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## New paths in drug research

**The need for novel drugs has never been greater. Average lifespans are increasing and the demand for new medications against common diseases such as cancer, diabetes, and dementia is continuously rising. The discovery of new drugs, once an almost exclusive realm of the pharmaceutical industry, is now increasingly being performed in research institutions. Therefore, the Helmholtz Drug Research Initiative is hosting its first public conference on this topic at the German Cancer Research Center (DKFZ) on December 8 and 9, 2016.**

“Over the past decades, the pharmaceutical industry has scaled back resources dedicated to the early stages of drug discovery. To develop innovative compounds, companies are now increasingly using new collaboration models with academic researchers,” says Aubry Miller from the DKFZ, one of the conference organizers. “Therefore, universities and research institutions such as Helmholtz play an ever more important role in drug discovery.”

Following an invitation by the Drug Research Initiative in the Helmholtz Association, approximately 190 participants from research and industry will meet in Heidelberg to present recent findings and discuss new strategies.

The supply of urgently needed new drugs crucially depends on scientists unraveling misguided cellular processes or altered biomolecules, which are the underlying causes of individual diseases. These malfunctioning cellular components are the so-called “targets” for new therapies, which drug molecules are designed to interfere with. Developing new drugs involves tremendous costs and, lamentably, many substance candidates that seem promising at first have to be abandoned in the clinical trials that follow. Therefore, it is critical to devise screening methods for new compounds that are as clinically relevant as possible.

**Joe Lewis** from the European Molecular Biology Laboratory (EMBL) will present an example of this approach. He will talk about the search for substances against extremely malignant childhood brain cancers that feature characteristic mutations. In collaboration with **Stefan Pfister** (DKFZ and Heidelberg University Hospital), he developed a screening system that examines thousands of test substances in two different brain cancer cell lines that differ from each other in a single DNA mutation. The goal is to find specific agents that exclusively kill tumor cells that exhibit one of the two mutations and not the other one.

Many of our most important antibiotics have become ineffective due to resistance mechanisms and, therefore, urgently need to be replaced by novel classes of substances. **Deniz Taşdemir** from the Geomar Helmholtz Center and the University of Kiel considers the diversity of marine microorganisms, which is still largely unexplored, to be a promising source for new substances with antibiotic effects. She will talk about her plans to examine the chemically diverse components of marine algae and fungi for their effectiveness against major pathogens.

The conference agenda also features the presentation of substances that are already in an advanced stage of drug development. **Stefan Pusch** (DKFZ) and **Olaf Panknin** (Bayer) will present one of these candidates, which will shortly be tested in a clinical trial. The substance specifically inhibits a particular type of mutation in an enzyme called IDH1 that frequently occurs in cancer cells and drives, for example, the growth of brain cancer and leukemia. The

DKFZ is collaborating with Bayer in drug research: The company and the research center jointly identify promising candidates and then collaboratively develop them further.

So-called epigenetic mutations in DNA crucially determine which genes are available for “reading” in a cell. Substances that influence epigenetic processes will play a major role in the treatment of cancer and also of neurodegenerative diseases in the future. They will therefore be addressed at the conference in a separate topic block.

Novel drugs based on small RNA molecules are also regarded as promising agents of the future and will be a topic at the conference. Examples include the minute siRNAs, which can be used to turn off specific genes, and so-called ribozymes – RNA molecules that can execute the function of enzymes and thus interfere with pathogenic cellular process.

Journalists are welcome to attend the conference.

Conference program:

[https://www.helmholtz-hzi.de/de/aktuelles/veranstaltungen/ansicht/event/info/drug\\_innovation\\_in\\_academia/](https://www.helmholtz-hzi.de/de/aktuelles/veranstaltungen/ansicht/event/info/drug_innovation_in_academia/)

A picture is available at:

<http://www.dkfz.de/de/presse/pressemitteilungen/2016/bilder/Protein-Inhibitor-Complex.jpg>

Caption: A compound binds to an enzyme and inhibits its function

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The German Cancer Research Center (Deutsches Krebsforschungszentrum, DKFZ) with its more than 3,000 employees is the largest biomedical research institute in Germany. At DKFZ, more than 1,000 scientists investigate how cancer develops, identify cancer risk factors and endeavor to find new strategies to prevent people from getting cancer. They develop novel approaches to make tumor diagnosis more precise and treatment of cancer patients more successful. The staff of the Cancer Information Service (KID) offers information about the widespread disease of cancer for patients, their families, and the general public. Jointly with Heidelberg University Hospital, DKFZ has established the National Center for Tumor Diseases (NCT) Heidelberg, where promising approaches from cancer research are translated into the clinic. In the German Consortium for Translational Cancer Research (DKTK), one of six German Centers for Health Research, DKFZ maintains translational centers at seven university partnering sites. Combining excellent university hospitals with high-profile research at a Helmholtz Center is an important contribution to improving the chances of cancer patients. DKFZ is a member of the Helmholtz Association of National Research Centers, with ninety percent of its funding coming from the German Federal Ministry of Education and Research and the remaining ten percent from the State of Baden-Württemberg.

#### **Contact:**

Dr. Stefanie Seltmann  
Head of Press and Public Relations  
German Cancer Research Center  
Im Neuenheimer Feld 280  
D-69120 Heidelberg  
T: +49 6221 42 2854  
F: +49 6221 42 2968  
[presse@dkfz.de](mailto:presse@dkfz.de)

Dr. Sibylle Kohlstädt  
Press and Public Relations  
German Cancer Research Center  
Im Neuenheimer Feld 280  
D-69120 Heidelberg  
T: +49 6221 42 2843  
F: +49 6221 42 2968  
Email: [presse@dkfz.de](mailto:presse@dkfz.de)