

2020 LOUIS-JEANTET PRIZES

The 2020 Louis-Jeantet Prizes are awarded to ERIN SCHUMAN, director of the Max Planck Institute for Brain Research in Frankfurt, Germany, and jointly to GRAZIELLA PELLEGRINI and MICHELE DE LUCA, from the Centre for Regenerative Medicine “Stefano Ferrari” in Modena, Italy.

The LOUIS-JEANTET FOUNDATION grants the sum of CHF 500,000 for each prize, of which CHF 450,000 is for the continuation of the prize-winner's research and CHF 50,000 is for their personal use.

The prize-winners are conducting fundamental and translational research that is of considerable significance for medicine.



GRAZIELLA PELLEGRINI and MICHELE DE LUCA, of Italian nationality, will share the 2020 Jeantet-Collen Prize for Translational Medicine for the development of epithelial stem cell-based regenerative therapy in patients with severe eye and skin disease.

The use of stem cells to treat or prevent a disease, offer great promise in regenerative medicine. Graziella Pellegrini and Michele De Luca have played a pivotal role in establishing epithelial stem cell therapies, combining them with gene therapy. Their discoveries in the fields of corneal regeneration and skin replacement therapies have allowed hundreds of patients to be treated.

Graziella Pellegrini and Michele De Luca will use the prize money to pursue research on new cell and gene therapies to restore vision in patients who have suffered corneal injuries as well as to cure patients affected by devastating genetic skin diseases.



ERIN SCHUMAN, of American nationality, is awarded the 2020 Louis-Jeantet Prize for Medicine for her work on the requirement for local protein synthesis in synaptic plasticity.

Synaptic plasticity is one of the fundamental mechanisms underlying learning and memory. Erin Schuman and her team have provided the first evidence that proteins made locally near synapses enable and enhance synaptic communication and plasticity. Her work is central for understanding how synapses work as well as how to target neurodevelopmental disorders and rehabilitation following brain damage.

Erin Schuman will use the prize award to examine how protein synthesis and degradation mechanisms are optimized to serve the needs of brain synapses.

THE AWARD CEREMONY WILL BE HELD IN GENEVA (SWITZERLAND) ON **WEDNESDAY, APRIL 22nd 2020**

GRAZIELLA PELLEGRINI and MICHELE DE LUCA

Born in Genoa in 1961, Graziella Pellegrini (“GP”) earned her degrees in Chemistry and Pharmaceutical Technologies in 1988 and Pharmacy in 1989 from the University of Genoa. She carried out her postdoctoral work at the Advanced Biotechnology Center in Genova before becoming deputy head of the Laboratory of Tissue Engineering of Istituto Dermatologico dell’Immacolata (IDI) in Rome and Director of the Regional Research Center on Epithelial Stem Cells in Venice.

Michele De Luca (“MDL”) was born in Savona in 1956. He received his M.D. from the University of Catania and his specialization in endocrinology from the University of Rome. He was a fellow at the National Institutes of Health in Bethesda, USA and a visiting scientist at Harvard Medical School, USA. He was senior investigator at the Laboratory of Stem Cell Differentiation at the National Institute for Cancer Research in Genova, head of the Laboratory of Tissue Engineering at IDI in Rome and scientific director of the Veneto Eye Bank Foundation in Venice.

Currently, they both are full professors of Biochemistry (MDL) and Applied Biology (GP) and coordinators of cell (GP) and gene (MDL) therapy at the Centre for Regenerative Medicine of the University of Modena and Reggio Emilia, Italy. They are co-founders, members of the Board, Scientific Director (MDL), and Director of Research & Development (GP) of Holostem Therapie Avanzate S.r.l., of Modena, Italy.

Epithelial stem cells in cell and gene therapy

Few people today dispute the enormous potential of stem cells for regenerative medicine. Yet, despite an ever-increasing number of reports where stem cells are used to treat various disorders, proven stem-cell therapies remain few and far between. Graziella Pellegrini and Michele De Luca have dedicated most of their scientific activities to the study of epithelial stem cell biology aimed at clinical application in regenerative medicine, where their work has been pivotal.

In 2015, the European Medicines Agency recommended Holoclar, a treatment for moderate to severe limbal stem cell deficiency (“LSCD”) and the first advanced therapy medicinal product containing stem cells, for approval in the European Union. Limbal stem cells are stem cells located in the basal epithelial layer of the cornea. Damage caused by external factors such as chemical or thermal burns, can result in LSCD, leading to visual impairment and blindness. Holoclar, developed by De Luca and Pellegrini, allows full recovery of normal vision and has already cured hundreds of patients. To achieve this, the team first characterized the molecular mechanisms regulating long term proliferative potential, clonal evolution and self-renewal of epithelial stem cells, before developing the treatment, thus bridging basic science and medicine.

