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für Biochemie

Proteins: It all depends on a correct folding plan

The protein researcher Franz-Ulrich Hartl will be awarded the Heinrich Wieland Prize 2011

(Oct. 2011) What do neurodegenerative diseases such as Morbus Alzheimer, Chorea Huntington and Morbus Parkinson have in common? They all occur more and more frequently in an aging society, and wrongly folded, clumped proteins play a central role in disease development. Once that scientists have successfully decoded the molecular mechanisms underlying protein folding, new approaches for the prevention, diagnosis and therapy of these illnesses could emerge. The Heinrich Wieland Prize 2011 is awarded to Prof. Franz-Ulrich Hartl, director at the Max Planck Institute of Biochemistry in Martinsried for his pioneering work in the field of protein folding. The award is sponsored by the Boehringer Ingelheim Foundation and comes with a prize money of 50,000 Euros.

The award ceremony took place on 27 October 2011 in the Baeyer Auditorium of the LMU Munich (Faculty of Chemistry and Pharmacy).

Cells constantly produce thousands of different proteins involved in every bioprocess. Most proteins can only fulfill their biological functions – e.g. as enzymes in cell metabolism, antibodies in immune defense or structural proteins in the muscular system – when they adopt a defined, three-dimensional structure. Hartl's pioneering work has changed our way of thinking of how proteins fold within cells. Contrary to the previously held view that all proteins fold spontaneously and of their own accord, the scientist developed a new concept – namely that protein folding is a complex process requiring the assistance of other proteins, known as chaperones.

Many chaperones belong to the stress or heat shock proteins. They not only facilitate the correct folding of newly synthesized proteins, but also step in during stress situations, for instance to repair any proteins that misfolded due to high temperatures. Furthermore, molecular chaperones now play an important role in biotechnology. Biotechnological companies use, for example, bacterial cells with an increased chaperone content to produce large amounts of active forms of proteins required for the production of drugs. The groundwork for this was provided, among other things, by one of Hartl's discoveries – the "chaperonin", a cylindrically formed molecule which folds proteins inside a protected chamber. In the past few years, Hartl has concentrated on the analysis of those neurodegenerative diseases that are characterized by the misfolding and aggregation of certain proteins.

"Professor Hartl's research is a prime example of how basic research can find its way into biotechnological or medical application – in the long run, the results also have the potential to provide progress for the good of patients afflicted by such diseases", declared Professor Dr. Konrad Sandhoff, chairman of the board of trustees of the Heinrich Wieland Prize.

Franz-Ulrich Hartl studied medicine and obtained his doctoral degree in Heidelberg in 1985. He then moved to the laboratory of Walter Neupert in Munich, where he first worked as a post-doc and then as a group leader. In 1991 he accepted a professorship in cell biology and genetics at Memorial Sloan-Kettering Cancer Center and Cornell Medical College in New York. He returned to Germany in 1997 to take up his present position as director at the Max Planck Institute of Biochemistry in Martinsried, near Munich.

The international Heinrich Wieland Prize (HWP), which comes with a prize money of 50,000 Euros, honours outstanding research on biologically active molecules and systems and its clinical impact in the areas of chemistry, biochemistry and physiology. It is named after the German chemist and Nobel Prize winner Heinrich Otto Wieland (1877 – 1957), who was professor of chemistry in Munich for many years. The prize has been awarded annually by an independent board of trustees since 1964. The Boehringer Ingelheim Foundation assumed sponsorship of the prize in 2011. The Boehringer Ingelheim Foundation is an independent, non-profit-making foundation for the promotion of medical, biological, chemical and pharmaceutical research (see www.boehringer-ingelheim-stiftung.de). Further information on the history of the prize and the names of former prize winners can be found at www.heinrich-wieland-preis.de.

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