



## **SCHCF + ALACF 2020**

*Program-at-glance*

**Sociedad Chilena de Ciencias Fisiológicas (SCHCF) &  
Asociación Latinoamericana de Ciencias Fisiológicas (ALACF)**

**November 16-20, 2020**

**Joint meeting (virtual)**

	Monday 16	Tuesday 17	Wednesday 18	Thursday 19	Friday 20
9:00-10:00	<p><b>Opening L Sobrevia</b> (SCHCF &amp; ALACF)</p> <p><b>Inaugural lecture</b> <b>J Chan</b> (China, IUPS) <i>Nitric oxide in the control of blood pressure: the good, the bad and the ugly</i></p>	<b>S3</b> – The exposome and metabolic diseases	<b>S6</b> – New approaches to identify oncogenic transformation across cancer progression – focus on extracellular vesicles	<b>YRS4</b> – Sarco-endoplasmic reticulum-mitochondrial coupling in physiology and pathophysiology	<b>S13</b> – Stem cells in regenerative medicine: targeted diseases
10:15-11:15	<b>S1</b> – New advances in cardiorespiratory neural control	<b>S4</b> – Preeclampsia more than hypertension in pregnancy	<b>S7</b> – Molecular and cellular mechanisms in cardiac diseases	<b>S9</b> – TRP channels: health and disease	<b>YRS5</b> – Inflammation in the cardiovascular system: a multifaceted pathway
11:30-12:30	<b>L1</b> – <b>M Moraes</b> (Brazil) <i>Physiopathology of epilepsy: from things working to going terribly wrong</i>	<b>L3</b> – <b>AD Mottino</b> (Argentina) <i>Regulation of the intestinal barrier associated with the organic anion-transporter MRP2 by intraluminal nutrients. Role of enteroglucagon GLP-2</i>	<b>L5</b> – <b>H Trimarchi</b> (Argentina) <i>The podocyte. New concepts</i>	<b>L7</b> – <b>D Mikhailidis</b> (UK) <i>Physiology and pharmacology of evolocumab</i>	<b>L8</b> – <b>JC Calderón</b> (Colombia) <i>The role of skeletal muscle in the pathophysiology of the metabolic syndrome: muscle mass, fiber types and myokines</i>
14:00-15:00	<b>YRS1</b> – Aquaporins in physiological and pathological conditions	<b>S5</b> – Physiology of kidney disease <i>(to be confirmed)</i>	<b>YRS3</b> – Protein and membrane interaction, always a good interaction? Osmoionic imbalances and signalling mechanisms in pathological contexts	<b>S10</b> – Physiology of extracellular vesicles in cardiovascular disease	<b>S14</b> – The social environment and the physiological state: what changes depending on who is around? Experiences in ruminants <i>(to be confirmed)</i>
15:15-16:15	<b>S2</b> – Muscle as endocrine and paracrine organs	<b>YRS2</b> – Biology of exercise in metabolic disorders	<b>S8</b> – Endothelial function, metabolism, and signalling	<b>S11</b> – Physiological approach to the type 2 diabetes mellitus treatment	<b>S15</b> – Lung cancer: pathophysiological aspects and advances in its treatment. The path from the molecular to the clinical
16:30-17:30	<b>L2</b> – <b>H León-Ariza</b> (Colombia) <i>What is new in the crosstalk between the immune and nervous systems?</i>	<b>L4</b> – <b>A Myatt</b> (USA) <i>How to evaluate mobile apps in physiology and health sciences?</i>	<b>L6</b> – <b>D Botero</b> (Colombia) <i>Cerebral blood flow regulation and cerebral hypoperfusion diagnosis in real time using artificial intelligence</i>	<b>S12</b> – Women in neuroinflammation: A multidisciplinary glimpse from the molecules to the translational medicine	<b>Closing lecture</b> <b>D Eisner</b> (UK) <i>Control of calcium in the heart: free and beyond</i>
17:30-17:45					<b>Closing MC Larocca</b> (SAFIS) <i>SAFIS + ALACF 2021</i>
17:45-18:45		<b>COA</b> – <b>C Pérez-Leighton</b> (Chile) Why do I like to eat and other questions about eating and obesity	<b>ALACF</b> <i>General assembly</i>	<b>SCHCF</b> <i>General assembly</i>	

S, symposium; L, lecture; YRS, young researcher symposium; COA, community outreach activity; IUPS, International Union of Physiological Sciences; ALACF, Asociación Latinoamericana de Ciencias Fisiológicas; SAFIS, Sociedad Argentina de Fisiología; SCHCF, Sociedad Chilena de Ciencias Fisiológicas

## INAUGURAL LECTURE

**Julie Chan** (President of IUPS, China)

*Nitric oxide in the control of blood pressure: the good, the bad and the ugly*

Proposed by ALACF Council

## CLOSING LECTURE

**David Eisner** (University of Manchester & Editor of J Gen Physiol, UK)

*Control of calcium in the heart: free and beyond*

Proposed by Paulina Donoso (ICBM, Universidad de Chile, Chile)

