PRESS RELEASE
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2022 LOUIS-JEANTET PRIZES

The 2022 Louis-Jeantet Prizes are awarded to CAROL ROBINSON, Director of the Kavli Institute for Nanoscience Discovery at the University of Oxford, UK, and, jointly, to UĞUR ŞAHIN, ÖZLEM TÜRECI, Mainz University and co-founders of BioNTech and KATALIN KARIKÓ, Professor at the University of Szeged, Hungary and senior vice-president of BioNTech, Germany.

2022 Louis-Jeantet Prize for Medicine

CAROL ROBINSON, of British nationality, is awarded the 2022 Louis-Jeantet Prize for Medicine for establishing mass spectrometry as a rigorous method to analyse the composition of protein complexes, and their interactions with small molecules.

Carol Robinson has pioneered the use of native protein mass spectrometry as a technology for understanding the molecular interactions, stability, and function of membrane proteins. These proteins, which are part of the membranes of our cells and constitute some 30% of the human proteome, are medically important as they are the targets for more than half of all drugs. Her methods are being applied to drug discovery for a variety of complex targets, addressing severe unmet medical needs.

Carol Robinson will use the prize money to further her research into membrane proteins focussing particularly on those within their native environments.

2022 Jeantet-Collen Prize for Translational Medicine

UĞUR ŞAHIN and ÖZLEM TÜRECI, of German nationality and KATALIN KARIKÓ, of Hungarian nationality, will share the 2022 Jeantet-Collen Prize for Translational Medicine for the design and development of mRNA-based vaccines that safely protect humankind against the deadly SARS-CoV-2 virus.

Uğur Şahin, Özlem Türeci and Katalin Karikó's work on messenger RNA (mRNA) for therapeutic purposes has culminated in the spectacularly rapid development of a highly effective vaccine against the coronavirus SARS-CoV-2, which has proven to play a decisive role in the worldwide containment of the COVID-19 pandemic. Their work will have unparalleled impact in the development of future vaccines against pathogens and cancer cells.

Uğur Şahin, Özlem Türeci and Katalin Karikó will use the prize award to further deepen their research on mRNA-based vaccines and immunotherapies.

The LOUIS-JEANTET FOUNDATION endows each of the two prizes with CHF 500,000, of which CHF 450,000 is intended to finance the continuation of the of the prize-winners' research and CHF 50,000 is for their personal use.

THE AWARD CEREMONY WILL BE HELD IN GENEVA (SWITZERLAND) ON **TUESDAY, OCTOBER 11th 2022.**

CAROL ROBINSON

Born in 1956, Professor Dame Carol Robinson graduated from the Royal Society of Chemistry in 1979 and completed her PhD at the University of Cambridge. She took an eight-year career break to bring up her children and later became the first female Professor of Chemistry at the University of Cambridge (2001-2009). She has held the Chair of Dr. Lee's Professor of Chemistry at the University of Oxford since 2009 and is Oxford's first female Professor of Chemistry. Since 2021 she has been Director of the Kavli Institute for Nanoscience Discovery.

Her work has attracted many awards including the Othmer Gold Medal from the Science History Institute, the Royal Medal A from the Royal Society, the Novozymes Prize and the Stein and Moore Award. She is the former President of the Royal Society of Chemistry, a Foreign Associate of the National Academy of Sciences USA and EMBO member. She holds fifteen honorary doctorates and offices and was appointed DBE in 2013 for her contributions to science and industry.

Soap bubbles for proteins

Carol Robinson is a founder and world leader of the native protein Mass Spectrometry (MS) field. Her focus is on membrane protein complexes and their interactions with ligands. Membrane proteins are hugely important drug targets but are incredibly hard to study as they are imbedded in a lipid hydrophobic membrane, whereas the parts on either side of the membrane are hydrophilic. When Carol Robinson began her research career, it was largely assumed that proteins needed to be denatured or even digested for analysis by MS, which entails the loss of their biological activity.

In 2008 Carol Robinson changed this perspective by discovering that intact, heterogeneous membrane protein complexes could be injected into the mass spectrometer if first imbedded in detergent micelles, or giant soap bubbles. These bubbles shield and protect the membrane proteins, so that they are transferred into the gas phase in their native folded state. Using this method, she uncovered mechanistic details of many different types of integral membrane proteins, including channels, transporters, and receptors, and has been able to study their association with lipids. Her work has wide medical impact, as her techniques are now routinely used to study a variety of processes spanning from antibody characterisation and small molecule drug screening to antibiotic resistance.

