



Press Release

New Agent against Cancer Cells

Freiburg scientists have discovered a substance that suppresses unchecked cell division in leukemia cells

Scientists of the University of Freiburg and the Freiburg University Medical Center from the collaborative research center Medical Epigenetics (SFB 992) have discovered a new active substance that inhibits cell division in leukemia cells and could play an important role in the fight against cancer. Junior professor Dr. **Stefan Günther** was in charge of the research project, which also included research groups participating in SFB 992 Medical Epigenetics led by Prof. Dr. **Manfred Jung** from the Institute of Pharmaceutical Sciences, Prof. Dr. **Oliver Einsle** from the Institute of Biochemistry, and Prof. Dr. **Roland Schüle** from the Freiburg University Medical Center. The team published their findings in the journal *Angewandte Chemie International Edition*.

The substance XD14 suppresses the function of several proteins from the BET family also known as epigenetic reader proteins: They identify epigenetic changes in so-called histones and pass on this signal, for instance in order to trigger cell division. In the case of leukemia, genetic mutations can cause a disturbance in signaling transduction: The cells continue to divide unchecked, causing damage to the entire organism.

The scientists detected the new agent with a method called virtual screening: The Pharmaceutical Bioinformatics Research Group, headed by Stefan Günther, studied the characteristics of roughly ten million molecules in a computer model. The goal was to identify the few substances whose

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binding affinity is so great that they can prevent certain proteins of the BET family from passing on signals. The complex calculations involved in this endeavor were made in a computer network maintained by the universities of Baden-Württemberg, the bwGRID. The scientists tested one of the substances on 60 different types of cancer cells. The experiment proved that the agent can significantly suppress cell division in leukemia cells. They are now investigating whether the molecule is suitable for use as a drug.

Around 20 different research groups from the University of Freiburg, the Freiburg University Medical Center, and the Max Planck Institute of Immunobiology and Epigenetics are collaborating on the study of epigenetic mechanisms in SFB 992 in order to develop new strategies for fighting diseases. The DNA stores information on genetic features and passes them on by means of cell division. Epigenetic features, on the other hand, are passed on without being part of the genetic code.

Original publication:

Xavier Lucas, Daniel Wohlwend, Martin Hügler, Karin Schmidtkunz, Stefan Gerhardt, Roland Schüle, Manfred Jung, Oliver Einsle and Stefan Günther (2013). 4-Acyl Pyrroles Mimic Acetylated Lysines in Histone Code Reading. *Angewandte Chemie International Edition*. doi: 10.1002/anie.201307652

Caption: Molecular model of the newly identified substance (yellow) bound to an epigenetic reading protein from the BET family (gray). The substance prevents the reading protein from bonding to a histone (turquoise).

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