## LECTURES (L)

**L1 – Márcio Moraes** (Federal University of Minas Gerais, Brazil)

*Physiopathology of epilepsy: from things working to going terribly wrong*

Proposed by Eduardo Colombari (President of the Sociedade Brasileira de Fisiologia)

**L2 – Henry H León-Ariza** (Universidad de La Sabana, Colombia)

*What is new in the crosstalk between the immune and nervous systems?*

Proposed by Asociación Colombiana de Fisiología (COLFISIS)

**L3 – Aldo D Mottino** (Universidad Nacional de Rosario, Investigador Superior CONICET, Argentina)

*Regulation of the intestinal barrier associated with the organic anion-transporter MRP2 by intraluminal nutrients. Role of enteroglucagon GLP-2*

Proposed by Sociedad Argentina de Fisiología (SAFIS)

**L4 – Angela Myatt** (USA)

*How to evaluate mobile apps in physiology and health sciences?*

Proposed by Luis Sobrevia (Member of the SCHCF)

**L5 – Hernán Trimarchi** (Hospital Británico de Buenos Aires, Argentina)

*The podocyte. New concepts*

Proposed by Jacobo Villalobos (Affiliate Member of the SCHCF)

**L6 – Daniel Botero Rosas** (Universidad de La Sabana, Colombia)

*Cerebral blood flow regulation and cerebral hypoperfusion diagnosis in real time using artificial intelligence*

Proposed by Asociación Colombiana de Fisiología (COLFISIS)

**L7 – Dimitri Mikhailidis** (University College London & Editor of Curr Vasc Pharmacol, UK)

*Physiology and pharmacology of evolocumab*

Proposed by Luis Sobrevia (President of the SCHCF & Bentham Science Publishers)

**L8 – Juan C Calderón** (Universidad de Antioquia, Colombia)

*The role of skeletal muscle in the pathophysiology of the metabolic syndrome: muscle mass, fiber types and myokines*

Proposed by Asociación Colombiana de Fisiología (COLFISIS)

## **SYMPOSIA (S)**

### **S1 – New advances in cardiorespiratory neural control**

**Coordinator:** Rodrigo Iturriaga (Pontificia Universidad Católica de Chile, Chile)

The symposium will discuss recent advances on molecular and cellular physiological mechanisms by which the carotid body chemoreceptors and brainstem nuclei (NTS, RVLM and RTN) plays a key role controlling breathing and cardiovascular function. In the last years, substantial advances in the comprehension of this process has been obtained using state of the art techniques, including optogenetic stimulation, designer receptors exclusively activated by designer drugs (DREADD)-based chemogenomic, and simultaneous recordings of ventilation and blood pressure in free-moving animals. The speakers will discuss a range of topics including the role played by neurons and glial cells in the neural control of cardiorespiratory function in health and disease.

#### **Speakers**

Thiago Moreira (University of São Paulo, Brazil)

*Adrenergic CI neurons and the control of cardiorespiratory integration during hypoxia*

Esteban Moya (University of California San Diego, USA)

*Microglia activation in the nucleus tractus solitarius with carotid body denervation during hypoxia*

Rodrigo del Río (Pontificia Universidad Católica de Chile, Chile)

*Astrocytes from the retrotrapezoid nucleus governs breathing rhythm regulation: implications for disordered breathing in heart failure*

### **S2 – Muscle as endocrine and paracrine organs**

**Coordinators:** Manuel Estrada (Universidad de Chile, Chile), Gerardo García-Rivas (Tecnológico de Monterrey, Mexico)

Muscle plasticity in response to normal functions and pathological conditions involves circulating hormones and the production and secretions of active factors into muscle cells collectively called myokines and muscle-related hormones. A coordinated link between activation of tissue and several organs are involved excitation-contraction coupling, metabolism, and muscle repair to specific up-to-date endocrine and paracrine muscle actions. Currently, it is known that skeletal myofibers, smooth and cardiac cells produce and release cytokines, myokines, and other active peptides. These molecules play crucial roles in the crosstalk of skeletal and cardiac muscle with other tissues. Together with the synthesis and degradation controlled by muscle metabolites, they represent an essential mechanism to regulate local and whole-body homeostasis. A coordinated link for muscle-related hormone production, secretion action mechanisms, and local and systemic functions has made a current study of endocrine and paracrine muscle actions to be considered a frontier of scientific knowledge and research worldwide. This symposium aims to stimulate the impact of endocrine and paracrine muscle functions.

