EXECUTIVE SUMMARY:

Directly or indirectly, as a part of the food chain plants supply all our food. Thus, understanding and manipulating plant growth is a central issue in the study of plant biology. Currently our knowledge of plant growth is limited to the general aspects of cell division and cell expansion and it is not clear how these processes are coordinated. The plant receptor ERECTA promotes organ growth most likely through stimulation and coordination of cell divisions. While the importance of ERECTA for plant growth is obvious, as mutations in the *ERECTA* gene and the two other family members lead to severe dwarfism, the mechanism of how this receptor works is unclear. To understand how ERECTA works it is essential to identify other parts of the signaling pathway. Preliminary work identified several proteins which interact with ERECTA *in vitro*. Here we want to concentrate on one of the proteins with the most promising qualities, which we named EKIP1. The structure of the *EKIP1* gene suggests that protein localization in the cell allows its interaction with ERECTA. It also implies that EKIP1 might be involved in selection of targets for protein degradation. It is possible that by selecting ERECTA for degradation EKIP1 prevents cell overproliferation and that is why mutations in the ERECTA pathway do not lead to cancerous growth. Several experiments will be performed to confirm interactions between ERECTA and EKIP1 *in vivo*, to determine EKIP1 function at a molecular level, and to uncover EKIP1's role in plant organ growth. The proposed research will provide new insights into signal transduction networks in plants and over the long term might lead to agricultural applications enabling redesign of size and shape of plant organs (e.g. leaves, stems, and flowers) for important crop plants.