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## PRESS RELEASE

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### 2011 LOUIS-JEANTET PRIZE FOR MEDICINE

**The 2011 LOUIS-JEANTET PRIZE FOR MEDICINE is awarded to the German biologist STEFAN JENTSCH, a Director at the Max-Planck Institute of Biochemistry in Martinsried, and to the Norwegian neurobiologists EDVARD and MAY-BRITT MOSER, Director and Co-director respectively of the Kavli Institute for Systems Neuroscience at the Norwegian University of Science and Technology (NTNU) in Trondheim.**

The LOUIS-JEANTET FOUNDATION grants the sum of CHF 700'000 for each of the 2011 prizes, of which CHF 600'000 is for the continuation of the prize-winners' work and CHF 100'000 for their personal use.

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

**STEFAN JENTSCH is awarded one of the 2011 Louis-Jeantet Prizes for Medicine for his work on small protein modifiers and their role in DNA repair.**

The German researcher pioneered studies on protein modifications by ubiquitin and related proteins. Modification of proteins by ubiquitin usually targets the proteins for degradation. However, STEFAN JENTSCH's research revealed that ubiquitin plays also a crucial role in genome maintenance and DNA repair. This research has significant medical importance as damaged DNA can cause various diseases, notably cancer.

STEFAN JENTSCH will use the prize money to continue his research on ubiquitin and related proteins. He is also planning to study the mechanisms that allow damaged chromosomes to be repaired.

**EDVARD and MAY-BRITT MOSER will share the other 2011 Louis-Jeantet Prize for Medicine for their discovery of "grid cells" in the brain. These neurons have a specific function as regards spatial representation, and allow mammals to know precisely their spatial location and to move from one place to another.**

For ten years the two Norwegian researchers have been studying how the brain builds a spatial map that allows rats – and probably other mammals including humans– to know their spatial location. In the entorhinal cortex of rodents they have notably discovered specific neurons named "grid cells" that are associated with this activity, suggesting this part of the brain is a crossroads of the cerebral network that enables mammals to find their way.

EDVARD and MAY-BRITT MOSER will use the prize money to continue their research on "grid cells" in order to better understand how they interact with other cells of the entorhinal cortex and hippocampus also contributing to spatial navigation and memory.

THE AWARD CEREMONY will be held in Geneva (Switzerland) on Thursday, 14 April 2011.

## STEFAN JENTSCH

Stefan Jentsch was born 1955 in Berlin, where he studied and obtained his PhD in 1983. Post-doctoral work then followed at the Massachusetts Institute of Technology (MIT) in Cambridge (USA). On his return to Germany, he was research group leader at the Friedrich-Miescher Laboratory of the Max-Planck Society in Tübingen and then professor at the University of Heidelberg. In 2003, he moved to the Max-Planck Institute of Biochemistry in Martinsried, where he heads the Department of Molecular Cell Biology. He is the second member of his family to be awarded the Louis-Jeantet Prize for Medicine: his brother Thomas Jentsch, Head of Department at the Leibniz-Institute for Molecular Pharmacology (FMP/MDC) in Berlin, already won the prize in 2000.

Stefan Jentsch is a fellow of the German National Academy of Sciences Leopoldina and of the European Molecular Biology Organization (EMBO), as well as honorary professor at Fudan University in Shanghai (China). He has already received several distinctions, in particular the Otto Klung Prize for Chemistry, the Otto Bayer Prize, the Gottfried Wilhelm Leibniz Prize and the Max-Planck Research Award from the Humboldt and Max-Planck Societies.

### Ubiquitin and human diseases

Each cell has a large number of proteins at its disposal, which steer all life functions. Each protein takes on special tasks, but these can be altered through protein modifications.

Modification of proteins by ubiquitin usually targets the proteins for degradation. Not only did Stefan Jentsch reveal that ubiquitin also plays a crucial role in genome maintenance and DNA repair, but he also was the first to discover the genes for ubiquitin activation and conjugation enzymes, and to define their various functions.