#### **Speakers**

Paola Llanos (Universidad de Chile, Chile)

*NLRP3 inflammasome participation in the development of low-grade inflammation during insulin resistance in skeletal muscle*

Noemí García (Tecnológico de Monterrey, México)

*Physical activity restores the mitochondria organization and function disrupted by obesity in skeletal muscle*

Luciana V. Rossoni (Universidade de Sao Paulo, Brasil)

*The role of perivascular adipose tissue in the control of vascular tonus*

### **S3 – The exposome and metabolic diseases**

**Coordinator:** Luis Sobrevia (Pontificia Universidad Católica de Chile, Chile)

Exposome refers to environmental contaminants that exert a deleterious effect altering the human health status. The exposome can be external, including air pollution, chemicals in food and water, and diet, and the internal exposome, including age, genetic and metabolic profile. Connections between the function of different organs and the regulation of the functioning of remote organs depend on the type or quality of signalling. Thus, an appropriate immediate microenvironment is required for cell survival, securing a healthy individual. This phenomenon includes the exposome not only from the external environment but of the immediate nearby extracellular environment. Prof David Hill will cover the development and plasticity of the endocrine pancreas responds to both the intrauterine and postnatal exposome in best efforts to predict and respond to alterations in nutritional availability and metabolic requirements. The plastic potential of pancreatic beta-cells appears to be set early in life in response to the exposome but critical windows may exist during the lifespan where the risk of adult metabolic diseases might be reduced through therapeutic interventions. Prof Karl-Werner Schramm will discuss the increasing evidences on how persistent organic pollutants (POP) can interfere with the endocrine system. These POPs referred as “endocrine disrupting chemicals” are widely present in the environment and populations are exposed globally. Perinatal exposure to such chemicals could leads to the onset diseases in later life. It is known, that, maternal thyroid hormones are transported into fetal tissues from 6 weeks of gestation and it seems that during the first trimester, and part of the second, the fetus is entirely dependent on maternal THs supply for its development. The most recent and important clinical studies concerning analytical perspectives, the association and tentative molecular background between the level of thyroid hormones and the exposure to POPs during the perinatal period will be discussed. Prof Heqing Shen will cover the metabolomics for small exogenous and endogenous molecular biomarkers of exposures and their effects (xenobiotics from pollutants and microbes, metabolic adducts and others), adductomics for the measurement of DNA and protein adducts of exposures and effect, computational aided exposure identification to molecule annotation and non-targeting strategies, and biomarker characterization with large-scale data mining and statistical associations among exposures and effects.

#### **Speakers**

David Hill (Lawson Research Institute, Canada)

*The exposome and pancreatic development and function*

Karl-Werner Schramm (Helmholtz Zentrum München-German Research Center for Environmental Health (GmbH), Molecular EXposomics, and Technical University of Munich, Germany)

*Perinatal effects of persistent organic pollutants (POP) on thyroid hormone network*

Heqing Shen (Xiamen University, China)

*Molecular analytical aspects of exposomics*

### **S4 – Preeclampsia more than hypertension in pregnancy**

**Coordinators:** Carlos Escudero (Universidad del Bío-Bío, Chile), Pablo Torres-Vergara (Universidad de Concepción, Chile)

Preeclampsia (PE) is a hypertensive disorder of pregnancy with multisystemic involvement and multifactorial origin that affects between 5-7% of pregnancies in the world, and manifests after 20 weeks of gestation. However, alterations associated to this disease are extended until adulthood in both mother and offspring. Therefore, this disease constitutes a syndrome involving several organs and systems. In this symposium, we joint Latin American speakers belong Chilean ([www.grivashealth.cl](http://www.grivashealth.cl)) and Iberomeric collaborative networks ([www.rivatrem.org](http://www.rivatrem.org)) who will present evidences from their laboratories. Topics will include failure in the processes of detoxification; alteration in the coagulation; and placental mitochondrial dysfunction that we hope generates an active interaction with the audience.

### Speakers

Carlos Galaviz-Hernández (Instituto Politécnico Nacional, Durango, Mexico)

*Association of genetic variants in maternal biotransformation enzymes with preeclampsia*

Paola Ayala (Pontificia Universidad Javeriana, Colombia)

*Role of thrombomodulin and tissue factor in preeclampsia*

Enrique Terán (Universidad San Francisco de Quito, Ecuador)

*Mitochondrial activity, ROS and preeclampsia*

### S5 – Physiology of renal disease

*(This symposium will be reduced to three speakers)*

**Coordinator:** Carlos E Irrarrázabal (Universidad de Los Andes, Chile)

In the last two centuries, very important research has been done to understand how the kidneys work and how to treat problems related to their function. All of this research has enabled growth and innovation in kidney care. However, medical evolution has not undergone the advances necessary to decrease the morbidity and mortality associated with kidney disease. In the last two decades. Globally 1.7 million people die from acute kidney disease each year<sup>1</sup>. The global mortality rate from Chronic kidney disease at all ages has increased by 41.5% between 1990 and 2017<sup>2</sup>. This situation establishes the need to continue generating knowledge to prevent and treat these diseases. This symposium will present some of the new advances in Latin American research in this regard.

### Speakers

Cristián Amadro (Universidad Autónoma de Chile, Chile).

