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University's innovation endowment fund enables Stefan M. Schiller to secure funding for his Project



The research group of Dr. **Stefan M. Schiller**, Institute for Macromolecular Chemistry, BIOSS Centre for Biological Signalling Studies, and Freiburg Institute for Advanced Studies, has received three distinctions for research on the lipid code of membrane proteins. The initial funding for the new approach came from the Innovation Endowment Fund of the University of Freiburg and the program "Research Seed Capital (RiSC)" of the Ministry of Science, Research, and the Arts of Baden-Württemberg. This initial funding provided the basis for securing additional funding from the German Research Foundation as part of a project coordinated by Priority Program 1623, "Chemoselective Reaktionen for the Synthesis and Application of Functional Proteins." The goal of the Innovation Endowment Fund is to promote high-quality research projects. "We are delighted that the fund has enabled us to further elaborate our approach and secure additional funding," says Schiller.

Lipids do not just serve as energy storage in the form of fat but also play an important role in many regulatory processes in the body. As modifications of proteins, they regulate the interaction between proteins and the membranes surrounding the cell as well as organelles inside of the cell. Among other things, the type of lipid modification of the proteins determines where in the cell the proteins are located and how long they stay there. This is a crucial factor for the exchange of information within and between cells, which in turn is of fundamental significance for the development of complex cell aggregates. For example, lipid patterns distribute so-called morphogenetic proteins to regulate the development of body parts of embryos. Moreover, the information exchange within and between cells can be an important factor in the development of diseases. The family of Ras proteins, for instance, contributes to the development of cancer by way of a changed lipid pattern.

Much is still unknown concerning the function of the various lipid patterns in the process of protein modification. Up until now, it was virtually impossible to bond various lipids to selected points of proteins in order to study the effect of variations in this lipid code. This is the starting point of Schiller's research project. His team is developing lipid building blocks and methods for introducing lipids into proteins at specific points with the help of amino acids. This will enable them to study the function of natural and synthetic lipid patterns for the first time ever. The studies complement approaches at the Cluster of Excellence BIOSS Centre for Biological Signalling Studies which aim to change synthetic signaling platforms in specific ways, such as synthetic membranes for the reconstruction of biological systems. The team hopes the research will lead to a basic understanding of important signaling mechanisms in the development of complex organisms as well as the development and regulation of diseases.