

SBMC 2010 Press Release May 5, 2010

Computer-assisted therapy

More targeted drug development thanks to systems biology – scientists at the SBMC 2010 in Freiburg explain how this works

Systems biology has finally come of age. Evidence for this is the third Conference on Systems Biology of Mammalian Cells (SBMC), which will take place on June 3-5, 2010 at the Concert Hall Freiburg (Konzerthaus) under the auspices of Prof. Dr. Annette Schavan, German Federal Minister of Education and Research. HepatoSys/Virtual Liver, the network for systems biology of the liver, will host the conference and the Federal Ministry of Education and Research (BMBF) has provided funding. For three days experts from all over the world will have the opportunity to exchange knowledge in the field of systems-biological analysis of processes in mammalian cells. But the focus will not only be on the newest technologies and revolutionary concepts: scientists will also present how medicine and pharmaceutical research already benefit from systems biology today – in particular, from the development of new and reliable drugs.

A model to support decision-making

Systems biology investigates biological processes at the system level. It takes into account that all activities in a cell, an organ and even in a whole body are linked dynamically with one another. To illustrate these comprehensive networks, systems biology combines quantitative methods from the field of molecular biology with tools and methodologies from mathematics, computer sciences and systems sciences. Medical-pharmaceutical research benefits above all from the systemsbiological analysis of mammalian cells: simulations enable a better understanding of the dynamics of the complex disease promoting mechanisms and facilitate the exploration and development of more targeted therapies. The impact of drugs, too, can be simulated with the help of mathematical models, as they provide information on how an active pharmaceutical substance spreads within the body, how fast it metabolizes and, against this background, how it should be dosed. "However, it becomes really exciting at the point when you take the whole to the next higher level and start making decisions with the help of models regarding which pharmaceutical substances should be investigated further and studied, for instance, in clinical trials", Jörg Lippert of Systems Biology & Computational Solutions Bayer Technology Services GmbH in Leverkusen explains. Lippert's team develops such simulations within the scope of HepatoSys/Virtual Liver.

The computer simplifies the assessment

Before scientists test a pharmaceutical substance in a clinical study, they have already done intensive research on the substance and its activity profile for many years. "Dozens of scientists are involved in this process, they produce unbelievable amounts of data and write reports on thousands of experiments", Lippert says. This provides the basis for experts to decide whether or not to continue further development of a pharmaceutical candidate. In the traditional approach, the basis for this kind of decision-making is years of experience, medicinal chemistry precedent and our understanding of biology. "No one can overlook and evaluate the diversity of scientific data in all its consequences. That is why the computer is an important tool," Lippert says. Skillfully used, systems biology models accumulate the information emerging from years of research and help the decision-makers to interpret it. Thus, with the help of simulations it is possible to predict how effective a candidate pharmaceutical may be, i.e. how many patients are likely ultimately benefit from it. Conversely, the simulations also illustrate the probability of side effects, even for rare and exceptional cases, which in a clinical study might not even be taken into consideration. "In this way, systems-biological models can help to make clinical studies more focused and reliable, reducing time and costs," Lippert summarizes.

The logo for SBMC 2010 is displayed in a stylized orange and blue font. To its right, the conference title "Conference on Systems Biology of Mammalian Cells" is written in a mix of orange and blue colors. The background of the top right corner features a circular graphic with a red central sphere and various blue and white molecular and cellular diagrams.

[SBMC 2010] Conference on Systems Biology of Mammalian Cells

June 3rd-5th 2010 · Freiburg | Germany · Konzerthaus · www.sbmc2010.de

Better medicine – especially for children

These models are especially important when it comes to children. According to current EU law and US-American regulations, pharmaceutical firms seeking approval for new medications must also always demonstrate how they plan to check the suitability of a drug for the treatment of children. However, this is especially difficult, as the Bayer researcher explains: "Children are not simply little people, but they differ in their body functions and tissue composition clearly from adults – and these things change when children's bodies grow and develop." Moreover, certain clinical studies – in which for example, the dosage and tolerability of a pharmaceutical substance is tested on healthy individuals – are prohibited for children for ethical reasons. Systems-biological models help here: They forecast the effect of a pharmaceutical substance on children in different stages of development and so make it possible to evaluate whether and under which conditions a drug will show the expected effect on these little patients.

A solid foundation via basic research and the promotion of young scientists

"The applications in drug development are important results for systems biology. They show clearly that we are on the right path", says Jens Timmer, scientific speaker of the competence network HepatoSys and coordinator of the systems biology conference SBMC 2010. Still, he warns against overhasty euphoria: "During the next years, basic researchers from our field must do a lot of work so that systems biology remains on a solid foundation." Against this background and in cooperation with the BMBF, the MTZ foundation from Erkrath near Dusseldorf promotes the young scientific generation in the field of systems biology. For the second time, three young scientists will be honored during the conference for their outstanding doctoral theses with the MTZ Award for medically oriented systems biology worth a combined total of 5,000 Euros.

The presentation will take place on Friday, June 4, 2010 at 2 pm. On Saturday, June 5th at 11:45 am Jörg Lippert will speak about the application of systems-biological models to drug development.

Further information as well as the SBMC 2010 program and on-line registration under: www.sbmc2010.de.

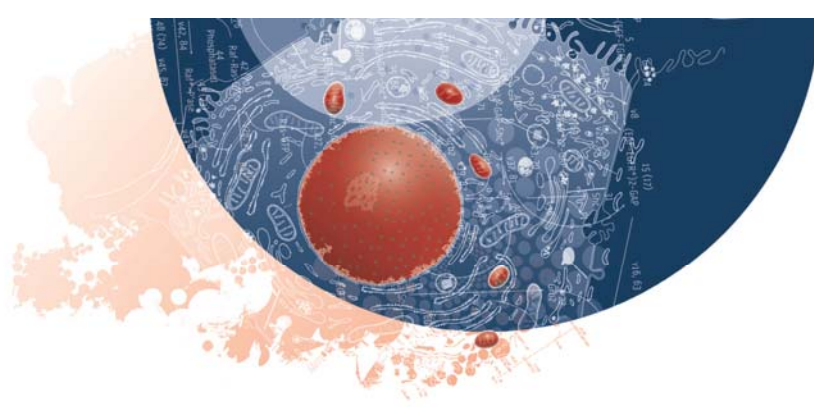
Journalists are warmly invited to take part at the conference.

About the SBMC

The third systems biology conference "Conference on Systems Biology of Mammalian Cells (SBMC 2010) will take place on June 3-5, 2010 in Freiburg. It is organized by HepatoSys/Virtual Liver, the German network on systems biology of liver. HepatoSys was initiated in 2004 by the Federal Ministry of Education and Research (BMBF) – for the research of the intracellular processes in liver cells. Since April, 2010 the succession project Virtual Liver aims at understanding these processes at the next higher level: based on the results of HepatoSys, the scientists involved in Virtual Liver have started to examine processes in cell organization up to the whole organ.

**[SBMC
2010]** **Conference
on Systems Biology
of Mammalian Cells**

June 3rd-5th 2010 · Freiburg | Germany · Konzerthaus · www.sbmc2010.de



Contact

Sabine Trunz

SBMC 2010 Conference on Systems Biology of Mammalian Cells

Public Relations

Institute for Physics

University of Freiburg

Hermann-Herder-Str. 3

D - 79104 Freiburg Germany

pr@sbmc2010.de email

+ 49 - 761 - 7076679 phone

+ 49 - 761 - 203 5781 fax