branch of the obtuse marginal artery by histological analysis. The untreated SHR show a significantly increase in the external diameter, lumen diameter, wall width, cross-sectional area and collagen volume density as expected for the experimental model. Dronedarone induced a significantly decrease in the wall width, cross-sectional area and collagen volume density in SHR-D in comparison with untreated SHR. All these values obtained in SHR-D rats were similar to the values measured in the WKY control group. Dronedarone attenuates intramyocardial artery remodeling induced by chronic hypertension in the SHR.

**Keywords:** multichannel blocker**,** intramyocardial artery, spontaneously hypertensive rats, vascular remodeling,

This study was supported by Spanish Health Ministry (Fondo de Investigaciones Sanitarias) under contract FIS 13/01261 and Fondos Feder.

## P31: Can a Selective Beta-blocker Produce Regression of Aorta Remodelling?

M.C González[*1], L Pazó-Sayós[2], MJ Delgado-Martos[2], PY Gutierrez-Arzapalo[1], R Martín-Oropesa[2], R.H Böger[3], N Lüneburg[3], E Delgado-Baeza[2], B Quintana-Villamandos[2]

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**Abstract**

Our group previously proved that short intravenous beta-blocker therapy produces regression of arteries coronaryby increasing nitric oxide (NO) bioavailability, in an experimental model of arterial hypertension. Asymmetric dimetilarginine (ADMA), inhibitor of nitric oxide synthesis, is a novel independent cardiovascular risk factor. However, esmolol effects on aorta remodeling have not been studied yet, as well as the role of ADMA in this process. Adult male spontaneously hypertensive rats (SHR) were randomly divided into therapy group (SHR-E, n=8) and placebo group (SHR, n=8). Wistar Kyoto rats were used as normotensive controls (WKY n=8). After 48 hours of intervention, ascending thoracic aorta was dissected to study vascular structure by confocal microscopy, volume density of elastic fibers (VD) using optical microscopy and passive mechanical properties (B parameter) by organ bath. ADMA levels and carbonyls were determined as biomarkers at aortic tissue. Comparisons among groups were made by ANOVA test of one factor. B parameter was calculated using non-linear regression analysis. After treatment with esmolol, a decrease in aortic cross-sectional área and wall thickness were observed at the expense of media layer, as well as lower volume density of elastic fibers and changes in mechanical properties that meant less stiffness in SHR-E compared to SHR. Moreover, SHR-E showed lower levels of ADMA and carbonyls than SHR. Surprisingly, no differences were observed between SHR-E and WKY in all studied variables. Esmolol produces an early regression of aortic remodelling after just 48h of treatment. This effect could be associated to its action on oxidative stress and ADMA/NO pathway.

**Keywords:** aorta, arterial hypertension, beta-blocker, esmolol, ADMA

**Acknowledgements:** This work was supported by a grant from FIS 13/01261 and Fondos FEDER, Spain

# P32: Early Regression in Coronary Arteries Remodelling with Dronedarone in Arterial Hypertension

**M.C González[*1], L Pazó-Sayós[2], R Martín-Oropesa[2], P Rodríguez-Rodríguez[1], SM Arribas[1], E Delgado-Baeza[2], B Quintana-Villamandos[2]**

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## Abstract

Dronedarone is a multichannel blocker used to treat atrial fibrillation (AF). Left ventricular hypertrophy is a substrat of AF. The aim of our study was to show the effects of dronedarone in coronary arteries in an experimental model of arterial hypertension and compensated left hypertrophy. Adult male spontaneously hypertensive (SHR) rats were randomly divided into therapy group (SHR-D, n=9) and placebo group (SHR, n=9). Kyoto rats were used as normotensive controls (WKY, n=9). After 14 days of treatment, left anterior descending coronary arteries were dissected to study vascular structure by confocal microscopy (wall thickness, media and adventitial layers). Segments of each artery were mounted on a wire myograph and concentration-response curves to 5-hydroxytryptamine (5-HT) were performed ($3x10^{-8}$ to $3x10^{-5}$ mol/L) to assess vasoconstrictor function. Vasodilator function was evaluated with increasing concentrations of acetylcholine (Ach $10^{-9}$ to $10^{-4}$ mol/L) in segments precontracted with serotonine (5-HT $3x10^{-7}$ mol/L). Comparisons among groups were made by ANOVA test. Wall thickness, adventitial thickness and media thickness were decreased in SHR-D compared to SHR. Dronedarone decreased the cell number in both media and adventitial layer compared to SHR. SHR-D showed a greater vasodilator response compared to SHR at low doses of acetylcholine ($10^{-9}$ to $10^{-7}$ mol/L). SHR displayed a greater vasconstricting response to 5-HT ($3x10^{-8}$ to $3x10^{-5}$ mol/L) than WKY. Dronedarone decreased the vasoconstricting response compared to SHR ($10^{-7}$ to $3x10^{-5}$ mol/L). No statistical differences were observed between WKY and SHR-D either in structure or in function. Dronedarone produces a regression in coronary arteries remodelling of spontaneously hypertensive rats.

