
PRESS RELEASE

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2014 LOUIS-JEANTET PRIZE FOR MEDICINE

The 2014 LOUIS-JEANTET PRIZE FOR MEDICINE is awarded to the Italian biochemist Elena Conti, Director of the Department of Structural Cell Biology at the Max-Planck Institute of Biochemistry in Munich (Germany) and to Denis Le Bihan, the French medical doctor, physicist and Director of NeuroSpin, an institute at the French Nuclear and Renewable Energy Commission (CEA) at Saclay near Paris.

The LOUIS-JEANTET FOUNDATION grants the sum of CHF 700'000 for each of the two 2014 prizes, of which CHF 625'000 is for the continuation of the prize-winner's work and CHF 75'000 for their personal use.

THE PRIZE-WINNERS are conducting fundamental biological research which is expected to be of considerable significance for medicine.

ELENA CONTI is awarded the 2014 Louis-Jeantet Prize for Medicine for her important contributions to understanding the mechanisms governing ribonucleic acid (RNA) quality, transport and degradation.

In order to function properly, our cells need to degrade macromolecules that are faulty or no longer needed. The biochemist deciphered at the level of atomic resolution how faulty RNAs are recognized and eliminated. Notably, her group deciphered the three-dimensional architecture and molecular mechanisms of the exosome, a multiprotein complex that recognizes and degrades RNAs. The work revealed that several principles of the mechanism of this essential nano-machine are conserved in different forms of life.

Elena Conti will use the prize money to conduct further research into the structure and regulation of the exosome.

DENIS LE BIHAN is awarded the 2014 Louis-Jeantet Prize for Medicine for the development of a new imaging method that has revolutionized the diagnosis and treatment of strokes.

This medical doctor and physicist developed a highly innovative technique of brain imaging, diffusion MRI. It is currently a key method for detecting strokes, for quickly commencing treatment and thus for improving life for numerous patients. The technique has also been used for detecting cancer, and for mapping the fibres connecting different brain regions, thus opening the way for a better understanding of Alzheimer's disease, of autism, schizophrenia and neurological disorders.

Denis Le Bihan will use the prize money to continue work on understanding the mechanisms governing water diffusion in the brain, and to develop new applications for diffusion MRI in medicine.

THE AWARD CEREMONY will be held in Geneva (Switzerland) on **Wednesday, 9 April 2014**.

ELENA CONTI

Elena Conti was born in 1967 in Varese, Italy. She studied chemistry at the University of Pavia and in 1996 received her PhD from the Faculty of Physical Sciences at the Imperial College of Science, Technology and Medicine in London (UK). Conti carried out her post-doctoral work at the Rockefeller University in New York (USA). She returned to Europe in 1999 to set up her own research group at the European Molecular Biology Laboratory (EMBL) in Heidelberg (Germany). In 2006, she was appointed Director and Scientific Member at the Max Planck Institute of Biochemistry in Munich (Germany), where she heads the Department for Structural Cell Biology. Since 2007, she is Honorary Professor at the Ludwig Maximilian University of Munich.

In 2009, Conti was elected member of the European Molecular Biology Organization (EMBO) and of the German National Academy of Sciences Leopoldina. In recognition of her work, she received several awards, including: in 2005 the Early Career Award of the European Life Science Organization, in 2008 the Gottfried Wilhelm Leibniz Prize of the German Research Foundation (shared with Elisa Izaurralde) and in 2010 the Hans Krebs medal from the Federation of European Biochemical Societies. In 2010 she was bestowed the title of Knight of the Italian National Order of Merit.

Molecular shredders for RNA

Just like we use shredders for destroying documents that contain potentially damaging information or that are no longer needed, cells use molecular machines for degrading defective or unneeded macromolecules. Elena Conti has studied the protein complexes that function as cellular nano-machines for shredding RNAs.

RNAs constitute a large family of macromolecules. They are present in all our cells and have multiple functions, such as allowing the translation of genomic information into proteins. Cells have sophisticated quality control systems to recognize RNAs that are either defective or no longer needed, and to swiftly degrade them. Failure in these surveillance systems leads to the accumulation of harmful macromolecules that are damaging to the cells and cause pathologies at the level of the organism.

Conti and her team have solved and visualized the atomic structures of intricate protein complexes caught in the act of marking RNAs (the exon junction complex) and of degrading them (the exosome complex). The results have shown that the molecular mechanisms used by the exosome complex for degrading RNAs are broadly present across different forms of life, and exhibit conceptual similarities with the mechanisms used by the proteasome, the cellular nano-machine that shreds proteins.