Their pioneering work on the use of human epidermal stem cell cultures also allowed hundreds of patients to be treated from their life-threatening burns as well as treating patients affected by vitiligo and piebaldism. Recently, Michele De Luca and Graziella Pellegrini took on the challenge of severe genetic skin disease. This required a combination of stem cell and gene therapy by means of transplantation of autologous epidermal sheets prepared from genetically corrected epidermal stem cells. They reported life-saving regeneration of the entire, fully functional, epidermis on a 7-year-old “Butterfly Child” suffering from a devastating, life-threatening form of Junctional Epidermolysis Bullosa and showed that the human epidermis is sustained only by a limited number of long-lived stem cells detected as holoclones. Based on their rigorous basic research work, De Luca and Pellegrini have developed new stem cell therapies that are now applied worldwide. Their approach to combine transplantation of cultured adult stem cells with gene therapy provides a blueprint that can be applied to the development of other adult stem cells for clinical therapies.

ERIN SCHUMAN

Born in 1963, Erin Schuman obtained her Bachelor's degree from the University of Southern California and her Ph.D. in Neuroscience from Princeton University. She carried out her postdoctoral work in Molecular and Cellular Physiology at Stanford University. In 1993 she joined the Biology faculty at the California Institute of Technology. In 1997 she was also appointed as an investigator of the Howard Hughes Medical Institute. In 2009 she was recruited as a founding director of the Max Planck Institute for Brain Research and moved to Frankfurt, Germany, where she heads the Department of Synaptic Plasticity.

In 2014 Erin Schuman was elected to the European Molecular Biology Organization (EMBO) and in 2017 she was elected to the German National Academy of Sciences Leopoldina. Throughout her career, she has been honoured with awards and recognition, including the Pew Biomedical Scholar Award, the Beckman Young Investigator Award, and mostly recently the Salpeter Lifetime Achievement Award from the Society for Neuroscience.

Local solutions to protein management in the brain

Brain cells ("neurons"), with their complicated branches (dendrites and axons), are the most structurally complex cells in the body. The strength of communication between brain cells is determined and regulated by proteins that inhabit their connections, called synapses. Most "synapses" are located far away from the cell body and nucleus. Given the distance of synapses from the cell body, how do they get the proteins they need to function at the right place at the right time and in the correct amount? Erin Schuman has provided key evidence that many proteins are made locally near synapses and can be used to enhance synaptic communication, a cellular correlate of memory.

Erin Schuman and her team discovered that protein synthesis occurs in neuronal processes. To study mRNA translation *in vivo*, her lab developed techniques for monitoring newly synthesized proteins. In 1996, in the course of exploring how growth factors enhance brain communication, Schuman made the seminal discovery that local protein synthesis within dendrites is required for this form of plasticity. She obtained some of the first direct evidence that protein synthesis occurs locally in dendrites. Her team discovered thousands of mRNAs localized to neuronal axons and dendrites. In addition, Schuman (together with her colleagues Tirrell and Dieterich) developed new methods to tag, purify, identify and visualize newly synthesized proteins in cells using non-canonical amino acids and click chemistry. Erin Schuman's work illustrates how protein synthesis machines and mechanisms have been specialized to serve the special needs of neurons. Her studies aim to understand brain plasticity, a crucial aspect of the learning and memory processes, as well as for sensory, motor and psychological rehabilitation after brain damage.

THE LOUIS-JEANTET PRIZES

Every year, the Louis-Jeantet Prizes distinguish leading-edge researchers who are active in the member states of the Council of Europe.

As one of the best-endowed awards in Europe, the Louis-Jeantet Prizes foster scientific excellence. They are not intended solely as the recognition of work that has been completed, but also to encourage the continuation of innovative research projects. When the research being recognised is close to practical applications for combating illnesses affecting humankind, one of the Louis-Jeantet Prizes converts into a Jeantet-Collen Prize for Translational Medicine, supported by generous donations from the Désiré Collen Stichting.

Established in 1986, the Louis-Jeantet Prizes have thus far been awarded to 93 researchers: 27 in the United Kingdom; 17 in Switzerland; 16 in Germany; 14 in France; 4 in Sweden and Italy; 3 in the Netherlands; and 2 each in Austria, Belgium, Finland and Norway. Among the 93 prize-winning researchers, 13 have subsequently won the Nobel Prize for physiology or medicine, or the Nobel Prize for chemistry.

Since 1986, a total sum of more than CHF 60 million has been awarded by the Foundation to the 93 prize-winners for the continuation of their work.

THE LOUIS-JEANTET FOUNDATION

Founded in 1983, the Louis-Jeantet Foundation is the legacy of Louis Jeantet, a French businessman and a citizen of Geneva by adoption. The Foundation's 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 3 million each year to promoting biomedical research. It invests this sum 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.

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