Abstract

Adhesion between the plasma membrane and the cell wall and the existence of the continuum of these two compartments is needed for signal transmission, e.g. under pathogen attack, during cell expansion and cell wall growth, or in response to environmental conditions. This adhesion is, in addition to the turgor, provided by physical connection of both compartments. One of the best-known examples of physical connection is found in the root system, in the Caspary strip region, where it is required to maintain apoplastic barriers of the root system, even under adverse conditions and consequent plasmolysis. There is little information about the physical interconnection and the participating macromolecules but there are candidates, which could participate in this interaction.

The diploma thesis deals with arabinogalactan (AGP) proteins with fasciclin-like domain (namely FLA9 and FLA2). These proteins may play a role in the adhesion of plasma membrane and cell wall and may be involved in the growth regulation and development of the root system. Both genes are are relatively strongly expressed in the roots, especially in the elongation zone and in the cortex, including the endodermis (according to chip data). Also, to a smaller extent, the thesis deals with integrin-like At14A protein. The most interesting result of the realised experiments is the finding that a mutant plant with lower expression of the FLA9 gene has decreased root system growth due to reduced number of lateral roots and its seed production is negatively affected. On the other hand, the growth of fla2 mutant plants root system doesn´t differ from the wild type. Localization of FLA9 has been observed in cell walls of root cells (especially in the cortex) starting from elongation zone, but also in the shoot and reproductive organs. By contrast, at14a mutant plants exhibit increased salinity resistance of the root system.

Key words: adhesion, cell wall, fasciclin-like, arabinogalactan proteins, WAK kinases, integrin-like, CASP, root system