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Research Initiative to Combat Cell Ageing

(Stuttgart) – Insilico Biotechnology and its partners have started a joint large-scale research project to study how reactive oxygen species trigger ageing processes on the cell and tissue level and how to prevent these if possible. Biomarkers will be used to expose the processes and molecular target structures will be identified which can be targeted with active agents to delay ageing.

Is it possible to slow down ageing processes or even stop them altogether? A group of German scientists is out to study one of mankind's longest dreams in a new joint systems biology project entitled OXISYS. At present, there are some indications that reactive oxygen species (ROS) – e.g. as free radicals – influence metabolism on a cellular level and trigger and/or aggravate ageing processes. In an integrated approach, correlated signalling pathways and reaction chains will be clarified completely for the first time. The results will provide the basis for identifying molecules formed only during these processes so that they can act as biomarkers for clinically diagnosing ageing processes caused by ROS. The project partners also aim to find molecular target structures which can be targeted with active pharmaceutical agents to stop such processes or at least slow them down.

Throughout the entire project, the research partners will benefit from Insilico Biotechnology's high competence in modelling and simulating metabolism as well as in signal transduction and gene regulation. Experiments will be carried out to study ageing processes caused by ROS in animal models as well as on animal and human liver cell cultures. Insilico will feed the results back into the research stream, paving the way for further experiments. The advantage of this step-by-step approach is a constant stream of more and more exact data on the course of ageing processes caused by ROS. Insilico's dynamic network models will also help to quantify age-related changes in liver metabolism comprehensively for the very first time. »Our technology platform and high-performance computers enable us to make fast and reliable predictions on age-related metabolic and signalling pathways. We can start each new experiment with high-precision original data from the step before because the results are fed into the system immediately«, explains Klaus Mauch, Insilico's CEO.

By simulating the effects of various potential active agents on ageing processes associated with ROS, Insilico also takes a giant step forward towards therapeutic use. Several promising candidates, which can e.g. influence certain enzyme activities, have already been identified and their effects will be tested on liver cell cultures as well as in animal models. Insilico will then adapt the results and integrate the data in its simulations of human metabolism.

The entire project is being supported by the Federal Ministry of Education and Research (BMBF) within the framework of the research initiative entitled »GerontoSys II« for an initial period of three years. Insilico Biotechnology is one of the two partners from industry with research groups from Berlin, Tübingen, Saarbrücken and Jena also taking part in this innovative project.

Press Release



Insilico Biotechnology reconstructs, simulates and predicts the performance of complex cellular systems for the chemical and pharmaceutical industries. Successful in business since 2001, Insilico has internationally renowned expertise and a unique technology platform for connecting cell model libraries with simulation processes. Insilico analyses the latest biotech data and integrates it in mechanistic whole-cell network models. With its high-performance computing techniques, Insilico develops superior solutions for manufacturing biochemicals and biopharmaceuticals and achieves considerable cuts in the time needed for drug toxicity tests. Insilico is a privately-owned company, located in Stuttgart, Germany.

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