

research abstract

The lives of most humans depend on our ability to grow food, and crops depend on the process of photosynthesis. Optimal photosynthesis depends on having a perfect milieu for it to take place. The milieu where light is absorbed and initially converted to chemical energy is within the plant membranes called “thylakoids”. Thylakoids are a mixture of various lipids and proteins. Their lipid composition is dynamic, and the right lipid composition is critical to the function of the photosynthetic machinery, particularly when plants are stressed by environmental factors, such as cold temperatures. There is a large gap in our knowledge of the factors that regulate thylakoid lipid composition to maintain optimal conditions for photosynthesis.

Based on a screening of a group of genetically altered plants for changes in lipid metabolism, we identified a specific gene that we hypothesized to encode a protein involved in regulation of plant thylakoid lipid composition during temperature stress. Initial analysis showed that when the gene function was knocked out, lipids of thylakoids were altered. Thus, we performed a genetic analysis to test the hypothesis that the specific gene affected thylakoid lipid composition, but our genetic analysis did not confirm the hypothesis. Analyses of other genes associated with lipid metabolism and whose functions are likely to affect plant growth and/or stress responses is currently underway.