



How Do Cellular Networks Change?

Research Focus Evolutionary Systems Biology

Natural evolution has created a tremendous variety of living organisms. Each of them is the result of a precisely choreographed interplay of different molecular and cellular networks at different organizational levels: from groups of interacting, jointly controlled genes, networks of interacting proteins and metabolic products, to the interplay of different cell groups in the formation of organs and the whole body.

To understand how today's biodiversity came about through evolution, it is necessary to explain how the underlying molecular and cellular networks have changed in order to produce the diversity of living organisms and their different manifestations. Such an understanding will also facilitate systematic improvements to crop plants and livestock that were not possible before.

Researchers of the Research Focus Evolutionary Systems Biology, therefore, work on projects investigating how changes in molecular and cellular networks have produced evolutionary changes of their traits as well as how the structures of such networks may have facilitated or impeded certain evolutionary transitions. In addition, the researchers examine whether the same superior properties of networks, such as their robustness or plasticity, have been realized during evolution in different ways. In order to answer these questions, it is not only necessary to have a comprehensive knowledge of the networks' components but also to determine the dynamics of their interactions. The application of the methodological



spectrum of systems biology to evolutionary biology thus promises a much more comprehensive picture on how biodiversity was created.

The Research Focus Evolutionary Systems Biology comprises professors and young researchers of the Faculty of Science of the University of Potsdam. Its work is characterized not only by a close networking of the departments in joint research projects, lectures, and courses but, above all, by its long-standing good relations with non-university research institutes, local and national companies.