DENIS LE BIHAN

Born in 1957, Denis Le Bihan studied medicine and human biology at the University of Paris VI, (Salpêtrière Faculty of Medicine) and physics at the University of Paris XI (Ecole Polytechnique laboratory). In 1987, he joined the Clinical Center of the National Institutes of Health (NIH) in Bethesda, to pursue his research on brain imaging. He returned to France in 1994, where he worked at Service Hospitalier Frédéric Joliot of the Nuclear and Renewable Energy Commission (CEA) at Saclay near Paris, and headed the laboratory of anatomical and functional neuroimaging. In 2005 he became Visiting Professor at the University of Kyoto in Japan, and in 2007 founded NeuroSpin. He is still the Director of this institute at the CEA, which has the goal of developing the use of ultra high field magnetic resonance for the understanding of cerebral functions and pathologies.

Denis Le Bihan has authored numerous publications and is a member of various scientific committees. His scientific contributions are acknowledged throughout the world. He is a Knight of the French national Order of Merit, a full member of the French Academy of Sciences and Academy of Technologies, as well as the European Academy of Sciences. He is the recipient of numerous awards, notably the gold medal of the International Society of Magnetic Resonance in Medicine (2001) and the Richard Lounsbery Award of the French and American Academies of Science (2002). In 2003 he shared (with S. Dehaene) the award of the "Fondation Louis D." of the "Institut de France", and in 2012 he won the prestigious Honda Prize.

The diagnosis of neurological diseases

Our brain is made up of 80% of water molecules that are continuously in movement at very low amplitude – so-called Brownian motion. When he was still a student, Denis Le Bihan had the idea of using MRI (magnetic resonance imaging) to observe these minute movements of molecules and to examine the microscopic structure of cerebral tissue. He had thus invented diffusion MRI.

This imaging technique is used throughout the world for the diagnosis of strokes. Strokes are caused by a blood clot forming in an artery, blocking circulation of the blood and leading to the death of neurons. The infarcted area is clearly visible on diffusion MRI images very soon after the stroke, and notably when the lesions are still small in size or multiple. Forms of treatment have hence been developed for dissolving the blood clots and thus improving or even eliminating the symptoms and avoiding the onset of serious disabilities. This technique is now used for the management of patients suffering from a stroke.

Diffusion MRI is also used for cancer detection, on the basis that proliferating cancer cells will act as an obstacle to the water and hence reduce its rate of diffusion.

Denis Le Bihan's method has for the first time made it possible to build 3D maps of the connections between the neurons in the brain. Already in use among neuroscience specialists, these maps are starting to be used in the medical domain and should in time lead to a better understanding of diseases associated with ageing (like Alzheimer), mental disorders (autism or schizophrenia), problems of addiction or neurological pathologies.

THE LOUIS-JEANTET PRIZE FOR MEDICINE

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

Established in 1986, the Louis-Jeantet Prize for medicine has thus so far been awarded to 80 researchers: 25 in the United Kingdom, 15 in Germany, 14 in Switzerland, 13 in France, three in the Netherlands, three in Sweden, two in Belgium, two in Finland, two in Norway and one in Austria. Their geographical distribution by country does not reflect the nationalities of the prize-winners - who can come from all over the world. It reflects the spread of the European centres of excellence in biomedical research.

The key research fields encouraged by the Louis-Jeantet Prize for medicine are physiology, biophysics, structural biology, biochemistry, cellular and molecular biology, developmental biology and genetics.

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 encourage the continuation of innovative research projects with high added value and of more or less immediate practical significance in the treatment of diseases.

Since 1986, a total sum of over CHF 54m has been awarded by the Foundation to the 75 prize-winners for the continuation of their work.

THE LOUIS-JEANTET FOUNDATION

The aim of the Louis-Jeantet Foundation is to move medicine forward, and to defend the role and identity of European biomedical research vs. international competition. It is the legacy of Louis Jeantet, a French businessman and a citizen of Geneva by adoption. Established in Geneva (Switzerland), the Foundation commenced activities in 1983.

The Louis-Jeantet Foundation devotes some CHF 4.5m 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, as well as the synergy of competences between this faculty and the graduate schools and university hospitals of the Lake Geneva region.

Since 2010, EMBO and the Louis-Jeantet Foundation are cooperating to 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 the EMBO Meeting hosts the Louis-Jeantet prize-winners' Lectures

A more detailed summary of the prize-winners' work is available on request at liernur@jeantet.ch.

For any further information you may require, please do not hesitate to contact:

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