Press Release

University of Freiburg

Rectorate

Public Relations

Fahnenbergplatz
D -79085 Freiburg

Contact:
Katrin Albaum
Tel. +49 (0)761 / 203 - 97662
katrin.albaum@bioss.uni-freiburg.de
www.pr.uni-freiburg.de

Freiburg, 24.01.2017

Cancer Medications Learn to Hide

The European Research Council awards Wilfried Weber an ERC Proof of Concept Grant

Wilfried Weber, Professor of Synthetic Biology at the University of Freiburg, has received a grant of roughly €150,000 for his project “Hide and Seek with Cancer Drugs” in which he is working to improve the drugs used in cancer treatment. Funding is provided by the European Research Council (ERC) in the form of a Proof of Concept Grant. This grant is awarded to researchers whose research projects have already received funding from the ERC and who are working to cultivate the innovation potential of their idea and to get their discovery ready for the market. The goal of Weber’s project is to improve the tolerance and efficiency of cytostatic drugs, which are used in chemotherapy to treat cancer. The grant period is 18 months.

Cytostatic drugs kill cells that grow and divide quickly. These include not only malignant cancer cells, but also healthy cells in the gastrointestinal tract or in hair roots. This can cause several of the serious side effects of cytostatic drugs to occur. The researchers’ goal is to reduce the effects of cytostatics on healthy cells by encapsulating medications within small nanocontainers, called liposomes, before administering them to patients. Bulky molecules that are bound to the surface of these nanocontainers keep the liposomes from interacting with cells, so that these cannot absorb the medication. “The nanocontainers have a kind of camouflage layer that allows the drugs to hide in the body," Weber said. “Only when the patient takes a second, harmless substance do the cytostatics lose their camouflage. Then,

the surface of the liposomes becomes exposed and the tumour cells can find and absorb the cytostatics."

However, the drug should not be released until the liposomes with the cytostatics have accumulated at the site where their destructive properties are needed most: where the tumour is growing. Here, the method takes advantage of one of the tumour's flaws. Just like healthy cells, cancer cells also depend on the flow of blood to get the oxygen and nutrients they need. That is why they release substances that facilitate the formation of new blood vessels. However, the blood vessels within tumours are often poorly formed and they leak small particles from the blood into the surrounding tissue. This, together with the insufficient drainage of fluids from the malignant tissue, allows the medication that has been transported through the blood stream to accumulate directly in the targeted area. After experiments with cell cultures have shown promising results, the grant will now enable the researchers to test the applicability of their method in an animal model using the widely administered cytostatic drug Doxorubicin.

Wilfried Weber is Professor of Synthetic Biology at the Faculty of Biology of the University of Freiburg. He is also a Principal Investigator of the cluster of excellence BIOSS Centre for Biological Signalling Studies at the University of Freiburg. Also involved in the project are **Balder Rebmann**, who is a PhD student in Weber's research group, as well as Dr. **Gerhard Pütz** from the Institute for Clinical Chemistry and Laboratory Medicine at the Medical Center – University of Freiburg. The EU Office of the Freiburg Research Services and the Technology Transfer Office at the University of Freiburg assisted with the grant application. This project is based on the results of the research project "CompBioMat – Computing Biomaterials", for which Weber received an ERC Starting Grant.

The University of Freiburg achieves top positions in all university rankings. Its research, teaching, and continuing education have received prestigious awards in nationwide competitions. Over 24,000 students from 100 nations are enrolled in 188 degree programs. Around 5,000 teachers and administrative employees put in their effort every day – and experience that family friendliness, equal opportunity, and environmental protection are more than just empty phrases here.

UNI FREIBURG

Contact:
Prof. Dr. Wilfried Weber
BIOSS Centre for Biological Signalling Studies
University of Freiburg
Phone: +49 (0)761 / 203 – 97654
E-Mail: wilfried.weber@bioss.uni-freiburg.de

The University of Freiburg achieves top positions in all university rankings. Its research, teaching, and continuing education have received prestigious awards in nationwide competitions. Over 24,000 students from 100 nations are enrolled in 188 degree programs. Around 5,000 teachers and administrative employees put in their effort every day – and experience that family friendliness, equal opportunity, and environmental protection are more than just empty phrases here.