

2017 LOUIS-JEANTET PRIZE FOR MEDICINE

The 2017 Louis-Jeantet Prize for Medicine is awarded to **SILVIA ARBER**, Professor of Neurobiology at the Biozentrum, University of Basel, Switzerland and senior group leader at the Friedrich Miescher Institute (FMI) in Basel, Switzerland, and to the immunologist **CAETANO REIS E SOUSA**, senior group leader at the Francis Crick Institute, United Kingdom.

The LOUIS-JEANTET FOUNDATION grants the sum of CHF 700'000 for each of the two prizes, of which CHF 625'000 is for the continuation of the prize winner's research and CHF 75'000 for their personal use.

The prize winners are conducting fundamental biological research that is expected to be of considerable significance for medicine.



SILVIA ARBER, of Swiss nationality, is awarded the 2017 Louis-Jeantet Prize for Medicine for her contributions to our understanding of how movement is controlled in mammals.

Movement is the final common output of the nervous system, and is essential for survival. Silvia Arber's laboratory has investigated how neuronal circuits control and orchestrate movement, thus contributing to a better understanding of how motor commands for specific actions are generated. As diseases of the nervous system frequently lead to movement disorders, and spinal cord injury causes immobility, the work of Silvia Arber will be essential for future interventions.

Silvia Arber will use the prize money to conduct further research on how neuronal circuits regulate the diversification of motor behavioural programs.



CAETANO REIS E SOUSA, of Portugal, is awarded the 2017 Louis-Jeantet Prize for Medicine for his contribution to our understanding of the mechanisms by which the immune system senses pathogen invasion and tissue damage.

Our immune system detects and responds to infections. It also destroys abnormal cells thereby acting as a line of defence from many cancers. Caetano Reis e Sousa's laboratory has made a series of seminal observations that place dendritic cells, key antigen presenting cells, as major sensors of invading pathogens as well as of dying infected and cancer cells. His work has important implications for the development of new vaccines and the treatment of cancer using immunotherapy.

Caetano Reis e Sousa will use the Prize money to continue to study the mechanisms that allow the immune system to detect the presence of pathogens and dead cells.

THE AWARD CEREMONY WILL BE HELD IN GENEVA (SWITZERLAND) ON **WEDNESDAY, 26 APRIL 2017**.

SILVIA ARBER

Silvia Arber was born in 1968 in Geneva and studied biology at the Biozentrum of the University of Basel. She graduated in 1995 with a doctorate in the laboratory of Pico Caroni at the Friedrich Miescher Institute for Biomedical Research (FMI) in Basel. After a postdoctoral fellowship in the laboratory of Thomas Jessell at Columbia University in New York, she returned to Basel in 2000 to establish her independent research group on neuronal circuits controlling motor behavior. She holds a joint appointment as a Professor of Neurobiology at the Biozentrum and a Senior group leader at the FMI in Basel.

Silvia Arber was elected as a member of the European Molecular Biology Organization (EMBO) in 2005. She is also a member of the Swiss Academy of Medical Sciences, the American Association for the Advancement of Science and the Academia Europaea. She has been recognized for her outstanding research with numerous prizes, including the Pfizer Research Prize (1998), the National Latsis Prize (2003), the Friedrich Miescher Award (2008), and the Otto Naegeli Prize (2014).

Circuits for Movement

Animals carry out an enormous repertoire of distinct actions, spanning from seemingly simple repetitive tasks like walking to more complex movements requiring fine motor skills. The central nervous system, composed of the brain and spinal cord, integrates information received from the body and coordinates its activity. Within the central nervous system, neurons never function in isolation, they are organised into neuronal circuits which are at the core of choosing, maintaining, adjusting and terminating distinct motor behaviours to coordinate movement.

Over the last decade, Silvia Arber's laboratory has demonstrated that neuronal circuits are organized into precise modules by functional subdivision at multiple levels of the motor system, including the spinal cord and the brainstem. Thus, precisely connected neuronal subpopulations in the motor system align with the distinct behavioural functions, allowing for functional subdivision of labour and diversification of motor programs. Silvia Arber's work provides important insight into the mechanisms and organizational principles responsible for the establishment and function of the motor system. She has decisively contributed to a better understanding of how neuronal circuits control and orchestrate movement.

