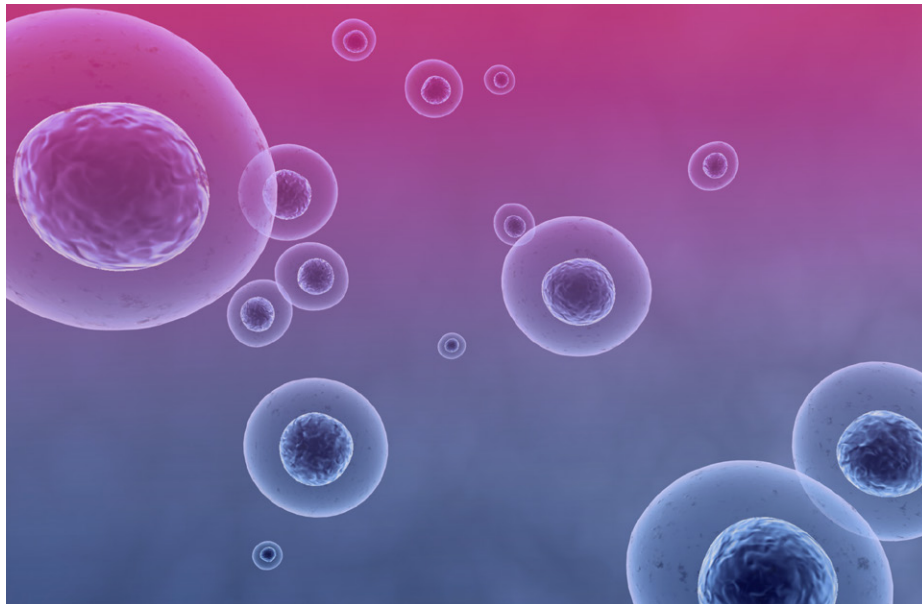




THE PONTIFICAL ACADEMY OF SCIENCES

WORKSHOP ON

# CELL BIOLOGY



# AND GENETICS

23-24 October 2017 | Casina Pio IV | Vatican City



Here I would recall the balanced position of Saint John Paul II, who stressed the benefits of scientific and technological progress as evidence of “the nobility of the human vocation to participate responsibly in God’s creative action”, while also noting that “we cannot interfere in one area of the ecosystem without paying due attention to the consequences of such interference in other areas”. He made it clear that the Church values the benefits which result “from the study and applications of molecular biology, supplemented by other disciplines such as genetics, and its technological application in agriculture and industry”. But he also pointed out that this should not lead to “indiscriminate genetic manipulation” which ignores the negative effects of such interventions. Human creativity cannot be suppressed. If an artist cannot be stopped from using his or her creativity, neither should those who possess particular gifts for the advancement of science and technology be prevented from using their God-given talents for the service of others. We need constantly to rethink the goals, effects, overall context and ethical limits of this human activity, which is a form of power involving considerable risks.

Pope Francis, *Laudato Si'*, §131.

## Introduction

The PAS Workshop on Cell Biology and Genetics will bring together a group of scientists from the Pontifical Academy and the Academia de Ciencias de América Latina (ACAL). The main goal will be to report on recent discoveries in Cell Biology. It will also include discussion on how to overcome the main challenges for scientific research in Latin America. Latin America is a vast continent that has experienced significant improvements in scientific capabilities in the past decades. There have also been setbacks and structural challenges. Science is a driving force for development with many social benefits, and scientific advances in many areas are making a great impact worldwide. Among them is cell biology which will be the focus of this workshop. Scientific sessions will bring together experts in the fields of membrane biology, genetics, cell signaling, neurobiology and biomedical applications of cell biology.

Science has important consequences for education, food production, biomedicine, and promotes social progress. Latin America has a highly educated, cultured population and a long history of important contributions to biological research. This includes two science Nobel prizes (awarded to PAS members Bernardo Houssay and Luis Leloir) for research carried out in the region. There are excellent groups in the area of cell biology which are having important impact as medicine becomes increasingly molecular. The

workshop will include several young cell biologists recently elected to ACAL.

