

Evolution, systems organization and pathogen attack of a plant interactome network

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Elucidating mechanisms of life requires analysis of whole systems and understanding the complex interplay of the individual components. Proteins control and mediate the majority of biological activities and interactions among proteins play a decisive role in the dynamic modulation of cellular behavior. Systematic protein-protein interactome mapping is therefore an essential element in the quest for a systems level understanding of life. The group explores interactome networks for plant models particularly *Arabidopsis thaliana*. Plants have a critical role for human sustenance and the functioning of ecosystems. Importantly, faced with both global warming and an exploding world population, understanding of how plants respond to biotic (pathogens) and abiotic (drought) stresses is critical. Recently, the first large-scale first binary interactome network for the reference plant *Arabidopsis thaliana* was completed. Using tools of graph theory we identify biologically relevant network communities from which a picture of the overall interactome network organization starts to emerge. Combination of interactome and comparative genomics data yielded insights into network evolution, and biological inspection resulted in many hypotheses for unknown proteins and revealed unexpected connectivity between previously studied components of phytohormone signaling pathways. Most recent data suggest a large-scale convergence of evolutionary distant pathogens on common targets in their host proteome, and systematic phenotypic validation suggests a correlation between convergence and phenotypic relevance of the targets.

Biography

Braun did his Ph.D at the Harvard Medical School and the Massachusetts General Hospital in Boston (MGH), USA. After a post-doc in the Chemistry Department at Harvard University he joined the Center for Cancer Systems Biology at the Dana-Farber Cancer Institute as a Group Leader, where he contributed in several technical and conceptual innovations in interactome analysis. In 2012 he moved back to Germany where he now has his group at the TUM. Dr. Braun has been a pioneer in interactome network analysis and has multiple publications in the most prestigious international journals.

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