*Effect of NGAL on the inflammation produced by unilateral ureteral obstruction*

Carlos E Irrarrázabal (Universidad de Los Andes, Chile)

*Renal ischemia and reperfusion induce the expression of endothelial-to-mesenchymal markers in a murine model*

Alexis González (Pontificia Universidad Católica de Valparaíso, Chile)

*Prorenin receptor as an inducer of profibrotic signals in renal collecting tubule cells*

Jonatan Barrera-Chimal (Universidad Nacional Autónoma de México, Mexico)

*Cardiovascular effects of acute kidney disease*

### S6 – New approaches to identify oncogenic transformation across cancer progression – focus on extracellular vesicles

**Coordinator:** Carlos Salomón (Universidad de Concepción, Chile & University of Queensland, Australia)

Cancer is defined as abnormal and uncontrolled cell growth and division and is the second leading cause of death globally. Major contributors to cancer-related deaths include lack of accessibility to treatments, delayed diagnosis, and late-stage presentation. Furthermore, metastasis, which is the spread of disease away from the primary site, also contributes to fatalities. Although exact causes underlying

oncogenic transformation of normal cells are unknown, it is understood that both genetic and environmental factors contribute to it. Therefore, there is a growing field of research focusing on cancer development, identifying biomarkers, monitoring disease progression, and therapeutic development. The past decade has observed an extraordinary explosion of research in the field of extracellular vesicles (EVs), especially in a specific type of EVs originating from endosomal compartments, called exosomes. In this symposium, we will discuss the potential role of EVs in cancer progression, and the ability of EVs for biomarkers and therapeutics.

### Speakers

Andreas Moller (QIMR Berghofer Medical Research Institute, Australia)

*Communication between cancer cells and their environment via exosomes*

Alissa Weaver (Vanderbilt University, USA)

*Cancer metastasis – EVs in the spread of cancer cells to distant organs*

Shayna Sharma (Early career researcher, University of Queensland, Australia)

*Role of exosomes in ovarian cancer*

## S7 – Molecular and cellular mechanisms in cardiac diseases

**Coordinators:** Alicia Mattiazzi (Universidad Nacional de La Plata, Argentina), Paulina Donoso (Universidad de Chile, Chile)

The objective of the symposium is to cover an important area of Cardiovascular Physiology, namely intracellular signals involved in cardiac function and dysfunction. We selected three novel and critical cardiac signalling pathways. One is triggered by Polycystin -1, a mechanosensor that regulates heart contractility and is involved in mechanical stretch-induced cardiac hypertrophy. A second one is triggered by alterations in endoplasmic reticulum function with the consequent activation of several transduction pathways of calcium regulation and dysregulation. Finally, the third one will focus on the link between the immune system and different homeostatic and perturbed conditions in the heart.

### Speakers

Zully Pedrozo (Universidad de Chile, Chile).

*Regulation of cardiac BIN1 expression through polycystin-1*

Cecilia Mundiña-Weilenmann (Universidad Nacional de La Plata, Argentina)

*Endoplasmic reticulum stress: a new player in the pathogenesis of stunned myocardium*

Emiliano Medei (Universidad Federal de Rio de Janeiro, Brasil)

*Cardioimmunology*

## S8 – Endothelial function, metabolism, and signalling

**Coordinators:** Carlos Escudero (Universidad del Bío-Bío, Chile), Marcelo González (Universidad de Concepción, Chile)

The endothelium forms the inner cellular lining of blood vessels. It is now well established that endothelial cells are highly metabolically active, highly tissue differentiated and play a critical role in many physiological processes, including the control of vasomotor tone, the trafficking of blood cells between blood and underlying tissue, the maintenance of blood fluidity, permeability, angiogenesis, and both innate and adaptive immunity. It is also recognized that the endothelium is involved in most if not all disease states, either as a primary determinant of pathophysiology or as a victim of collateral damage. However, there exists a wide bench-to-bedside gap in endothelial biomedicine. In this symposium, we joint Latin American speakers belong Chilean ([www.grivashealth.cl](http://www.grivashealth.cl)) and Iberomeric collaborative networks ([www.rivatrem.org](http://www.rivatrem.org)) to discuss about endothelial function, metabolism and signalling. Topics will include O-GlcNacylation, autocrine role in cancer.

## Speakers

Fernanda Giachini (Federal University of Mato Grosso, Brazil)

*O-GlcNAc impairs endothelial function in uterine arteries from virgin but not pregnant rats: The role of GSK3 $\beta$*

Alejandro S Godoy (Universidad San Sebastián, Chile & Roswell Park Comprehensive Cancer Center, USA)

*Angiocrine role of the endothelium in prostate cancer cells*

Martha Sosa-Macías (Instituto Politécnico Nacional, Mexico)

*Levetiracetam effect on placental carriers in a murine model*

## S9 – TRP channels: health and disease

**Coordinators:** Enoch Luis Baltazar (Cátedras CONACYT – Instituto de Fisiología Celular, Universidad Nacional Autónoma de México, México), Carlos Fernández-Peña Acuña (St. Jude Children's Research Hospital, USA)

The transient receptor potential (TRP) channels are a family of ion channels expressed in different tissues of the human body. In mammals, it has been described 28 TRP channels that are diverse in structure, mechanisms of activation and modulation, and function. The main objective of this symposium is that young/postdoctoral researchers and a Ph.D. student show their main results in the TRP channels field. The talks will cover aspects of TRP channels in neuroscience, including their physiology and pharmacology, and their roles in different processes, like nociception and vascular diseases.

