

Laboratory of Functional Genomics

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Research topics:

- Identification and molecular characteristics of genes, the expression of which confers freezing tolerance in *Solanum* species,
- Analysis of function DHN24 dehydrin, lipid transfer protein (LTP1) BBX24 protein in acclimate to cold and adaptation to water deficit,
- Identification of genes associated with adaptation to water deficit in *Hordeum*, *Brassica* and *Arabidopsis* species - genes belong to ABA.
- Obtaining of doubled haploids in cereals.

Major research achievements:

- Studies provided evidence that the expression of *Dhn24* gene, encoding a DHN24 dehydrin is associated with acclimate of Solanaceae species to low temperature and adaptation to water deficit: DHN24 protein localizes to the phloem tissue (sieve tubes and companion cells) in all organs, in the cell it occurs in cytoplasm and nucleus; DHN24 is phosphorylated in the plant cell by a serine/threonine protein kinase, and the poly serine track is phosphorylated; transport of DHN24 to the nucleus needs phosphorylation; DHN24 displays highly protective ability *in vitro* to freezing and dehydration sensitive enzymes; in protective function of DHN24 ionic and hydrogen interactions between DHN24 and enzymatic proteins are involved.
- Expression of LTP1 gene is associated with acclimate of *Solanum* species to cold and response to water deficit: LTP1 protein is present in to all aerial organs and localizes to phloem tissues. Inside the cell it occurs in cytoplasm; ability of LTP1 protein to bind palmitic acid *in vitro* suggests its transporting role in dehydration conditions.
- Expression of SsBBX24 gene, encoding zinc finger B-box protein is under control of circadian clock and light dependent: BBX24 is cumulated in the light phase of the day/night cycle and transported to the nucleus. In the dark phase the protein disappears, in stress conditions, abundance of the BBX24 increases and it does not undergo degradation at the night phase.
- Improvement of yield of androgenic wheat in liquid culturing of anthers,
- It was developed conditions for anthers culturing to obtain haploid and dihaploids of Triticale plants.