UĞUR ŞAHIN, ÖZLEM TÜRECI and KATALIN KARIKÓ

Born in 1965, **Uğur Şahin** studied medicine at the University of Cologne, Germany and graduated with a doctoral thesis in cancer immunotherapy. He then worked as a physician and scientist in Cologne, Homburg, Zürich and Mainz before being appointed Professor of Experimental Oncology in 2006 at the University of Mainz.

Born in 1967, **Özlem Türeci** studied medicine at Saarland University in Homburg, Germany where she graduated in 1992. She completed her habilitation qualification at the University of Mainz, where she has been a Lecturer in Cancer Immunotherapy since 2002. Since 2021 she is also Professor of Individualized Immunotherapy at the Helmholtz Institute HI-TRON.

Born in 1955, **Katalin Karikó** studied biochemistry at the University of Szeged, Hungary, where she earned her PhD. She then moved to Temple University, Philadelphia, USA for her postdoctoral studies before being appointed Adjunct Professor at the University of Pennsylvania where she investigated RNA-mediated immune activation. Since 2021 she is Professor at the University of Szeged, Hungary.

In 2001, Uğur Şahin, Özlem Türeci and Christoph Huber co-founded Ganymed Pharmaceuticals, a company developing monoclonal antibodies directed against novel cancer cell surface targets discovered by them, for use against oesophageal and gastrointestinal cancer. In 2008 they co-founded the biotechnology company BioNTech, were Uğur Şahin serves as CEO and Özlem Türeci as Chief Medical Officer. Katalin Karikó joined BioNTech in 2013 as vice-president and became a senior vice-president in 2019.

Uğur Şahin, Özlem Türeci and Katalin Karikó have received many awards, including the National German Sustainability Award (Sahin and Türeci), the Knight Commander's Cross of the Order of Merit of the Federal Republic of Germany (Sahin and Türeci), the Award of the Hall of Fame of German Science (Sahin and Türeci), the Paul-Ehrlich Prize (Sahin, Türeci and Karikó), the Breakthrough Prize in Life Sciences and the Lasker-DeBakey Clinical Medical Research Award (Karikó).

An mRNA vaccine

mRNAs are messenger molecules that carry the genetic information encoded by DNA, found in the nucleus, to the protein making machinery which is found in the cytoplasm of the cell. Here the RNA messages are read and translated into fully functional proteins which will carry out the many tasks needed for a functioning cell. Each specific mRNA codes a specific protein. Traditional vaccines are protein-based, i.e. they use viral proteins which have been weakened or deactivated to induce an immune response. However, growing large amounts of a virus and then weakening the virus or extracting the protein takes time and resources.

In the 1990s, a handful of scientists began exploring whether vaccines could be made more simply. If you know the exact structure of the mRNA that makes the critical piece of a virus' protein coat, such as the spike protein, could you inject the mRNA and let our cell machinery do the translation? The idea seems simple, but it kindled little enthusiasm in the community as mRNAs are unstable molecules and exogenous mRNAs produce immune reactions and are destroyed before being taken up by our cells. Through their dedicated research over the last 20 years, Uğur Şahin, Özlem Türeci and Katalin Karikó played key and complementary roles in the development of a clinically effective and safe mRNA-based vaccine against COVID-19. In ground-breaking research, Katalin Karikó, in collaboration with Drew Weissman, investigated RNA-mediated immune activation and discovered that making specific modifications to the nucleosides in the mRNA could suppress the body's own inflammatory response against the synthetic mRNA. Uğur Şahin and Özlem Türeci, who have a long-lasting interest in mRNA-based drugs for use as individualized cancer immunotherapies, solved several mRNA-associated vaccine problems: they developed methods for delivering mRNA to dendritic cells using a suitable lipid carrier; they enhanced their stability; and they increased the level of protein translation.

Collectively, vaccines have done more good for humanity than any other medical advance in history. The work of Uğur Şahin, Özlem Türeci and Katalin Karikó has not only played a decisive role in the worldwide containment of the COVID-19 pandemic but has proven the potential of mRNA as a new drug class.

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 100 researchers: 28 in the United Kingdom; 19 in Germany; 17 in Switzerland; 15 in France; 4 each in Sweden, Italy and the Netherlands; 2 each in Austria, Belgium, Finland and Norway; and 1 in Hungary. Among the 100 prize-winning researchers, 14 have subsequently won the Nobel Prize in Physiology or Medicine, or the Nobel Prize in Chemistry.

Since 1986, a total sum of more than CHF 60 million has been awarded by the Foundation to the 100 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 2.5 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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