# Calcium-dependent Protein Kinases, CDPKs

Tina Romeis



Calcium is a universal second messenger molecule with conserved functions in human, animal, and plant cells. Intracellular calcium concentrations constantly undergo temporally and spatially defined changes in response to extracellular signals. Fluctuations of intracellular calcium concentrations hence relay information on exogenous stress or endogenous developmental processes. Calcium-dependent protein kinases (CDPK) are modular enzymes that combine a kinase effector domain and a calcium sensor module within one molecule. The CDPK gene family is unique to plants and several protists. Our group investigates the function of CDPKs in the early decoding of calcium signals and their stress- and development-specific translation into targeted protein phosphorylation. These early signaling events are a prerequisite for the establishment of subsequent long-lasting and systemic changes in gene expression that culminate in stress tolerance or pathogen resistance.

The project area **Biochemical Regulation** focuses on selected CDPK enzymes and the mechanism controlling their catalytic activity by enzyme-specific parameters such as calcium-binding, protein folding, phosphorylation and other post-translational modifications. A second project area, **Plant Defense**, investigates the integration of CDPKs in signaling cascades, that subsequently lead to the activation of local and systemic resistance responses towards biotic stress. The third project area, **Biotechnological Transfer**, studies underlying mechanisms of the CDPK-mediated growth and developmental processes. These projects investigate CDPK-mediated processes with the potential for addressing challenges in several biotechnological areas of plant biology.