**Keywords:** dronedarone, arterial hypertension, confocal microscopy, miograph, atrial fibrillation.

**Acknowledgements**: This work was supported by a grant from FIS 13/01261 and Fondos FEDER, Spain.

## P33: Impact of Intensity of Exercise on Immune Cells Responses to Exercise in Male Thai Patients with Type 2 Diabetes

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**Abstract**
Total white blood cells (WBCs) and the differential WBCs (neutrophils; NE, lymphocytes; LY and monocytes; MO) count are well known as the markers of inflammation. Increases of these markers are related to metabolic syndrome such as type 2 diabetes (T2D). Exercise is known as one of factors that affects the numbers of WBCs and the differential WBCs count. In addition, there is a lack of information about the changes in WBCs during acute exercise in T2D patients. Therefore, the purpose of this study was to determine WBCs count during a single bout of exercise at different intensities (low, 25% peak oxygen consumption ($\dot{V}O_{2peak}$); moderate, 65%$\dot{V}O_{2peak}$ and high, 85%$\dot{V}O_{2peak}$) in male Thai patients with T2D. Eight male patients with T2D (30-60 years of age) who were diagnosed as T2D at least 1 year and treated with metformin or glibenclamide were recruited in this study. They randomly cycled at low, moderate and high intensity for 10, 10 and 5 minutes respectively with at least 7 days apart. Blood samples were collected immediately before and after and 30 minutes after the exercise. WBCs, NE, LY and MO were significantly increased during increasing exercise intensity and then returned to baseline after 30-min exercise ($p<0.05$). The results of this study show the effect of the intensity of exercise on WBCs and the differential WBCs count in male Thai patients with T2D.

**Key words:** physical activity, hyperglycemia, inflammation, leukocyte

# P34: Exercise Capacity and Hemodynamics in Overweight or Obese Thai Subjects

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**Abstract**

Overweight and obesity are risk factors that may cause many diseases. Regular exercise is well known to be the effective treatment for weight reduction. Six-minute-walk test (6MWT) is an exercise test that is suitable to measure the exercise capacity for these persons. The aim of this study was to investigate the exercise capacity and hemodynamics with 6 MWT in overweight or obese subjects. Twenty seven overweight (body mass index (BMI) $\geq$ 23 to 24.9 kg/m$^2$) or obese (BMI > 25 kg/m$^2$) Thai subjects were engaged in this study. All subjects walked for 6 minutes as fast as possible in the distance of 30 meters. The distance of walking was recorded to evaluate exercise capacity. In addition, heart rate, blood pressure and oxygen saturation were assessed before and after walking. Rating of perceived exertion (RPE) and rating of perceived dyspnea (RPD) were also assessed during walking. The averaged walk distance was 467.8 ± 77.1 meters. We also found significant increases in heart rate (80 ± 9.5 to 83.9 ± 11.2 /min; $p < 0.005$) and systolic blood pressure (122.1 ± 14.6 to 124.7 ± 17.37 mmHg; $p < 0.03$) when compared with baseline. However, diastolic blood pressure (78.6 ± 15.8 to 77.3 ± 15.5), oxygen saturation (98.3 ± 0.87 to 98.3 ± 0.86 %)were not changed. Moreover, RPE and RPD were 8.3 ± 0.5 and = 2.1 ± 0.4 respectively. The results show that these subjects had normal exercise capacity and that 6 MWT is low-intensity exercise test.

**Keywords:** six-minute-walk, physical fitness, body mass index , heart rate, blood pressure

# P35: The Relationship Between Inspiratory Muscle Strength and Chest Wall Expansion in Healthy Thai Adults

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**Abstract**

Measurement of the chest wall expansion is used to evaluate a patient's baseline status and monitor the improvement of respiratory muscle function during pulmonary rehabilitation. Chest wall expansion is influenced by several factors, such as lung tissue elasticity, structure and elasticity of chest wall, and in particular the inspiratory muscle strength (IMS). Therefore, IMS might be an important determinant for chest wall expansion. However, the relationship between IMS and chest wall expansion is still controversial. This study was aimed to investigate the relationships between IMS and chest wall expansion in healthy adults. Seventy-six healthy subjects (aged 20-59 years, body mass index 18.5-22.9 $kg/m^2$) were recruited. IMS was evaluated in all subjects by measuring maximum inspiratory pressure (MIP) using a *MicroRPM*™. The chest wall expansion was measured with rigid tape at 3 different levels, including upper, middle, and lower thoracic circumferences. The diaphragmatic movement was also measured circumferences at the lateral lower edge of the $10^{th}$ rib by using a rigid tape. Thoracic chest expansion and diaphragmatic movement were recorded for three times by taking the difference between breathing out maximally to breathing in maximally. Results showed that MIP was positively correlated with chest wall expansion at the middle ($R = 0.328$, $p = 0.004$) and lower levels ($R = 0.309$, $p = 0.007$). Moreover, MIP was also associated with the diaphragmatic movement ($R = 0.476$, $p<0.001$). This suggests that the IMS was associated with the expansion of chest wall and movement of diaphragm in healthy subjects. The findings of this study may be useful in clinical practice, especially in patients with limited chest expansion.

**Keywords:** maximum inspiratory pressure, Inspiratory muscle strength, chest expansion, diaphragmatic movement

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