



Boehringer Ingelheim
Stiftung

2019
HEINRICH WIELAND PRIZE



AWARD SYMPOSIUM OF THE 2019 HEINRICH WIELAND PRIZE

Nymphenburg Palace, Munich, Germany
Thursday, 7 November 2019

HEINRICH WIELAND PRIZE

The international Heinrich Wieland Prize honours distinguished scientists for their outstanding research on biologically active molecules and systems in the fields of chemistry, biochemistry, and physiology as well as their clinical importance. The prize is endowed with 100,000 euros by the Boehringer Ingelheim Foundation and named after Heinrich Wieland (1877–1957), Nobel Laureate in Chemistry in 1927.

Every year, the Foundation invites scientists to make nominations in an open call. It entrusts the selection of the awardees to a scientific Board of Trustees, all of whom work in an honorary capacity (see page 7 for current members). Presented annually since 1964, the Heinrich Wieland Prize has four subsequent Nobel Laureates among its awardees.

www.heinrich-wieland-prize.de



AWARD SYMPOSIUM

- 3:30 p.m. **Registration**
- 4:00 p.m. **Welcome and opening remarks**
Professor Dr Franz-Ulrich Hartl, Chair of the Board of Trustees of the
Heinrich Wieland Prize, Max Planck Institute of Biochemistry, Martinsried, Germany
- 4:10 p.m. **“Leptin and the neural circuit regulating body weight”**
Professor Jeffrey M. Friedman, MD, PhD,
The Rockefeller University, New York, NY, USA
- 4:50 p.m. **“Central intracellular mechanisms in metabolism regulation”**
Professor Sabrina Diano, PhD,
Yale University, New Haven, CT, USA
- 5:30 p.m. **Coffee break** including **“Meet the Speakers”** for selected students
- 6:10 p.m. **“Unimolecular combination therapeutics for the treatment of obesity and type
2 diabetes”**
Professor Dr Matthias H. Tschöp,
Helmholtz Zentrum München, Munich, Germany
- 6:50 p.m. **Award ceremony**
Moderated by Dr Claudia Walther,
Managing Director of the Boehringer Ingelheim Foundation, Mainz, Germany
- Musical introduction**
Wolfgang Amadeus Mozart (1756–1791), Divertimento in D major, KV 136, I. Allegro
- Laudation**
Professor Dr Matthias H. Tschöp
- Award presentation**
to Professor Dr Jens C. Brüning,
Max Planck Institute for Metabolism Research, Cologne, Germany
by Professor Dr Michael P. Manns, Member of the Executive Committee of the Boehringer
Ingelheim Foundation, Mainz, and Hannover Medical School (MHH), Hannover, Germany,
and by Professor Dr Franz-Ulrich Hartl
- Award lecture**
“CNS-dependent regulation of energy and glucose homeostasis”
Professor Dr Jens C. Brüning
- Musical conclusion**
Wolfgang Amadeus Mozart (1756–1791), Divertimento in D major, KV 136, III. Presto
- 8:00–10:00 p.m. **Get-together**

Music performed by Schumann Quartet Munich (members of the Bavarian State Orchestra): Barbara Burgdorf (violin), Traudi Pauer (violin), Stephan Finkentey (viola), Oliver Göske (cello)

Professor Dr Jens C. Brüning

Max Planck Institute for Metabolism Research, Cologne, Germany

The endocrinologist and geneticist Jens Brüning is honoured with the 2019 Heinrich Wieland Prize for his pioneering research on how the brain regulates energy metabolism. He was the first to switch off insulin signalling in specific tissues in mice and thus uncovered important and surprising roles of this pathway in the development of metabolic disorders. For example, he established insulin as a critical signal for the brain to promote weight loss. In addition, he discovered that so-called Agouti-related peptide (AgRP) neurons in the hypothalamus are master regulators of food intake, glucose production in the liver, and whole body insulin sensitivity. More recently, he found evidence in mice as to why the children of obese mothers may face a higher risk of developing diabetes or obesity, a long-known clinical phenomenon: If mice are on a high-fat diet during breastfeeding – the developmental time equivalent of the last trimester of human pregnancy – the neuronal circuit that normally suppresses appetite cannot form in the hypothalamus of the pups. In addition, he has shown that the gene FTO, which is often linked with obesity and type-2 diabetes, plays a fundamental role in the control of energy expenditure, likely by changing the way neurons in the brain communicate with each other. By unravelling how neuronal circuits in the brain control the uptake, storage, and consumption of energy in the body, Brüning discovered fundamental physiological principles that will help to understand and cure prevalent metabolic diseases.



