NF-Y genes in the somatic embryo development

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For many important legumes, protocols for their efficient transformation and regeneration have not yet been developed. Somatic embryogenesis (SE) — the embryo development from somatic cells — has an important application in biotechnology: reproduction and obtaining of transgenic plants.

There are transcription factors involved in embryogenesis processes, which can stimulate the development of somatic embryos, such as the LEC1 gene in Arabidopsis thaliana.

The LEC1 belongs to the NF-YB family. NF-YB together with NF-YA and NF-YC subunits form heterotrimeric complex NF-Y. In plants, each subunit is encoded by several genes, and combinations of different subunits are able to regulate various processes in plant.

We hypothesized that the LEC1 orthologues in legumes can stimulate SE in combination with specific NF-YA and C subunits. The aim of our study was to find new SE regulators among NF-Y genes in legumes.

In the model legume object Medicago truncatula we find NF-Y genes highly expressed during SE. Among these genes, potential LEC1 partners were selected with the use of the yeast two-hybrid system. Analysis of calli with overexpression of LEC1 orthologues didn’t demonstrate increased SE capacity, but overexpression of one of the NF-YA genes increased callus weight.

We are planning to investigate the effect of co-overexpression of NF-YA, B and C genes on the regeneration processes.

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