## DESCRIPTION FOR THE GENERAL PUBLIC

Phytohormone abscisic acid (ABA) play fundamental role in plant development and in plant adaptation to biotic and abiotic stresses. For decades, understanding of ABA perception and signal transduction have been a major goal of plant research studies. Finally, identification of the core ABA pathway including PYR/PYL/RCAR proteins, the SnRK2 kinases and the group A of the protein phosphatases type 2C (PP2C) changed the picture of ABA signaling and revealed molecular mechanism of PP2C inhibition by ABA receptors. The current knowledge about of the ABA-PYL-PP2C structure and catalytic mechanism of PP2Cs inactivation facilitate development of efficient and specific group A PP2C inhibitors in plants. It is hypothesized therefore that candidate group A PP2C inhibitor can be selected among small-compounds. Thus, the aim of the project is to characterize candidate inhibitors of group A PP2C in Arabidopsis. Specific aims include 1) testing the specificity and selectivity of small compounds as potential group A PP2Cs inhibitors; 2) biochemical, crystallographic and computational characterization of the ABI1-candidate inhibitor complexes; and 3) investigation of the effect of candidate PP2Cs inhibitor on cellular processes in Arabidopsis.

The presented investigations concern important and universal biological phenomena - molecular mechanism for inhibition of the *Arabidopsis thaliana* protein phosphatase ABI1, known as a negative regulator of ABA signaling. The results from this study will provide eligible ABI1 PP2C candidate inhibitor for further development. Novel findings will be beneficial for understanding the mechanisms of plant protein phosphatase 2C inhibition by diverse small-molecule compounds. Another anticipated outcome of these studies will be a better knowledge of structure of protein complexes and clues about molecular basis of PP2Cs-small compounds interactions. Results from this project will be helpful for target-specific design the variety of potential molecules involved in regulation of PP2C activity including oligopeptides or protein-RNA duplexes. Undoubtedly, such molecules or scaffolds as potential therapeutics for human PP2C-based diseases provides a huge advantage to their use in medicine. Usually, small-compounds function across cell types and species. Moreover, the identification of an ABI1 inhibitor could find application in agriculture, for crop protection against drought. It is documented that inhibition of ABI1 and ABI1-like PP2Cs activity results in the increase in drought tolerance