The closing session of the workshop will be dedicated to a general discussion aimed at increasing international cooperation through the vast subcontinent. This will include the preparation of a final statement with recommendations for the future of science in this important region. Discussion topics will include intra-continental scientific collaborations which have much room for improvement due to the current emphasis on vertical relations with the Northern hemisphere rather than horizontal among neighbors. Other topics will include key ingredients such as mutual cooperation, student and researcher exchanges, and common efforts for the establishment of infrastructure. The results of these discussions will be shared with governments, academies of sciences and scientific societies in Latin America. ACAL was founded during a special meeting called by PAS President Carlos Chagas in 1982, and this encounter between PAS and ACAL will examine progress 35 years later, and look ahead towards sustained development in biomedicine. The PAS, with its universal perspective, hopes to give impulse to many more decades of building bridges in Latin American science.

Prof. EDWARD DE ROBERTIS

# Programme

Monday, 23 October 2017	
<b>OPENING SESSION</b>	
9:00	<i>Word of Thanks</i> <b>Claudio Bifano</b>   ACAL President <i>Objectives of the Workshop</i> <b>Edward De Robertis</b>   Uruguay/USA
9:15	<i>Presentation of the PAS-ACAL Encounter</i> <b>H.E. Msgr. Marcelo Sánchez Sorondo</b>   Chancellor PAS
<b>BIOPHYSICS AND MEMBRANE BIOLOGY SESSION   Chair: Esward De Robertis</b>	
9:20	<i>Biophysics and Biochemistry in Singulo: When Less is More</i> <b>Carlos Bustamante</b>   Peru/USA
9:45	Discussion
9:55	<i>Transient Receptor Potential Channels as Sensors of Heat and Pain</i> <b>Ramón Latorre</b>   Chile
10:20	Discussion
10:30	Coffee Break
11:00	<i>Is the Inflammatory Response the Cause of Tissue Dysfunction in Chronic Diseases?</i> <b>Juan Carlos Sáez</b>   Chile
11:25	Discussion
11:45	<i>Free Radicals, Oxidants and Antioxidant Systems in Physiology and Disease</i> <b>Rafael Radi</b>   Uruguay
12:10	Discussion
12:20	<i>The Role of Glucosylation and Demannosylation on the Quality Control of Glycoprotein Folding in the Endoplasmic Reticulum</i> <b>Armando J. Parodi</b>   Argentina
12:45	Discussion
12:55	Lunch at the Casina Pio IV
<b>GENETICS SESSION   Chair: Rafael Vicuña</b>	
15:00	<i>Design of Novel Regulatory Gene Circuits in Plant Cells using Recombinase Serine Integrase</i> <b>Elibio Rech</b>   Brazil
15:25	Discussion
15:35	<i>Molecular Mechanisms of Cell Adaptation to Hypoxia</i> <b>Pablo Wappner</b>   Argentina
16:00	Discussion
16:10	<i>How Chloroplast-derived Signals Influence Leaf Developmental Fate; the Voice of the Slave</i> <b>Patricia León</b>   Mexico
16:35	Discussion
16:45	<i>Nitrogen Fixation and Tropical Crops</i> <b>María Luisa Izaguirre</b>   Venezuela
17:10	Discussion
17:20	Coffee Break

17:40	<i>Molecular Genetics of Plant Cell Resistance to Stress</i> <b>Luis R. Herrera Estrella</b>   Mexico
18:05	Discussion
<b>CELL SIGNALING AND DEVELOPMENTAL BIOLOGY SESSION   Chair: Salvador Moncada</b>	
18:15	<i>On the Origin of Life on Earth</i> <b>Rafael Vicuña</b>   Chile
18:40	Discussion
18:50	<i>Regulation of Protein Degradation by Wnt Signaling</i> <b>Edward De Robertis</b>   Uruguay/USA
19:15	Discussion
19:25	Dinner at the Casina Pio IV