The German researcher discovered a “molecular switch”, which acts through protein modification of the protein PCNA (Proliferating Cell Nuclear Antigen) by ubiquitin and a related protein called SUMO (Small Ubiquitin-like MOdifier). This “PCNA switch” facilitates flawless duplication of the genome and also controls genetic mutations, such as those arising from the effects of UV light. Its role is fundamental, for errors in the process of DNA duplication cause genome instability, which in turn results in ageing and in the development of cancers.

Stefan Jentsch’s discoveries have medical implications since defective ubiquitylation is the cause of numerous human diseases, from breast cancer to Fanconi anemia and *Xeroderma pigmentosum*.

## **EDVARD and MAY-BRITT MOSER**

Edvard Moser was born 1962 in Ålesund and May-Britt Moser in 1963 in Fosnavåg, Norway. Both studied several different disciplines, in particular mathematics, statistics, computer programming, neurobiology and psychology at the University of Oslo, where they received doctorates in neurosciences in 1995, followed by post-doctoral training in the United Kingdom. On their return to Norway in 1996, they were nominated as associate professors in biological psychology at the Norwegian University of Science and Technology (NTNU) in Trondheim. They are now professors of neurosciences at the Faculty of Medicine of this university. At this same university, they founded in 2002 the Centre for the Biology of Memory, and in 2007 the Kavli Institute for Systems Neuroscience, where they hold the positions of Director and Co-director respectively.

Edvard and May-Britt Moser are both fellows of the Norwegian Academies of Sciences and Technological Sciences, as well as of various other scientific bodies. They have received several distinctions, in particular the W. Alden Spencer Award of Columbia University in 2005, the Liliane Bettencourt Prize for Life Sciences in 2006, and the Eric K. Fernström's Great Nordic Prize in 2008.

### **The brain makes its own maps**

The brain of the rat – and probably our brain too – has a kind of “biological GPS” which provides individuals with a sense of spatial orientation, the ability to find their way when they need to go from one point to another, and to memorize spatial environments. The various types of neurons that contribute to achieving this are situated in two parts of the brain: the hippocampus and the entorhinal cortex.

The entorhinal cortex – where information is processed prior to being sent to the hippocampus – is where Edvard and May-Britt Moser discovered, in 2005, the existence of special neurons which they called “grid cells”. These cells fire selectively when the individual passes different locations in the environment. The firing locations of each cell define a periodic triangular array that tiles the entire space visited by the subject, much like the cross points of graphics paper, but with an equilateral triangle as the unit of the grid. The brain thus makes its own maps.

The entorhinal cortex thus turns out to be a crossroads in the network of neurons that allows us to find our way. After discovering the “grid cells”, the Norwegian neurobiologists identified other types of neurons which play a part in navigation. They indeed found cells, in the same brain system, that respond selectively depending on the direction taken by the animal, and others which tell it when it is approaching the physical limits of its environment. They also showed that the signals emanating from these different cells are used by spatial memory circuits situated in the hippocampus.

Edvard and May-Britt Moser's discoveries – in particular the “grid cells” which the magazine *Science* described as the most important finding in the field for two decades – are quite remarkable. They have shown how the brain calculates the position of the organism in its spatial environment, completely overturning prior conventional thinking in the field.

## 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. This is the first time the Prize goes to Norwegian researchers.

Established in 1986, the Louis-Jeantet Prize for Medicine has thus so far been awarded to 73 researchers: 23 in the United Kingdom, 14 in Switzerland, 12 in France, 11 in Germany, 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 approximately CHF 50m has been awarded by the Foundation to the 73 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 posthumous work 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 project. On the European level, apart from the annual Louis-Jeantet Prize for Medicine, the Foundation will for the first time in 2011 award the Louis-Jeantet Young Investigator Career Award, the winner of which is chosen in cooperation with the European Research Council. 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.

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*Since 2010, the European Molecular Biology Organization (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 sponsors the Louis-Jeantet prize-winners' Lectures at The EMBO Meeting 2011, in Vienna, from 10-13 September.*

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**A more detailed summary of the prize-winners' work is available on request at [info@jeantet.ch](mailto:info@jeantet.ch).**

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

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