

2018 LOUIS-JEANTET PRIZE FOR MEDICINE

The 2018 Louis-Jeantet Prize for Medicine is awarded to **CHRISTER BETSHOLTZ**, Director of the Integrated Cardio Metabolic Centre based at Karolinska Institute, and Professor at Uppsala University in Sweden, and to the immunologist **ANTONIO LANZAVECCHIA**, Director of the Institute for Research in Biomedicine and Professor at the Università della Svizzera italiana in Switzerland.

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.

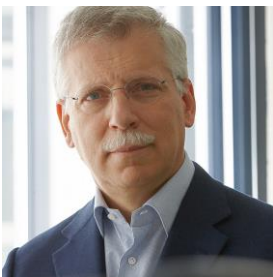
The prize-winners are conducting fundamental biological research that is expected to be of considerable significance for medicine.



CHRISTER BETSHOLTZ, of Swedish nationality, is awarded the 2018 Louis-Jeantet Prize for Medicine for his seminal discoveries in vascular biology, in particular the characterisation of specialised cells – pericytes – and their role in vascular development and permeability.

Christer Betsholtz studies angiogenesis: the mechanism whereby new blood vessels form from existing ones. In particular, his laboratory has made seminal discoveries regarding the vascularisation of the blood-brain barrier, the layer that protects the brain from potentially neurotoxic substances present in the blood, while allowing the passage of nutrients and other substances essential for the correct functioning of the brain. His research has important implications for the development and treatment of diseases in the brain.

Christer Betsholtz will use the prize money to continue to study blood vessels in the central nervous system and their role in physiological and disease processes.



ANTONIO LANZAVECCHIA, of Italian nationality, is awarded the 2018 Louis-Jeantet Prize for Medicine for his contributions to our understanding of the human immune response to infection and its application to vaccinology.

Antibodies provide a highly specific and powerful mechanism of protection against invading pathogens (bacteria, viruses, parasites, etc.). Antonio Lanzavecchia's laboratory developed methods to isolate potent and broadly neutralizing antibodies from the human immune response, which can be used against a variety of common and emerging pathogens that are responsible for life-threatening diseases such as influenza, Ebola or Zika. This approach also led to the surprising discovery of a new type of antibodies specific to malaria parasites, revealing a new mechanism of antibody diversification with important implications for understanding host-pathogen interaction and for the development of new vaccines and antibody-based therapies.

Antonio Lanzavecchia will use the prize money to continue to characterise this new mechanism of antibody diversification.

THE AWARD CEREMONY WILL BE HELD IN GENEVA (SWITZERLAND) ON **WEDNESDAY, 25 APRIL 2018**.

CHRISTER BETSHOLTZ

Christer Betsholtz was born in 1959 in Stockholm and studied medicine at the University of Uppsala, where he also graduated with a PhD degree in 1986 and established his first independent research group. He moved to Göteborg University in 1994 and to Karolinska Institutet in Stockholm in 2004. In 2013 he moved back to Uppsala as Professor of Vascular and Tumour Biology, where he remains jointly active as Director for the AstraZeneca / Karolinska Institutet Integrated Cardio-Metabolic Centre.

Christer Betsholtz was elected as a member of the European Molecular Biology Organization (EMBO) in 2004. He is also a member of Academia Europaea, the Swedish Royal Academy of Sciences and the Nobel Assembly at Karolinska Institutet. He has been recognised with a number of awards, including the Göran Gustafsson Prize, the Lundberg Medal, the Axel Hirsch Prize, and the Anders Jahre Medical Prize.

Formation and function of the Central Nervous System (CNS) vasculature

Almost all of our body's organs contain dense networks of blood vessels that supply oxygen and nutrients, remove waste products and allow rapid distribution of immune cells. Whereas the blood vessels are formed by generic mechanisms and composed of generic cell types – endothelial cells (cells that line the interior surface of blood vessels) and mural cells which envelop the surface of the vascular tube (pericytes and vascular smooth muscle cells) – the end result are capillary beds that are organotypic. They are perfectly adapted to each organ's specific functions, ranging from absorption in the intestine, respiration in the lung and filtration in the kidney.