Sara Luz Morales Lázaro (Universidad Nacional Autónoma de México, Mexico)

*Molecular relationship between TRPV1 channel, the Sigma-1 receptor and progesterone*

Rebeca Caires (University of Tennessee, USA)

*Modulation of TRPV4 channels by Omega-3 fatty acids*

Aida Marcotti (Instituto de Neurociencias de Alicante, Universidad Miguel Hernández, Spain)

*Modulation of the TRPA1 ion channel by sigma 1: implications in peripheral neuropathy by oxaliplatin*

## S10 – Physiology of extracellular vesicles in cardiovascular disease

**Coordinator:** Carlos E. Irarrázabal (Universidad de Los Andes, Chile)

Cardiovascular diseases (CVD) consider coronary heart disease, heart failure, stroke, and arterial hypertension. All epidemiological studies by the WHO, AHA / NIH (USA) and MINSAL (Chile) have reported that CVD is the leading cause of death at the local and global level. Worldwide, the WHO reported that in 2012, 17.5 million people died from cardiovascular diseases. The age-adjusted mortality rate goes from 40.4-52.9 to per 100,000 population. Extracellular vesicles are released by cells and contain as nucleic acids, proteins and lipids. Extracellular vesicles rise earlier than troponin in patients with acute coronary syndrome. Exosomes are extracellular vesicles with a size ranging from 30 to 150 nm in diameter and have been suggested as cardioprotectors.

## Speakers

Carlos E. Irarrázabal (Universidad de Los Andes, Chile)

*Cardiac ischemia induced by stress tests promotes an increase in extracellular vesicles in peripheral blood*

Luis Osorio (Universidad de los Andes, Chile)

*The nanoparticle tracking analysis technique associated with immunofluorescence allows the quantification of extracellular vesicles with specific charge*

Carolina Jaquenod De Giusti (UNLP-CONICET, Universidad Nacional de La Plata, Argentina)  
*Exosomal non-coding RNA (Exo-ncRNAs) in cardiovascular health*

### **S11 – Physiological approach to the type 2 diabetes mellitus treatment**

**Coordinator:** Jacobo Villalobos (Hospital Regional de Antofagasta, Chile)

Physiological approach to the type 2 diabetes mellitus treatment”, is a great example of integration of the biomedical sciences in regards of the great number of patients all over the world that suffer these diseases and its consequences. Actually, patients can receive a pharmacological treatment elaborated in base of the physiology of the glucose homeostasis, with biochemical and medical evidences of a better patient’s prognosis. It is our aim to provide scientific information that support a pharmacological intervention thought since the physiology of hormones, receptors and membranes transporters in different organs that participate in the metabolic control.

#### **Speakers**

Daniel Marante (Hospital Regional de Antofagasta, Chile)

*Control mechanisms of insulin secretion and their implications in the physiopathology of type 2 diabetes mellitus*

Jacobo Villalobos (Hospital Regional de Antofagasta, Chile)

*Control mechanisms and glycaemia regulation*

Cristian Tabilo (Hospital Regional de Antofagasta, Chile)

*Physiological bases of the new hypoglycaemic therapies*

### **S12 – Women in neuroinflammation: A multidisciplinary glimpse from the molecules to the translational medicine**

**Coordinator:** Trinidad A Mariqueo (Universidad de Talca, Chile)

Looking for people’s health benefits require a Public Health good design, but also a compromise of the scientist community to look for new tools and approaches in the scientific research. Different disciplines should be connected to develop more approaches in aim to expedite the discovery of new diagnostic tools and treatments. Multi-disciplinary, highly collaborative research groups with different expertise could accomplish that step earlier. Neurophysiology and inflammatory systems share common molecular cues to develop cooperative networks that have been recently involved in central neural system diseases. In this symposium, we propose a new point of view, supported by a strong experimental background in basic science but with an important component on translational science. From the small ionic channel to the individual, several points of view are cooperating to offer ‘science with applications’ in the neuro-immune field.

#### **Speakers**

Fernanda Neutzling-Kaufmann (Université Laval, Canada)

*Stress, depression and resilience: Neuroimmune mechanisms and sex differences*

Carolina A. Oliva (Universidad Andrés Bello, Chile)

*Neurodegenerative diseases: From synaptic plasticity to cognitive deficiencies*

Trinidad A Mariqueo (Universidad de Talca, Chile)

*The neuro-immune modulation of inhibitory glycinergic neurotransmission at the central nervous system plays a critical role in the perception of different levels of pain*

### **S13 – Stem cells in regenerative medicine: targeted diseases**

**Coordinator:** Claudio Aguayo T (Universidad de Concepción, Chile)

In recent years a new area of medicine called regenerative medicine has emerged, based mainly on new knowledge about stem cells and their ability to become cells of different tissues. Stem cells are

classified as embryonic and somatic or adult. For several years, the hematopoietic stem cell was considered to be the only bone marrow cell with generative capacity. However, several studies have shown that the composition of the bone marrow is complex, with a heterogeneous group of adult stem cells has been identified, among which are: hematopoietic cells, mesenchymal cells, multipotent adult progenitor cells. Several studies have suggested that the potentiality of some types of adult stem cells is greater than expected since they have demonstrated, under certain conditions, the ability to differentiate into cells of different lineages, similar to the potentiality of embryonic cells. This has created new perspectives for the treatment of different diseases, such as type I diabetes mellitus, Parkinson's disease, and myocardial infarction. In this symposium, the basic and clinical concepts of the use of stem cells in the treatment of human diseases will be exposed.