Jens Brüning studied medicine at the University of Cologne, Germany, followed by a residency in internal medicine from 1992 to 1994. For his post-doctoral research, he joined Professor C. Ronald Kahn at Harvard Medical School in Boston, USA. In 1997, he returned to Cologne to continue his residency in internal medicine and endocrinology and set up an independent research group. He obtained a tenured professorship at the Institute for Genetics at the University of Cologne in 2003, and four years later, he became coordinator of the Cologne Excellence Cluster "Cellular stress responses in aging-associated diseases (CECAD)". In 2011, he was appointed Director of the MPI for Metabolism Research and Director of the Polyclinic for Endocrinology, Diabetes, and Preventive Medicine at the University Hospital Cologne. Jens Brüning received many prestigious awards including the Gottfried Wilhelm Leibniz Prize of the Deutsche Forschungsgemeinschaft, the Minkowski Prize of the European Association for the Study of Diabetes, the Ernst Jung Award for Medicine, and the Carl Friedrich von Weizsäcker Prize. He is an elected member of EMBO, the Academy of Sciences and Arts in North Rhine-Westphalia, and the National Academy of Sciences Leopoldina.

Professor Sabrina Diano, PhD

Yale University, New Haven, CT, USA

Sabrina Diano unravelled inter- and intracellular pathways by which neurons in the hypothalamus sense hormonal and nutritional signals and translate them into a physiological response. She discovered that eating induces mitochondria in satiety-promoting neurons to produce more radicals, which activate these neurons. In mice with diet-induced obesity, she found that levels of free radicals are buffered by peroxisomes to prevent activation of neurons and explains their resistance to the satiety-promoting hormone leptin. Recently, she revealed that mitochondria are also key for keeping blood sugar at safe levels: At high levels, mitochondria divide to provide energy for the firing of glucose-excited neurons. This induces muscle and liver to respond better to insulin and lower blood sugar. Understanding these molecular pathways may open new ways to treat metabolic disorders such as obesity and type 2 diabetes.

Sabrina Diano studied biology and earned her PhD with honours in 1998 from the University of Naples "Federico II", Italy. She then joined Yale University School of Medicine in New Haven, USA, as a postdoctoral researcher and became assistant professor only two years later. Since 2012, she is tenured professor and director of the Reproductive Neurosciences Group of Yale University School of Medicine, and, in 2018, has also been named the Richard Sackler Family Professor. For her outstanding contributions to the field of diabetes research, she recently received the Helmholtz Diabetes Award.

Jeffrey M. Friedman, MD, PhD

The Rockefeller University, New York, NY, USA

Jeffrey Friedman identified key molecules that allow the body to maintain constant weight, the hormone leptin and its receptors. He revealed leptin's role in a feedback loop that controls the amount of fat: When fat mass decreases, it secretes less leptin into the blood and signals to the hypothalamus to induce appetite, while increasing fat mass secretes more leptin and the hypothalamus suppresses appetite and raises energy expenditure. With the insight that many overweight people fail to respond to leptin, he established a biologic basis for obesity and overturned the notion that obese people lack adequate self-control. He recently discovered two opposing sets of neurons in the brain stem that can bypass leptin's role to elicit hunger and satiety, respectively, and may open new ways to treat obesity and related disorders.

