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Three ERC Synergy Grants For Universität Heidelberg Scientists

Heidelberg University scientists are to receive three ERC Synergy Grants – three highly endowed grants of the European Research Council – for pioneering research projects by several teams working in collaboration.

With colleagues in Amsterdam and Zurich, cell and molecular biologist Prof. Dr Bernd Bukau is coordinating a trinational group project dealing with new approaches to exploring the biogenesis of protein complexes. Another project coordinator is chemist Prof. Dr Michael Mastalerz who, with partners in Marburg and Tübingen, is aiming to achieve the synthesis of special carbon compounds to form the basis for new classes of materials. In addition, Prof. Dr Anna Marciniak-Czochra (mathematics) and Junior Professor Dr Simon Anders (biostatistics) are involved in another ERC Synergy project focusing on interdisciplinary research into the dynamics and control of neural stem cells. It is based at the Heidelberg research hub and is being implemented with the participation of a research team from Paris. The European Research Council is funding the three projects over a period of six years to the tune of over 35 million euros; approximately eleven million euros will go to Ruperto Carola.

The ERC project "Mechanisms of co-translational assembly of multi-protein complexes" (CoTransComplex) centres on the formation of multi-protein complexes in cells. Current findings show that these complexes are already formed during their synthesis by several translating ribosomes in a manner that is coordinated in time and space. This is a fundamental process in biology, as most cell proteins do not develop their biological activity until these complexes are formed, and disturbances of these processes are associated with numerous diseases. By elucidating these processes, the researchers involved in the CoTransComplex project hope also to uncover hitherto unknown levels in the control of protein biogenesis, says Bernd Bukau, who coordinates the project. He heads the research group "Biogenesis and quality control of proteins" at the Center for Molecular Biology of Heidelberg University (ZMBH) and directs the Chaperones and Proteases division at the German Cancer Research Center (DKFZ). Prof. Bukau is working on the topic of the ERC Synergy Grant alongside Dr Günter Kramer, who is also a member of the ZMBH. Partners in the CoTransComplex team are biophysicist Prof. Dr Sander Tans of the AMOLF research institute on the physics of functional complex matter in Amsterdam (Netherlands) and molecular biologist Prof. Dr Nenad Ban from ETH Zurich (Switzerland). Funding of about 13 million euros is available for the research activities, with approximately 3.9 million euros going to Ruperto Carola.

The project "Tackling the cyclacene challenge" (TACY) is concerned with a special class of polyaromatic carbon compounds known as cyclacenes – smallest segments of carbon nanotubes. Due to their unique chemical, electronic and structural properties, these compounds are of fundamental interest for potential applications in organic electronics, for instance. Despite decades of efforts, it has not yet been possible to synthesise them, something the researchers now intend to achieve through new approaches in the context of the TACY project. Cyclacenes form the basis for entirely new classes of materials that could be used in different technological areas, project coordinator Michael Mastalerz explains. An expert on the organic synthesis of nanodimensional molecules, his teaching and research takes place at the Institute of Organic Chemistry of Ruperto Carola; in the TACY team he cooperates with Prof. Dr Michael Gottfried (interface chemistry and nanosciences) from the University of Marburg and Prof. Dr Holger Bettinger (physical organic chemistry) from the University of Tübingen. The European Research Council is funding the project with approximately eleven million euros, of which about 3.3 million have been allocated to the research work at Heidelberg University.

The ability of stem cells to renew themselves and to differentiate is at the centre of the project "PerPetuating Stemness: From single-cell analysis to mechanistic spatio-temporal models of neural stem cell dynamics" (PEPS). In order to create new cells as needed, the body possesses several systems of what are known as stem cells. These stem cells are able to divide, either to produce the required cells or to restore the stem cell reservoir. The PEPS project will investigate for the vertebrate brain how the balance between these two processes is maintained over the life span through complex interactions between the cells involved. To this end, the researchers will develop and combine experimental methods with data analysis and mathematical modelling. Two teams from Heidelberg University are making significant contributions to this research. Prof. Marciniak-Czochra heads the research group "Applied Analysis and Modelling in Biosciences" at the Institute for Applied Mathematics and is a member of the Interdisciplinary Center for Scientific Computing. Prof. Anders does research at the BioQuant Center with his group "Biostatistics for Omics Data". The project is coordinated at the German Cancer Research Center by Prof. Dr Ana Martin-Villalba, who heads the DKFZ Division of Molecular Neurobiology and also has a professorship at Heidelberg University.

Biologist Dr Laure Bally-Cuif is involved via the Institut Pasteur in Paris (France). The ERC is making available approximately eleven million euros for the PEPS project, with almost 3.8 million going to fund the work at Ruperto Carola.

The ERC Synergy Grants fund collaborative projects that, due to their complexity, are carried out by several scientists and their groups, in order to achieve breakthroughs that would not be possible in individual projects. For this purpose, the European Research Council allocates grants of up to ten million euros, in special cases also up to 14 million. The ERC Synergy projects may take up to six years.

Press release

25-Oct-2022
Source: Heidelberg University

Further information

- University of Heidelberg