### **Speakers**

Víctor Carriel Araya (Universidad de Granada, Spain)

*Biomaterials as stem cells delivery system in peripheral nerve tissue engineering*

Paloma Ordóñez-Morán (University of Nottingham Biodiscovery Institute, UK)

*Intestinal stem cell niche in both in vivo and novel in vitro models*

Patricia A. Luz Crawford (Universidad de los Andes, Chile)

*Perspectives of mesenchymal stem cell therapy in medicine*

## **S14 – The social environment and the physiological state: what changes depending on who is around? Experiences in ruminants**

*(This symposium is waiting for final confirmation from coordinators)*

**Coordinators:** Florencia Beracochea, Julia Giriboni (Universidad de la República, Uruguay)

Animal behaviour influences a wide variety of systems, from neurological to endocrine. In ruminants, social behaviour is inherent to the species, so it is impossible not to consider it when asking new questions and designing experiments. Thus, understanding the physiological bases of behaviour is essential for any researcher in animal science. This symposium proposes to focus on how the social environment determines many of the physiological responses of animals, in particular on reproduction.

### **Speakers**

Rodolfo Ungerfeld (Universidad de la República, Uruguay)

*How does the social environment influence the display of sexual and agonistic behavior?*

Luis Zarazaga (Universidad de Huelva, Spain)

*Physiological bases of the male effect, how does the presence of the male trigger ovulation and more in females?*

Antonio Landaeta-Hernández (Universidad de Zulia, Venezuela)

*Biostimulation and the restart of reproductive activity in cattle*

## **S15 – Lung cancer: pathophysiological aspects and advances in its treatment. The path from the molecular to the clinical**

**Coordinators:** Ivonne Olmedo, Germán Ebersperger (REECPAL, Universidad de Chile, Chile)

Lung cancer is the leading cause of cancer death in men and second-leading cause of death among women worldwide. Lung cancer is also the cancer with the highest lethality in Latin America and the second-highest lethality in Chile. Factors such as high rates of smoking and poverty as well as a scarcity of knowledge regarding underlying disease mechanisms threaten our ability to control this cancer. Eradicating lung cancer, therefore, represents a series of challenges ranging from basic science to clinical concerns. In our symposium, we will address three topics related to cancer research. Dr López will discuss the role of polyamines in the metabolism of lung cancer tumour cells and the implications of these molecules for the development of cancer. Several cellular processes are involved

in the aetiology of this disease, such as epigenetic regulation, cellular proliferation and apoptosis, which ultimately disturb cellular homeostasis. Dr Jara will explain the role of stem cells in lung cancer pathophysiology and the ways in which these cells acquire resistance to drug treatments. Drug resistance greatly hinders the development of therapeutic strategies to combat the primary tumour and subsequent metastases. Finally, Dr Fernández will update us on the progress of clinical research in various therapeutic fields. The panel of researchers will collectively report on our current knowledge regarding the response of tumour cells to the drugs used to fight lung cancer and how physiological or pathophysiological processes are modulated by these experimental approaches.

### **Speakers**

Rodrigo López (Universidad Austral de Chile, Chile)

*Polyamines and their role in the metabolism of non-small-cell lung cancer*

José Jara Sandoval (Universidad de Chile, Chile)

*Lung tumor stem cells and drug resistance mechanisms*

Gonzalo Fernández (Hospital Clínico Universidad de Chile & Instituto Nacional del Tórax, Chile)

*Progress in the treatment of lung cancer: Molecular biology and clinical advances*

## **YOUNG RESEARCHERS SYMPOSIA (YRS)**

### **YRS1 – Aquaporins in physiological and pathological conditions**

**Coordinator:** Raúl A. Marinelli (Instituto de Fisiología Experimental (IFISE-CONICET), Universidad Nacional de Rosario, Rosario, Argentina)

The aquaporins (AQPs) are a family of intrinsic membrane channel proteins that facilitate the osmotically-driven movement of water molecules. Some AQPs also display permeability to certain small uncharged molecules. AQPs assemble into tetrameric functional units, essential to life, being expressed in all kingdoms. In humans, there are 13 AQPs, at least one of which is found in every organ system. The structural biology of the AQP family is well-established and many functions for AQPs have been reported in health and disease. The targeted modulation of AQPs therefore presents an opportunity to develop novel treatments for diverse conditions or reliable diagnostic and prognostic biomarkers. This symposium aims to highlight the relevance of AQPs in the context of some pathological conditions such as neuromyelitis optica, cholestasis and preeclampsia.