<b>Tuesday, 24 October 2017</b>	
<b>NEUROBIOLOGY SESSION   Chair: Rafael Radi</b>	
9:00	<i>Sound Perception: From the Ear to the Brain and Back</i> <b>Ana Belén Elgoyhen</b>   Argentina
9:25	Discussion
9:35	<i>New Insights About the Biology of Zika Virus Using Human Induced Pluripotent Stem Cell</i> <b>Stevens Rehen</b>   Brazil
10:00	Discussion
<b>BIOMEDICINE SESSION   Chair: Vanderlei Bagnato</b>	
10:10	<i>Endothelial Cells in Physiology and Medicine</i> <b>Salvador Moncada</b>   Honduras/UK
10:35	Discussion
10:45	Coffee Break
11:15	<i>Physiopathology of the Cerebrovascular System: Advances from Genomics</i> <b>Conrado J. Estol</b>   Argentina
11:40	Discussion
11:50	<i>The Methylome as an Example of the Contribution of Basic Research to Solving Medical Problems in the Third World</i> <b>Rafael J. Apitz-Castro</b>   Venezuela
12:15	Discussion
12:25	<i>Applications of Physics to Cell Biology</i> <b>Vanderlei S. Bagnato</b>   Brazil
13:00	Lunch at the Casina Pio IV
15:00	<i>RNA Processing, Ageing and Neurodegeneration</i> <b>Francisco E. Baralle</b>   Argentina/Italy
15:25	Discussion
15:35	<i>Translating the 'Sugar Code' into Immune and Vascular Programs: from Basic Discovery to Drug Design</i> <b>Gabriel A. Rabinovich</b>   Argentina
16:00	Discussion
16:10	Coffee Break

**CLOSING SESSION | Chairs: Claudio Bifano (Venezuela) and Luis Davidovich (Brazil)**

16:50 **General Discussion: Improving Scientific Cooperation in Latin America**

*Academia de Ciencias de América Latina 35*

**Claudio Bifano** | Venezuela

*Intracontinental Scientific Collaborations*

**Luiz Davidovich** | Brazil

*Science and Technology Initiatives of the Department of State of the USA*

**Franklin A. Carrero-Martinez** | Puerto Rico/USA

*Generating the Final Statement of the PAS-ACAL Encounter*

**Rafael Vicuña** | Chile

19:40 Dinner at the Casina Pio IV

# List of Participants

## Speakers

<p><b>Dr. Rafael J. Apitz-Castro</b> Cancellor, Academia de Ciencias de América Latina (ACAL), Venezuela</p>	<p><b>Dr. María Luisa Izaguirre</b> Full Professor Emeritus Vice Chancellor of the Latin American Academy of Science, Venezuela</p>
<p><b>Prof. Vanderlei S. Bagnato</b> PAS Academician University of Sao Paulo Department IFSC - Physics, Brazil</p>	<p><b>Prof. Ramón Latorre</b> Profesor y Director Centro Interdisciplinario de Neurociencia Universidad de Valparaíso, Chile</p>
<p><b>Dr. Francisco E. Baralle</b> PI RNA Biology Group Former Director-General International Centre for Genetic Engineering and Biotechnology (ICGEB), Trieste, Italy</p>	<p><b>Dr. Patricia León</b> Universidad Nacional Autónoma de México, Department of Plant Molecular Biology, Mexico</p>
<p><b>Dr. Claudio Bifano</b> President, Academia de Ciencias de América Latina (ACAL), Venezuela</p>	<p><b>Prof. Sir Salvador Moncada</b> Cancer Domain Director Division of Cancer Sciences, School of Medical Sciences, Faculty of Biology, Medicine and Health; Manchester Cancer Research Centre Building, University of Manchester, Manchester, UK</p>
<p><b>Dr. Carlos Bustamante</b> Professor Molecular and Cell Biology, Chemistry, and Physics, UC Berkeley, USA</p>	<p><b>Dr. Armando J. Parodi</b> Laboratorio de Glicobiología Fundación Instituto Leloir Buenos Aires, Argentina</p>
<p><b>Dr. Franklin A. Carrero-Martínez</b> Deputy Science and Technology Adviser to the Secretary, acting Office of the Science and Technology Adviser to the Secretary (E/STAS) US Department of State, USA</p>	<p><b>Dr. Gabriel A. Rabinovich</b> National University of Córdoba (Argentina) School of Exact and Natural Sciences University of Buenos Aires Immunopathology Lab (IBYME) Buenos Aires, Argentina</p>
<p><b>Prof. Luiz Davidovich</b> Universidade Federal do Rio de Janeiro Instituto de Física Departamento de Física Matemática, Brazil</p>	<p><b>Dr. Rafael Radi</b> Professor and Chair of Biochemistry, Director, Center for Free Radical and Biomedical Research, Departamento de Bioquímica Facultad de Medicina, Universidad de la República Montevideo, Uruguay</p>
<p><b>Prof. Edward De Robertis</b> University of California, Los Angeles Howard Hughes Medical Institute, USA ▶ PAS Academician</p>	<p><b>Prof. Elibio Rech</b> EMBRAPA Genetic Resources and Biotechnology Laboratory of Synthetic Biology Brasília, Brazil</p>
<p><b>Dr. Ana Belén Elgoyhen</b> Laboratorio de Fisiología y Genética de Audición INGEBI-CONICET, Buenos Aires, Argentina</p>	<p><b>Dr. Stevens Rehen</b> Head of Research - D'Or Institute for Research and Education Professor of Biomedical Sciences - Federal University of Rio de Janeiro, Brazil</p>
<p><b>Dr. Conrado J. Estol</b> Director, Stroke Unit, Guemes Clinic, University of Buenos Aires School of Medicine, Argentina</p>	<p><b>Dr. Juan Carlos Sáez</b> Departamento de Fisiología, Pontificia Universidad Católica de Chile, Santiago, Chile</p>
<p><b>Dr. Luis R. Herrera Estrella</b> Dirección Langebio Cinvestav IPN Irapuato, Guanajuato, Mexico</p>	