CAETANO REIS E SOUSA

Born in 1968 in Lisbon (Portugal), Caetano Reis e Sousa moved to the UK in 1984 to finish his secondary education at Atlantic College in Wales. He went on to study Biology at Imperial College, London, and obtained a DPhil in Immunology from Oxford before moving to the National Institutes of Health, USA, as a postdoc. In 1998 he returned to the UK and set up his research group at the Imperial Cancer Research Fund, later to become the London Research Institute. In 2015, the London Research Institute was subsumed into the Francis Crick Institute where Caetano Reis e Sousa is currently a Senior Group Leader. He is also Professor of Immunology in the Department of Medicine at Imperial College and holds honorary professorships at University College London and King's College London.

Caetano Reis e Sousa was elected a member of the European Molecular Biology Organisation (EMBO) in 2006, a fellow of The Academy of Medical Sciences in the same year and was made an Officer of the Order of Sant'Iago da Espada by his native Portugal in 2009. He is included in the list of Highly Cited Researchers (Thomson Reuters) and has previously won the BD Biosciences Prize of the European Macrophage and Dendritic Cell Society (2002), the Liliane Bettencourt for Life Sciences Award (2008) and the Award for Excellence in Basic/Translational Research from the European Society for Clinical Investigation (2011).

Dendritic cells as sensors of pathogens and tissue damage

Invasion by bacteria, fungi or viruses triggers potent immune responses that eliminate the pathogen. Caetano Reis e Sousa found that when viral and fungal pathogen invaders are taken up into cells they are detected by specific sensors that emit signals to promote immunity. He also demonstrated that actin filaments, the skeletons that are exposed when our own cells suffer damage and rupture their external membrane, can trigger similar pathways. This indicates that the immune system responds not only to pathogens but also to cell death induced by infection or cancer growth.

Many of the receptors and pathways involved in pathogen and dead cell sensing are expressed by specialised immune cells known as dendritic cells (DCs). Caetano Reis e Sousa has helped decipher how DCs integrate various sensory inputs and coordinate subsequent immune responses. He further studied how DCs develop from white blood cell progenitors present in the bone marrow and he identified human DC1, a specialised subtype of DCs that plays a critical role in anti-cancer and anti-viral immunity. Caetano Reis e Sousa's work helps illuminate the cellular and molecular mechanisms responsible for immune detection of infection and cancer and opens the door for their translation into new vaccines and immunotherapies.

THE LOUIS-JEANTET PRIZE FOR MEDICINE

Every year, the Louis-Jeantet Prize for Medicine distinguishes leading-edge researchers who are active in the Council of Europe member countries.

As one of the best-endowed awards in Europe, the Louis-Jeantet Prize for Medicine fosters scientific excellence. It is not intended as the consecration for work that has been completed, but to finance the continuation of innovative research projects with high added value and of more or less immediate practical significance in the treatment of diseases.

Established in 1986, the Louis-Jeantet Prize for medicine has thus so far been awarded to 86 researchers: 27 in the United Kingdom, 15 in Germany, 15 in Switzerland, 14 in France, 3 in Sweden, 3 in the Netherlands, 2 in Austria, 2 in Belgium, 2 in Finland, 2 in Norway and 1 in Italy. Among the 86 prize-winning researchers, 10 subsequently won the Nobel Prize for physiology or medicine, or the Nobel Prize for chemistry.

Since 1986, a total sum of approximately CHF 59m has been awarded by the Foundation to the 86 prize winners for the continuation of their work.

THE LOUIS-JEANTET FOUNDATION

The Louis-Jeantet Foundation, set up in 1982, is the legacy of Louis Jeantet, a French businessman and a citizen of Geneva by adoption. Its aim is to move medicine forward and to defend the role and identity of European biomedical research vs. international competition. Established in Geneva, the Foundation is part of an open Europe and devotes its efforts to recognizing and fostering medical progress for the common good.

The Louis-Jeantet Foundation allocates some CHF 4.2m each year to promoting biomedical research. It invests this sum in equal proportions for European and for local research projects. On the local level, the Foundation encourages teaching and the development of research at the Faculty of Medicine of the University of Geneva.

Since 2010, EMBO and the Louis-Jeantet Foundation jointly promote the leading-edge research work of the winners of the Louis-Jeantet Prize for Medicine. In this context, the journal *EMBO Molecular Medicine* features special contributions by the prize winners and hosts the Louis-Jeantet prize winners' lectures given during the annual EMBO Congress.

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More information on the prize winners' work is available on our website: www.jeantet.ch