### **Speakers**

Natalia Szpilbarg (Assistant Researcher, CONICET, Laboratorio de Biología de la Reproducción, IFIBIO UBA-CONICET, Universidad de Buenos Aires, Argentina)

*Possible role of AQP3 in the etiology of preeclampsia*

Vanina Netti (Assistant Researcher, CONICET, Laboratorio de Biomembranas, IFIBIO UBA-CONICET, Universidad de Buenos Aires, Argentina)

*Role of aquaporin-4 as an osmosensor in retinal müller cells: implications in the physiopathology of neuromyelitis optica spectrum disorder*

Julieta Marrone (Assistant Researcher, CONICET, Instituto de Fisiología Experimental, IFISE-CONICET, Universidad Nacional de Rosario, Argentina)

*Hepatic gene transfer of Aquaporins for cholestasis*

### **YRS2 – Biology of exercise in metabolic disorders**

**Coordinator:** Sergio Martínez Huenchullán (Universidad Austral de Chile, Chile)

Obesity is a global health problem, where its high prevalence worldwide, and particularly in Latin America, is associated with the development of metabolic complications ranging from insulin resistance and type 2 diabetes, to cardiovascular disease, and non-alcoholic fatty liver disease. Therefore, strategies that aim to counter these obesity-derived complications have been increasing in the last decades. From those, physical exercise is one of the most effective lifestyle modifications used to manage obesity and its comorbidities. However, even when its health benefits are well-known, the physiological mechanisms behind these processes are far from being fully understood. Organ-cross talk, redox signalling, and insulin-signalling are some of the processes being currently investigated. The motivation behind the scientific exploration of this knowledge gap resides in develop advances towards the individualization of exercise modalities as therapy for metabolic disorders. This symposium aims to highlight some of the recent advances in the understanding of the physiological mechanisms and effects of exercise in the context of metabolic dysfunction, particularly focused on obesity and insulin resistance, along with some of the future challenges in the field.

### Speakers

Carlos Henríquez-Olguín (Postdoc, University of Copenhagen, Denmark)

*Intracellular hydrogen peroxide as signal for molecular responses to exercise.*

Jonas Roland Knudsen (Postdoc, École Polytechnique Fédérale de Lausanne, Switzerland)

*Novel insights into GLUT4 in insulin-sensitized and –resistant skeletal muscle*

Sergio Martínez-Huenschullán (Lecturer-Researcher, Austral University of Chile, Chile)

*Influence of exercise intensity on metabolic adaptations in an obesity context.*

### **YRS3 – Protein and membrane interaction, always a good interaction? Osmoionic imbalances and signalling mechanisms in pathological contexts**

**Coordinator:** Pablo J. Schwarzbaum (Principal Researcher CONICET - Instituto de Química y Físicoquímica Biológicas "PROF. ALEJANDRO C. PALADINI", Argentina)

Exposure to toxins from different organisms can trigger a variety of responses in different cell types. In human erythrocytes, both exposure to the peptide Mastoparan-7 and exposure to the toxin alpha-hemolysin (HlyA, secreted by uropathogenic strains of E. coli (UPEC), activate signalling mechanisms mediated by extracellular ATP and induce an osmotic imbalance in these cells. On the other hand, it has been shown that HlyA is an important virulence factor in the pathogenesis of urinary tract infections in pregnant women, where UPEC strains are responsible of the 80% of the infections. Exposure to HlyA of human chorioamniotic membranes induce the remodelling of the extracellular matrix, leading to a premature birth or abortion.

It has been suggested that the damage induced by toxin-membrane interaction might be mediated by the alteration of water homeostasis, among other mechanisms, due to the interaction of the toxins with one or more aquaporin present in the cell membrane. This interaction would trigger lytic mechanisms in different tissues during the course of a bacterial infection or a toxin-induced cellular injury. Since the discovery of aquaporin 1 (AQP1, the main water transport channel in human erythrocytes) and each member of the AQP family, it has been studying the role of these transmembrane channels in the sensing and the regulation of the water homeostasis in all domains of life. These channels transport water and small molecules. Beyond the specificity of transport, their functional diversification would be determined both by the expression patterns and by the set of gating mechanisms and the interaction with proteins that regulate their location in the membrane, resulting in an alteration in water homeostasis.

