

Healthcare industry BW

BioValley “Science meets Business Day 2009”

This year’s presentations at the “Science meets Business Day 2009” once again showed that the exchange between science and the industry in the BioValley works extraordinarily well. The “Science meets Business Day 2009” concluded this year’s BioValley Life Science Week, where researchers from five completely different disciplines and their industrial partners presented their views on what makes the economic location in the area bordered by Germany, France and Switzerland so successful. Around 220 visitors, including more than 100 schoolchildren from the Merian School, were guided through a fascinating evening by Dr. Ralf Kindervater from BIOPRO Baden-Württemberg GmbH.

“It is not just a matter of chance that the Freiburg Region has survived the economic crisis so well,” said Dr. Bernd Dallmann, Chairman of the BioMed Technology Foundation Freiburg, in his opening speech at the “Science meets Business Day”. “I am no biotechnologist, but from an economic point of view I clearly understand that the life sciences form the economic backbone of the BioValley.” He also mentioned that about twenty per cent of all the inhabitants in the region are employed in the life sciences and health sectors. Dr. Bernd Dallmann highlighted: “More and more people want to and need to spend more money on their health.” Dallmann added that this required research institutions and biotechnology and medical technology companies to work closely together. He particularly welcomed the 100 schoolchildren from the Merian School in Freiburg, which has been offering special biotechnology courses since 2002. “The networking between science, industry and schools is a model for the future,” said Dallmann.

Demand for continuous innovation

Prof. Dr. Ralf Baumeister from the University of Freiburg gave a talk on “Systems biology: a holistic approach for investigating life and its diseases” and highlighted the importance of cooperation between research and development. Baumeister has spent many years investigating the small threadworm *C. elegans*, which is an excellent experimental model for Alzheimer’s, Parkinson’s and cell processes such as programmed cell death. Baumeister also told the audience in the Freiburg Concert House that for him biology is the most exciting course of studies, adding that it would be impossible to pursue studies in modern biology today without the technological tools available and without the synergetic effects between science and industry. “Cells are extremely complex dynamic networks consisting of a vast number of interacting molecules,” said Baumeister. Pharmaceutical companies that plan to use drugs to intervene with such networks, require in-depth understanding of the entire networks of cells and organisms.

At the Centre for Biological Systems Analysis (ZBSA), the ZBSA’s director and the ZBSA’s molecular biologists, bioinformaticians, doctors, mathematicians, physicists and engineers are not only attempting to identify as many elements as possible in the different molecular networks, but also to understand the networks in their entirety. “This requires high-throughput experiments,” said Baumeister. It is necessary to breed and genetically manipulate thousands of *C. elegans* worms. Hundreds of thousands of different substances need to be tested for their effects on cells. Nowadays, this is done by robots that carry out the individual work steps automatically, one after the other. The flood of data produced as a result of such high-throughput experiments, can only be handled effectively using mathematical models. There is a demand for continuous innovation: High-performance computers, intelligent microscopes, DNA biochips that are getting smaller and smaller. These are challenges where research and industry must cross-fertilise each other.

Fighting bacteria with antibiotic resistance

In their presentation entitled “New weapons to fight old diseases: combating antibiotics-resistant bacteria”, Prof. Dr. Wilfried Weber from the Centre of Biological Signalling Studies (bloss) at the University of Freiburg and Marc Gitzinger from BioVersys GmbH (Basel, Switzerland) highlighted ways in which research and industry can work together. Weber and his colleagues from the bloss centre are focusing on the development of tools to switch off the antibiotics resistance of tuberculosis pathogens. In order to do this, the researchers combine known biological components, i.e. individual genes or parts of genes, into new systems that can subsequently be introduced into cells. Using synthetic biology, the researchers have succeeded in developing a cellular device that functions like a test system for new drugs. “In the meantime we have discovered a substance that is able to

switch off the antibiotics resistance of the tuberculosis pathogens," said Weber highlighting the possibility that this might help the pharmaceutical industry save billions in the development of new antibiotics. The researchers have founded the company BioVersys GmbH with the aim of turning the product into a drug.

"We are currently looking for industrial partners," said Gitzinger, BioVersys' managing director, adding that he is not worried about the future of the spin-off. Gitzinger is confident that in contrast to the company's competitors, BioVersys is able to switch off the antibiotics resistance in a broad range of different bacteria. "The resistance switch we are targeting is universal and controls different resistance types," said Gitzinger. The company is working very closely with Weber's laboratory, but also maintains collaborative projects with other universities, including the ETH Zurich and the University of Lyon, which according to Gitzinger will be decisive in achieving their goal. Gitzinger is sure that the automation of work steps, the development of high-throughput methods and systems biological analysis methods requires many institutes to work together in the endeavour to develop new drugs.

Software for clinical and laboratory applications

Prof. Dr. Andreas Schulze-Bonhage, head of the Epilepsy Centre at the Freiburg University Medical Centre, and Oliver Eberhardt of Freiburg-based Tikanis GmbH, highlighted that working with industry is also of major benefit when it comes to clinical applications. In their presentation entitled "From Bench to Bedside: Flexible Software in Research and Clinic" they pointed out that there are currently no drugs available for the treatment of epilepsy that do not give rise to severe side effects, and that epileptics usually complain about tiredness, irritability and memory disorders. "As doctors, we need to constantly monitor our patients using psychological test methods," said Schulze-Bonhage. With a team led by Dr. Thomas Maiwald and Julie Blumberg, Tikanis GmbH has developed a software platform to turn pocket computers into various different test systems. These reprogrammed pocket computers will enable patients to acquire data about themselves 24/7 wherever they happen to be. The first collaborative studies have already shown that this works quite well. Tikanis also has additional products on offer. "Tikanis GmbH was founded on the basis of research carried out at the University of Freiburg," said Eberhardt in his part of the presentation. Maiwald is currently working in Harvard where he is using another Tikanis product to support scientists in their work. This product is a piece of software called "Potterswheel" which can be used to turn complex amounts of data into models. Software of this kind is of particular importance for systems biology applications, as well as in all other areas where experiments lead to measurement results that change dynamically. Potterswheel helps to select the decisive parameters and to set up dynamic models. At present, around two thousand users from around 100 institutes are working with this product, which is very much on the way to becoming a gold standard in clinical and laboratory applications.

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