

## **DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)**

(State the objective of the project, describe the research to be carried out, and present reasons for choosing the research topic - max. 1 standard type-written page)

### **Regulation of LHCII antenna complex phosphorylation during dark chilling stress in chilling tolerant and chilling sensitive plant species**

The essence of photosynthesis is conversion of light energy into chemical one, which is next used for the synthesis of carbohydrates. This multistep process takes place in chloroplasts, specialized plant cell organelle, inside which internal membrane system called thylakoids exist. In thylakoid membranes are embedded photosystems, complexes of protein, lipid and pigments, which absorb light energy and convert it into chemical one. With changes of the environmental conditions thylakoid membranes adjust the photosynthesis efficiency due to sophisticated regulatory mechanisms. Because of broad temperature range on Earth surface, which changes during year seasons as well as during day time, plants are often exposed to temperature stress during their growth. In temperate climate the main factor which limits productivity and geographic coverage of plant cultivation is cold stress. Nowadays many plant species of economic importance are spread far away from their place of origin and this makes them susceptible to temperatures in the range of 0 to 15 °C. That is why the stress response and plant adaptation to low temperature processes are in the area of interest of wide group of scientists.

The aim of this project is to investigate the regulation of the LHCII antenna protein complex phosphorylation, one of the most important photosynthesis regulatory mechanism, during dark chilling stress in chilling sensitive (CS) and chilling tolerant (CT) plants species. We will perform the analysis of the LHCII protein phosphorylation levels, their interactions with photosystems and mechanism of activation of LHCII phosphorylation. We will also correlate the level of LHCII phosphorylation and chilling related damage and, with the help of electron microscopy, we will observe structural changes of thylakoids with different LHCII phosphorylation levels.

Studies on changes in structure, composition and function of the chloroplasts are very important for understanding the photosynthesis regulation mechanisms in low temperature conditions. Our results will be also a good starting point for selection of chilling tolerant species and to increase plant productivity in the future.