### Speakers

Victoria A Vitali (Postdoc CONICET - Instituto de Química y Físicoquímica Biológicas "Prof. Alejandro C. Paladini", Argentina)

*Functional diversification of aquaporins: the case of the PIP subfamily*

María Florencia Leal Denis (Assistant Researcher CONICET - Instituto de Química y Físicoquímica Biológicas " Prof. Alejandro C. Paladini", Argentina)

*Effect of mastoran-7 and alpha-hemolysin on ATP release and cell volume in human erythrocytes. The role of aquaporin 1*

Melisa Pucci Molineris (Postdoc CONICET - Instituto de Investigaciones Bioquímicas de La Plata "Prof. Dr. Rodolfo R. Brenner", Argentina)

*Role of alpha-hemolysin in the extracellular matrix remodeling of human chorioamniotic membranes*

#### **YRS4 – Sarco-endoplasmic reticulum-mitochondrial coupling in physiology and pathophysiology**

**Coordinator:** Julieta Palomeque (National University of La Plata & Independent Researcher, CONICET, Argentina)

The physical links between Sarco-endoplasmic reticulum (SR/ER) and mitochondria were first proposed over 40 years ago based on transmission electron microscopy of liver mitochondria. SR/ER and mitochondria join together at contact sites to form specific domains, termed mitochondria associated membranes (MAMs), with a characteristic set of proteins and distinct biochemical properties. Interorganellar contacts are increasingly recognized as central to the control of cellular behaviour. A significant body of evidence shows clearly that the association between SR/ER and mitochondria play important roles in several biological processes, e.g. ion and lipid transfer, inflammasome formation, unfolded protein response, autophagy, signalling and mitochondrial fission have been established. Furthermore, the changes in MAMs have been implicated in different diseases, e.g. Alzheimer's disease, cancer, metabolic disease, and cardiac ischemia reperfusion. The objective of this symposium is to develop and highlight recent findings that reveal the crucial role of SR/ER-mitochondrial coupling in physiology and pathophysiology. We convoked 3 early careers from different countries and that have embraced this topic with enthusiasm. Although data available on the proteins that constitute MAMs are constantly increasing, there are still many uncertainties concerning the exact composition of these contact points and how it changes in response to various stimuli and cellular stress. The symposium is therefore more than timely, and the speakers proposed were selected to emphasize that SR/ER-mitochondria coupling has become a hot topic in physiology and pathophysiology.

#### **Speakers**

Federico Marilén (Cardiovascular Research Center, National University of La Plata (UNLP) *SR-Mitochondria communication promotes mitochondrial damage and apoptosis in prediabetic hearts*

Sergio De La Fuente Pérez (Thomas Jefferson University, USA) *Strategic positioning of the mitochondrial Ca<sup>2+</sup> transporters at the SRmitochondria interface in the cardiac tissue*

Roberto Bravo Sagua (Unidad de Nutrición Pública INTA - Universidad de Chile, Chile) *Caveolin-1 and PKA regulate ER-mitochondria communication during the early response to ER stress*

#### **YRS5 – Inflammation in the cardiovascular system: a multifaceted pathway**

**Coordinator:** Verónica De Giusti (Universidad Nacional de La Plata & Adjunct Researcher, National Council for Scientific and Technical Research (CONICET), Argentina)

Although the role of inflammation in the onset of cardiovascular disease is not yet fully understood, inflammation is common in heart and vascular disease. It's important to know what inflammation is

and how it can affect the cardiovascular system. This symposium covers traditional and non-traditional risk factors like hypertension, obesity, and air pollution exposure that have high prevalence in the modern society and are closely related to chronic inflammatory states that can injure the healthy heart by modulating specific intracellular signalling pathways. Although all molecular mechanisms have not been clearly defined, the exposure to pro inflammatory cytokines, reactive oxygen species and free fatty acids intermediaries have been suggested as key elements in the cardiovascular homeostasis. The study of the inflammatory role in these risk factors, as well as possible modulators, could gradually lead to development of more effective therapeutic strategies to prevent cardiovascular events.

### Speakers

Timoteo Marchini (Universidad de Buenos Aires, Argentina, Assistant Researcher IBIMOL-CONICET, Argentina & Researcher at the Friburgo University Hospital, Germany)

*Inflammatory and metabolic pathways modulated by environmental factors in cardiovascular disease onset and progression*

Carolina Caniffi (Universidad de Buenos Aires, Argentina & Researcher IQUIMEFA-UBA-CONICET, Argentina)

*Anti-inflammatory and anti-oxidant protection through C-type natriuretic peptide in normotension and hypertension*

Rodrigo García (Doctoral Fellow, IMBECU-CONICET, Argentina)

*Protective effects of hydroxychloroquine in cardiovascular remodelling associated with metabolic syndrome*

## COMMUNITY OUTREACH ACTIVITY (COA)

### COA1 – Why do I like to eat and other questions about eating and obesity

**Coordinator:** Claudio Pérez-Leighton. Pontificia Universidad Católica de Chile, Chile.

During the last decades, and despite the available treatments or policy interventions, obesity rates have steadily increased in Chile and worldwide. One of the main causes of obesity is excess food intake, which has been related to a lack of restraint in eating palatable, tasty food. However, our predilection for palatable food and our ability to eat it beyond satiety or without hunger is not just a problem of willpower, but it has deep biological roots that reach our brain and ability as a species to survive. In this seminar, we will discuss four questions about the scientific evidence about food intake and obesity: Why do we like to eat? What is the difference between hunger and desire to eat? What is an "edible" and is it different from food? and why do diets almost always fail? The goal of this seminar is to bring the science about eating and obesity closer to the general public to help them better understand their daily decisions about food and its health consequences.

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