

SBMC 2010: Press release, May 25th, 2010

OF RHEUMATISM, FEEDBACK LOOPS AND POTTERS' WHEELS

Interdisciplinary, pioneering, and award worthy:

three young scientists nominated for the MTZ[®] Award for Medical Systems Biology 2010

Ground-breaking research requires top-class young scientists – To this end, the **MTZ[®] Award for Medical Systems Biology** will be presented on **Friday, June 4, 2010 at the Freiburg Concert Hall (Konzerthaus)**. The prize, which has a total value of 5,000 euros and is granted by the **MTZ[®] foundation of Erkrath in cooperation with the Federal Ministry of Education and Research (BMBF)**, awards young scientists for their outstanding doctoral theses in the domain of medical systems biology. Three candidates have already been nominated in the run-up by an international jury. The ultimate decision regarding the order of the winners as well as the awards ceremony will take place in the context of the **third Conference on Systems Biology of Mammalian Cells (SBMC) at the Freiburg Concert Hall (Konzerthaus) from June 3-5, 2010 under the aegis of the Federal Minister for Education and Research, Prof. Dr. Annette Schavan.**

Modeling systems in medical research

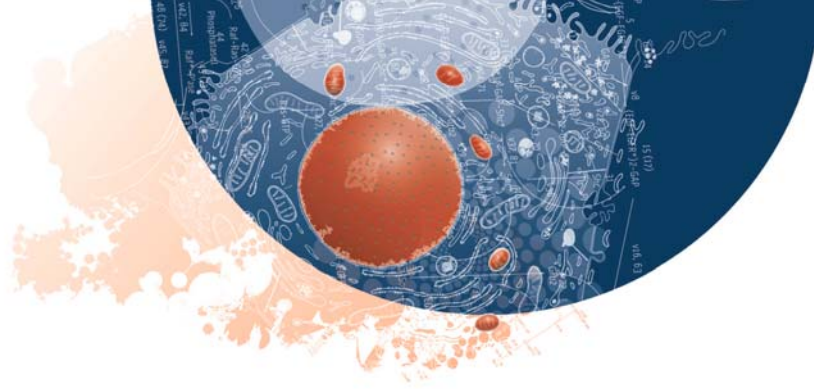
Medical research, in particular, profits from a systems biological approach. Systems biology grasps disease mechanisms both as a whole and as dynamic processes and thereby makes it possible to selectively develop new and efficient therapies in medicine. Against this backdrop the MTZ[®] foundation in cooperation with the BMBF decided to support young scientists in medically oriented fields with the MTZ[®] Award for Medical Systems Biology.

Feedback loops in rheumatic diseases

In the case of rheumatic diseases, researchers are concerned with complex pathological processes in which the defense mechanisms of the body are misguided and attack healthy tissue. The result is painful inflammation of the joints, bones and other organs. With conventional scientific methods it is difficult to grasp the cause of the inflammatory reactions – the defenders are too diverse, as are their strategies and the many messengers they send out. Using a systems biological approach Edda Schulz, who did her doctorate at the Humboldt University and the German Rheumatism Research Center (DRFZ) in Berlin, was able to shed some light on the underlying feedback loops. By a skillful combination of experiments and mathematical models, the biochemist Schulz discovered that a protein molecule called T-bet, which is responsible for the inflammatory reaction, is distributed in two waves – it is the second wave that causes the degenerative arthritis. T-bet is composed of so-called T-helper cells, which are important players in the immune system. “The better we understand how these defense cells contribute to rheumatic processes, the closer we’ll come to our goal of hindering their destruction of the body’s own tissue,” says Schulz, who has been chosen for an MTZ[®] Award for her work.

Feedback for healthy organs

Also nominated is the biochemist Stefan Legewie. His dissertation at the Humboldt University of Berlin dealt with the simulation of biological control loops. He was especially interested in feedback loops. These loops are essential for the stable functioning of a biological system: Like a thermostat in a heater, they



regulate the activity in the system and shut it down when needed. With the help of systems biological models Legewie proved that negative feedback loops – that is, those in which the appearance of a certain substance slows down gene expression – play a significant role in maintaining equilibrium in a biological system. If these feedback loops get thrown out of kilter, the result can be serious illnesses such as cancer.

In collaboration with a molecular biology group at the German Cancer Research Center in Heidelberg as well as with theoreticians at the University of Freiburg, Legewie studied the effect of such feedback mechanisms on liver regeneration. If the organ, for instance, regenerates itself after being poisoned, then all processes must be fine-tuned. Only then can the liver recover its original functionality without undergoing excessive growth or pathological changes resulting in cancer. Using experiments with cultivated primary hepatocytes and computer simulations, these researchers identified the central regulator, a protein molecule called SnoN.

