

Press Release, September 6, 2016

## Strategies in Fighting Neurodegenerative Diseases: the Role of Protein Folding

**Ernst Schering Foundation honors cell biologist Franz-Ulrich Hartl for his outstanding research on the role of chaperones in protein folding in living cells**

Proteins perform a variety of essential tasks in all cells of our body. In order to fulfill their biological functions, these chain-like molecules must fold into specific three-dimensional patterns. This process was originally thought to occur spontaneously. However, work by Prof. Dr. Franz-Ulrich Hartl, director of the Cellular Biochemistry Department at the Max Planck Institute of Biochemistry in Martinsried, showed that in our cells protein folding is mediated by helper molecules. These helper molecules are called chaperones, since these molecules make sure that proteins behave, i.e. fold, correctly. Incorrectly folded proteins tend to clump together to aggregates, which disturb cell functions in various ways and can cause neurodegenerative pathologies, such as Alzheimer's dementia, Parkinson's and Huntington's disease. The insight that age-related diseases are caused by incorrectly folded proteins offers opportunities for novel therapeutic approaches. Prof. Hartl's current research particularly focuses on these therapeutic approaches.



Foto: Robert Haas

For his outstanding research on the role of chaperones in protein folding in living cells, the Ernst Schering Foundation presents Prof. Dr. Franz-Ulrich Hartl with the Ernst Schering Prize 2016. The festive award ceremony will take place on **September 26, 2016, at the Meistersaal in Berlin.**

The 50,000-euro **Ernst Schering Prize** is one of the most prestigious German science prizes. Established by the Ernst Schering Research Foundation in 1991, the award has been presented annually by the Ernst Schering Foundation since 2003. It is given internationally and honors outstanding achievements in basic research in the fields of medicine, biology or chemistry. Professor Hartl was nominated for the Ernst Schering Prize 2016 by Prof. Dr. Helmut Sies (Heinrich Heine University Düsseldorf), Prof. Dr. Wolfgang Baumeister (Max Planck Institute of Biochemistry in Martinsried), and Prof. Dr. Nikolaus Pfanner (University of Freiburg). Professor Sies, who will give the presentation speech at the award ceremony, says about Hartl's work: *"Franz-Ulrich Hartl's outstanding research deserves the highest recognition. It combines fundamental new insights into the homeostasis of correctly folded proteins with new perspectives on the development and progression of neurodegenerative diseases, which may lead to innovative therapeutic approaches."*

### Award Ceremony

**September 26, 2016, 6:30 p.m.**

**Meistersaal at Potsdamer Platz** (Köthener Straße 38 | 10963 Berlin)

Registration until September 15, 2016, at: [anmeldung@scheringstiftung.de](mailto:anmeldung@scheringstiftung.de)

The prize will be awarded together with the 2016 Friedmund Neumann Prize of the Ernst Schering Foundation.

### Lectures by the Award Winner

**September 23, 2016** (not open to the public)

**Lecture by Prof. Dr. Franz-Ulrich Hartl** at Schulfarm Insel Scharfenberg, Berlin-Tegel

**September 23, 2016, 2 p.m.**

#### **Public Scientific Lecture with Prof. Dr. Franz-Ulrich Hartl**

*Molecular Chaperones: Their Role in Protein Folding and Neurodegenerative Disease*

Freie Universität Berlin | Lecture Hall Inorganic Chemistry (H101) | Fabeckstr. 34-36 | 14195 Berlin

The lecture is aimed at scientists and students and will be in English.

Registration is not required.

### More Information

More information and images are available for download at [www.scheringstiftung.de](http://www.scheringstiftung.de) under "Press."

Prof. Hartl will be available for press interviews. To arrange an interview, please contact:

Andrea Bölling | Public Relations

Schering Stiftung | Unter den Linden 32-34 | 10117 Berlin

Phone: ++49 (0)30-20 62 29-60 | [boelling@scheringstiftung.de](mailto:boelling@scheringstiftung.de)

### Background Information

#### **Research**

Proteins are the working molecules of our cells. They are synthesized on specialized machines, the ribosomes, as chains of the 20 amino acid building blocks. However, before a new protein can become biologically active, its chain must fold into a defined three-dimensional pattern. Protein folding was originally thought to occur spontaneously, but over the last two decades it has been realized that cells contain so-called molecular chaperones to mediate the folding process. Research by Franz-Ulrich Hartl was critical in the discovery and functional analysis of these essential cellular machines.

Incorrectly folded protein chains tend to clump together to aggregates, which disturb cell functions in various ways and can cause neurodegenerative pathologies, such as Alzheimer's dementia, Parkinson's and Huntington's disease. The chaperone molecules have evolved to prevent the aggregation of immature protein chains – similar to the human chaperone preventing her protégé from engaging in unwanted interactions. Some molecular chaperones use a particularly elegant mechanism: they form sub-microscopic cylinders with a lid, in which a single protein chain is enclosed and allowed to fold unimpaired by aggregation.

Why do the chaperones not prevent the neurodegenerative aggregation diseases that increasingly plague our aging societies? Recent work shows that the activity of the chaperone system declines during aging, especially in nerve cells which have only a limited capacity for regeneration. However, studies in cellular disease models demonstrate that pharmacologic activation of chaperone function is feasible, suggesting that drugs may be developed that can prevent or reduce the formation of neurodegenerative aggregates. While these efforts are still at an early stage, the basic research on molecular chaperones and their role in protein folding has the potential to address one of the major medical challenges of our time.

#### **Vita**

Franz-Ulrich Hartl studied medicine at the University of Heidelberg, where he also completed his doctorate in biochemistry in 1985. He subsequently worked as a post-doc and group leader under the direction of Walter Neupert at the University of Munich. After a one-year stay in the lab of Bill Wickner in Los Angeles, he completed his habilitation in biochemistry in 1990 at the University of Munich. Hartl was professor at the Memorial Sloan-Kettering Cancer Center and at the Cornell University, Graduate School of Medical Sciences, New York (1991-1997) and Associate Investigator at the Howard Hughes Medical Institute (1994-1997). Since 1997, Hartl has been a director at the Max Planck Institute of Biochemistry in Martinsried near Munich.