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## **Insilico is partner in a new joint research project to investigate neurodegenerative aspects of Alzheimer's disease**

**(Stuttgart, Würzburg) – The interdisciplinary consortium HiPSTAR tries to decipher the molecular mechanisms leading to Morbus Alzheimer. In particular, pathological alterations at the blood-brain-barrier are in the focus of this applied research project. The long-term goal of this collaborative effort is the development of new drugs and therapies targeting this predominant form of dementia. The project is coordinated by the University of Würzburg (Medical Faculty, Department of Tissue Engineering and Regenerative Medicine, TERM), and the Fraunhofer Institute for Molecular Biology and Applied Ecology, ScreeningPort, is a partner in the consortium. The German Ministry for Education and Research (Bundesministerium für Bildung und Forschung, BMBF) funds this project with an overall budget of 1.7 million Euro.**

In order to decipher the molecular mechanisms leading to Morbus Alzheimer and associated changes at the blood-brain-barrier the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt e. V., DLR) funds this interdisciplinary research project with an overall budget of 1.7 million Euro over a three year period. The acronym HiPSTAR is short for "Human iPS Cell-based Blood-Brain Barrier Technology in Alzheimer Research" and is coordinated by the Department of Tissue Engineering and Regenerative Medicine (TERM) of the University of Würzburg. The consortium consists of academic partners and small and medium sized enterprises (see below). HiPSTAR is part of the BMBF initiative "directive on the promotion of innovative stem cell technologies for individualised medicine".

### **Working hypothesis: Altered blood-brain-barrier is a prerequisite for the development of Alzheimer's**

"The development of new drugs requires more detailed research and understanding of the exact causes of neuronal degeneration in the brain", Dr. Marco Metzger explains. The coordinator of the HiPSTAR project at TERM continues: "In addition, we assume that an altered blood-brain-barrier plays an essential role in the development of Alzheimer's disease and also worsens the prognosis of the disease". The blood-brain-barrier is a protective barrier between the sensitive brain and the blood circulation.

### **Goal: Establishment of an in-vitro model of the blood-brain-barrier**

The aim of the research project launched at the beginning of February this year is to develop a new in vitro model of the human blood-brain barrier specifically for Alzheimer's research. Dr. Metzger explains: "This model will serve as a research tool for the development of improved diagnostic methods, the identification

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of suitable target structures for treatment and the discovery of cellular mechanisms of the disease." The cells required for the model either originate directly from Alzheimer's disease patients or are artificially generated in the laboratory using molecular genetic methods, so that they carry the known mutations of Alzheimer's relevant genes. By applying microfluidics to mimic vesicular blood flow and disease-specific molecules the laboratory setting will be customized to the "real" situation within the patient's brain. The newly established models will be validated with approved and marketed drugs and compared to conventional models currently applied in pharmaceutical drug development. In addition, Insilico Biotechnology AG is developing a computer-based model to identify cellular target structures and predict the effects and transport properties of drugs at the blood-brain barrier.

## **Insilico's partners in HiPSTAR consortium**

- University of Würzburg, Medical Faculty, Department of Tissue Engineering and Regenerative Medicine (TERM; <http://www.term.ukw.de/>)
- Fraunhofer Institute for Molecular Biology and Applied Ecology IME (ScreeningPort, Hamburg; [www.ime.fraunhofer.de](http://www.ime.fraunhofer.de))
- University of Halle, Medical Faculty, Department for Psychiatry, Psychotherapy and Psychosomatic Medicine ([www.uk-halle.de](http://www.uk-halle.de))
- TissUse GmbH (Berlin, [www.tissuse.com](http://www.tissuse.com))
- Pharmacelsus GmbH (Saarbrücken, [www.pharmacelsus.de](http://www.pharmacelsus.de)),
- Austrian Institute of Technology (AIT) GmbH (Vienna/Austria; [www.ait.ac.at](http://www.ait.ac.at))

## **About Insilico's technology**

Insilico's technology is built around Insilico Cells™, which are genome-based mechanistic network models of various cell lines. These models are refined and calibrated to become an individualized representation of the specific cells in silico. Based on simulations using such models, the behaviour of cells can be simulated and understood for an almost unlimited number of scenarios. Since those simulations can require significant computing power, Insilico uses supercomputing or cloud resources to complete them.

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## **About Insilico**

Insilico Biotechnology is a market-leading company providing predictive solutions for the Bioeconomy. An interdisciplinary team of experts offers mechanistic models, customized software, and a high performance computing platform for the simulation of living cells. For world-leading pharma and biotech companies Insilico's technology lowers time, risk and costs of development processes. Founded in 2001, Insilico is a privately held company based in Stuttgart.

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