A potter's wheel for models

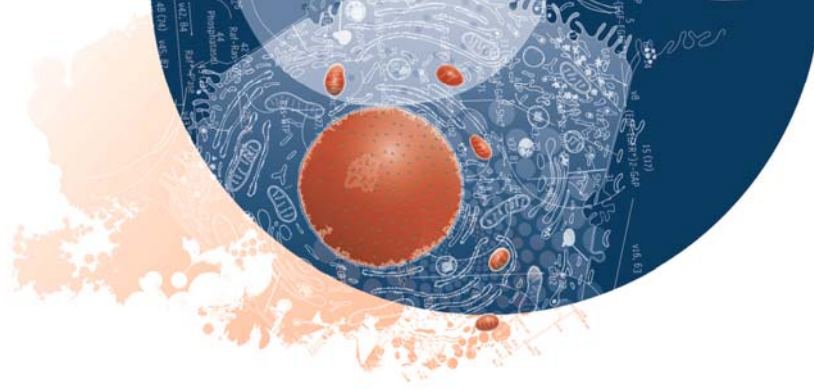
In his search for this control protein Legewie worked hand in hand with the third nominee, the physicist Thomas Maiwald. During his time as a doctoral student at the University of Freiburg, Maiwald developed new statistical methods to help improve the measurement of standard experiments, or to reduce the number of experiments necessary. Furthermore, he developed the software PottersWheel: functioning like a potter's wheel, this program aids systems biologists in translating experimental data into mathematical models. Thus, it enables them to calculate to what extent a hypothesis regarding a certain signaling or regulatory pathway corresponds to the measurement results or requires adjustment. "Especially important for me was the close collaboration with scientists from other disciplines, as that is what constitutes systems biology at its core," as Maiwald enthusiastically states. And he has even more reason to be excited: PottersWheel now helps systems biologists from all over the world with their calculations. In order to promote the program's development, Maiwald even founded a company, which he manages together with a colleague when he's not doing research.

A soft spot for interdisciplinary research

Thomas Zimmermann, who set up the MTZ[®] foundation together with his wife Monika, is particularly pleased that two of the scientists nominated for the MTZ[®] Award for Medical Systems Biology have cooperated so closely: "Interdisciplinary work was always important for both of us, so we decided quickly to promote a scientific field that only becomes productive by means of interdisciplinary research." The founding couple of Erkrath near Düsseldorf will be present at the awards ceremony. Before that, however, the three nominees will each give a talk, on the basis of which the jury will determine the order of the winners.

Journalists are cordially invited to attend both the conference and the awards ceremony.

To find out more about the SBMC and for a complete conference program with all abstracts, please visit our site at www.sbmc2010.de



The MTZ[®] foundation and the MTZ[®] Award for Medical Systems Biology

Following the central theme “For a better future...” Monika and Thomas Zimmermann created the MTZ[®] foundation to support science and research in the domain of human medicine. Their primary focus is on junior scientists in medical fields, especially in the area of medical systems biology. Today, an MTZ[®] Award is regarded as a national trademark – the first major prize honoring an innovative research approach in the vita of young scientists.

Granted by the MTZ[®] foundation in close cooperation with the Federal Ministry of Education and Research (BMBF), the MTZ[®] Award for Medical Systems Biology honors outstanding dissertations. The total prize value of 5,000 Euros is awarded every two years in the framework of the SBMC.

About the SBMC

The third systems biology symposium, “Conference on Systems Biology of Mammalian Cells (SBMC 2010)”, will take place on June 3-5, 2010 in Freiburg. It is being organized by HepatoSys/Virtual Liver Network, the German Systems Biology competence network for the study of the liver. In 2004, HepatoSys was set up by the Federal Ministry of Education and Research (BMBF) to do research on intracellular processes in hepatocytes (liver cells). Established in April 2010, the Virtual Liver Network builds on the work of HepatoSys, with the objective of understanding these processes at the next level: that is, moving from a focus on the cell to integrate quantitative data from all levels of organization, to generate a dynamic view of liver function.

Contact

Sabine Trunz
SBMC 2010 Conference on Systems Biology of Mammalian Cells
Public Relations
+ 49 - 761 - 7076679 phone
+ 49 - 761 - 203 5781 fax
pr@sbmc2010.de email
Zasiusstr. 116
D-79102 Freiburg
www.sbmc2010.de