Jeffrey Friedman received his MD in 1977 from Albany Medical College of Union University, USA, and trained in internal medicine at Albany Medical Center Hospital. He obtained his PhD in molecular biology in 1986 from The Rockefeller University in New York, USA, where he has been a professor since 1995 and an HHMI Investigator since 1996. He received many awards, including the Canada Gairdner International Award, the Shaw Prize, the Albert Lasker Basic Medical Research Award, the Wolf Prize in Medicine, and the Heinrich Wieland Prize. He is a member of the National Academies of Sciences and of Medicine (USA), a foreign member of the Royal Society, a fellow of the AAAS, and an associate member of EMBO.

Professor Dr Matthias H. Tschöp

Helmholtz Zentrum München, Munich, Germany

Matthias Tschöp identified key players in the communication between the gastrointestinal tract and the brain to regulate sugar and lipid metabolism. He showed that the peptide hormone ghrelin, which is secreted mainly by the stomach, activates a neuronal network in the brain to trigger hunger and body weight gain. He also found that fasting and low levels of body fat induce the release of ghrelin and deciphered how ghrelin is activated. In parallel, he invented new strategies for treating metabolic diseases with hybrid molecules consisting of the bioactive domains of two different peptide hormones or a combination of a steroid with a peptide hormone. In fact, several of these innovative drug candidates to treat diabetes and obesity are already undergoing promising clinical trials.

Matthias Tschöp obtained his MD from Ludwig-Maximilians-Universität München (LMU) in Munich, Germany, in 1998. After a research stay at Eli Lilly and Co. in Indianapolis, USA, he moved to the German Institute of Human Nutrition in Potsdam in 2002. In 2003, he joined the University of Cincinnati, USA, first as associate, later as full professor. Awarded an Alexander von Humboldt Professorship in 2012, he joined Helmholtz Zentrum München, of which he has been CEO since 2018. He has received many honours, including the Erwin Schrödinger Prize, the Paul Martini Prize, the Outstanding Scientific Achievement Awards by both the American Diabetes Association and Obesity Society, and the Carus Medal of the German National Academy of Sciences Leopoldina, of which he is a member.

THE PRIZE

Heinrich Otto Wieland was born on 4 July 1877, in Pforzheim, Germany. Wieland studied chemistry at the Ludwig-Maximilians-Universität München (LMU) in Munich, Germany, where he received his doctorate in 1901 and was appointed “außerordentlicher Professor” in 1909. At this time, he was already interested in oxidation processes in the living cell, one of the foundation stones of the field of biochemistry. He worked at the Technische Universität München (TUM), also in Munich, and LMU until 1921 as well as at the Kaiser Wilhelm Institute in Berlin-Dahlem, Germany. Wieland then accepted a call to the University of Freiburg, Germany, but returned to LMU in 1925 to succeed Richard Willstätter as Chair of Chemistry. He retired in 1952 and died in Munich on 5 August 1957.

Heinrich Wieland received numerous awards, among them the 1927 Nobel Prize in Chemistry for his pioneering investigations of bile acids and related substances.

Heinrich Wieland was a cousin of Albert Boehringer, the founder of the company Boehringer Ingelheim. As early as 1903, Wieland worked with the company and, in 1917, his advice led to the company establishing its first scientific department dedicated to innovative research. His scientific findings made it possible, for example, to produce drugs for cardiovascular and respiratory diseases.



The Board of Trustees of the Heinrich Wieland Prize

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BOEHRINGER INGELHEIM FOUNDATION

The Boehringer Ingelheim Foundation is an independent, non-profit organization committed to the promotion of the medical, biological, chemical, and pharmaceutical sciences. It was established in 1977 by Hubertus Liebrecht (1931–1991), a member of the shareholder family of the Boehringer Ingelheim company. With the Perspectives Programme Plus 3 and the Exploration Grants, the Foundation supports independent junior group leaders. It also endows the internationally renowned Heinrich Wieland Prize as well as awards for up-and-coming scientists. In addition, the Foundation is donating a total of 154 million euros from 2009 to 2027 to the University of Mainz to finance scientific operations at the Institute of Molecular Biology (IMB). Since 2013, the Foundation has been providing a further 50 million euros for the development of the life sciences at the University of Mainz.



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