The vasculature of the CNS harbours a specialisation known as the blood-brain barrier (BBB), which protects the brain from potentially neurotoxic substances present in the blood, while allowing the passage of nutrients and molecular building blocks essential for the correct functioning of the brain. Christer Betsholtz' work has helped explaining how blood vessels sprout in the CNS by the formation of specialised endothelial tip and stalk cells, how the endothelial cells signal to the pericytes in order to promote their co-recruitment during angiogenic sprouting, and how pericytes finally stabilise the capillaries and promote maturation of the BBB. His work has shed light on genetic causes of neurovascular diseases, and he has mapped the gene expression patterns of the brain's different vascular cell types with high detail, opening new doors for the discovery of physiological functions and disease mechanisms in the brain.

ANTONIO LANZAVECCHIA

Antonio Lanzavecchia was born in 1951 in Italy and studied, as a fellow of the Almo Collegio Borromeo, at the University of Pavia where he obtained a medical degree and specialised in paediatrics and in infectious diseases. He started research in cellular immunology at the University of Genova and in 1983 moved to Switzerland to the Basel Institute for Immunology, where he worked until 2000, when he became the founding director of the Institute for Research in Biomedicine in Bellinzona. He was professor of Immunology at the Universities of Genova and Siena and at the Swiss Federal Institute of Technology, ETH Zürich.

Antonio Lanzavecchia received the EMBO Gold Medal, the Cloetta Prize, the Robert Koch Prize, and the Sanofi-Institut Pasteur Award. He is member of the EMBO, of the Swiss Academy of Medical Sciences and a Foreign Associate of the US National Academy of Sciences.

Antibodies, key elements of the body's defences

Antibodies have been used for more than a century to protect from toxins and infectious diseases. However, in spite of their great potential, their use is still limited, one reason being that potent neutralizing antibodies have been difficult to identify. Antonio Lanzavecchia's laboratory investigates the mechanisms of antibody-mediated resistance to infectious diseases. They have developed new methods to screen human memory B cells or plasma cells and isolate antibodies with potent and broad neutralising activity against different viruses, ranging from common respiratory viruses such as influenza and RSV to emerging viruses such as SARS, MERS, Ebola and Zika. These antibodies are candidates for prophylaxis and treatment of infectious diseases and are used as tools to identify optimal vaccine components in a process of antibody-guided vaccine design.

These studies also led to the discovery of a new type of antibodies that are frequently produced by malaria-infected individuals. The new antibodies contain an extra domain that is derived from a cellular protein that is targeted by the parasite to evade the immune response. Different modalities of insertion lead to "naturally engineered antibodies". These findings shed light on the complex interaction between the malaria parasite and the immune system and suggest that similar antibodies might be spontaneously produced in response to other pathogens. Antonio Lanzavecchia's work illustrates how basic immunological research has the potential to generate new antibody therapies and vaccines and can lead to unexpected discoveries that reveal the ingenuity of Nature.

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 far been awarded to 88 researchers: 27 in the United Kingdom, 15 in Germany, 16 in Switzerland, 14 in France, 4 in Sweden, 3 in the Netherlands, 2 in Austria, 2 in Belgium, 2 in Finland, 2 in Norway and 1 in Italy. Among the 88 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 more than CHF 60m has been awarded by the Foundation to the 88 prize-winners for the continuation of their work.

THE LOUIS-JEANTET FOUNDATION

Founded 35 years ago, the Louis-Jeantet Foundation 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. At 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.

For more information, please contact:

Jürg A. SCHIFFERLI

Secretary of the Scientific Committee of the Louis-Jeantet Foundation

Tel: +41 (0) 79 771 8515

E-mail : schifferli@jeantet.ch

Website: www.jeantet.ch

Christer BETSHOLTZ

Tel. : + 46 (0) 8 524 82590

E-mail: christer.betsholtz@ki.se

christer.betsholtz@igp.uu.se

Website: <http://ki.se/en/people/chrbet>

<http://www.igp.uu.se/research/vascular-biology/christer-betsholtz/>

Antonio LANZAVECCHIA

Tel.: +41 (0) 91 820 0310

E-mail : lanzavecchia@irb.usi.ch

Website: <http://www.irb.usi.ch/director-institute>

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