**H.E. Msgr. Marcelo Sánchez Sorondo**

Chancellor,  
The Pontifical Academy of Sciences,  
Vatican City

**Prof. Rafael Vicuña**

Pontificia Universidad Católica de Chile,  
Facultad de Ciencias Biológicas,  
Departamento de Genética Molecular y Microbiología,  
Santiago, Chile  
▶ PAS Academician

**Dr. Pablo Wappner**

Director,  
Laboratorio de Genética y Fisiología Molecular,  
Instituto Leloir,  
Buenos Aires, Argentina

**Observers**

**José Luis M. Martínez LC**

**Mario Zurita**



# Memorandum

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1. On 23 and 24 October 2017 a bus will leave the Hotel della Conciliazione at 8:40 a.m. for the Academy and at 8:45 a.m. from the Domus Sanctae Marthae for the Seat of the Academy (Casina Pius IV). A bus will depart from the Academy after dinner at the end of the afternoon sessions to take participants back to the hotels (Hotel della Conciliazione and Domus Sanctae Marthae). The meals listed in the program will be served at the Academy.
  2. If you are coming to the Academy on your own, please enter the Vatican through the Sant'Uffizio Gate or Perugino Gate. Please make sure you bring your passport/ID since you will be crossing the Vatican City State border. The Vatican guards will have a list of the invitees.
  3. If you are vegetarian or have any dietary restrictions, food allergies and/or religious restrictions please let us know as soon as possible.
  4. WiFi credentials:  
Network: WLAN\_PADS (WPA2)  
Password: !!WIFI\_2017\_PADS!!
  5. You can check our website [www.pas.va](http://www.pas.va) for further information on the Academy, the Academicians, and current and past events.
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## MEDIA ENQUIRIES

 All journalists and media organizations wishing to apply for accreditation may request TEMPORARY accreditation through the online form of the Media Operations Section of the Holy See Press Office website: <http://press.vatican.va/content/salastampa/en/accrediti/pubblico/> **accredito**. Journalists and media organizations regularly accredited at the Holy See Press Office may send their request through the usual channels. All requests must be sent no less than 48 hours before the event.

 I giornalisti e gli operatori media che intendono partecipare devono inviare richiesta di accreditamento TEMPORANEO attraverso il modulo disponibile online nella sezione accrediti del sito della Sala Stampa della Santa Sede: [press.vatican.va/accreditamenti](http://press.vatican.va/accreditamenti). Coloro che già dispongono di accredito ordinario valido devono inviare una richiesta di partecipazione secondo le consuete modalità. Tutte le richieste dovranno pervenire entro 48 ore dall'evento.

 Todos los periodistas y gráficos que deseen participar deben enviar una solicitud de acreditación TEMPORAL a través del módulo que está disponible online en la sección de acreditaciones de la página web de la Oficina de Prensa de la Santa Sede: [press.vatican.va/accreditamenti](http://press.vatican.va/accreditamenti). Los que ya dispongan de acreditación normal válida, deben enviar una solicitud de participación según la modalidad habitual. Todas las peticiones deberán hacerse al menos 48 horas antes del evento.

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