Abstract

Plants, as well as all other living organisms, have to react to environmental changes and are forced to put up with the danger that comes from their environment. As a response to this danger, a sophisticated defense system, which moderates responses to stress cues, comes from the outside as well as created inside the plant itself, has evolved in plants. The signaling in this system is mediated by a number of phytohormones, which include salicylic acid, jasmonic acid, abscisic acid, ethylen and auxins. The phytohormone signaling results in a transcription of specific genes. One of the essential components of this signaling network is the phospholipid signaling system, where enzymes called phospholipases play a major role. These enzymes catalyze the hydrolysis of phospholipids, which are part of cellular membranes and products of the hydrolysis can act as signal transferring molecules.

In this thesis we studied the potential engagement of phospholipase Dβ isoform into signaling pathways, using an *Arabidopsis thaliana* mutant plant with mutations in both genes coding phospholipase Dβ. Firstly, we verified that wild type phospholipase Dβ mRNA is not being transcribed in the mutant plants. Subsequently, we compared mutant and wild type plants' reactions to mechanical wounding, pathogen infection and phytohormone sensitivity. Mechanical wounding reactions were studied by the marker gene *BAP1* and *LOX2* expression analysis.

Since no difference between the two genotypes was observed, we presume that PLDβ was not involved in the mechanical wounding signal transduction. Either there was no effect, or we did not register it. We did not register any differences in *Pseudomonas syringae* pv. *tomato* infection. Using the method of *in vitro* plantlets cultivated in solidified medium containing phytohormones, we analyzed the effect of the used phytohormone on root growth inhibition of both genotypes. We observed slight differences in root growth between wild type plants and doublemutants while using methyljasmonate, salicylic acid, aminocyclopropancarboxylic acid and indolyl-3-acetic acid and abscisic acid. The biggest of these differences was observed when using abscisic acid. Next, we analyzed salicylic acid- and jasmonate-responsive gene expression in plantlets grown in liquid medium with forementioned phytohormones.

In neither of these tests were there differences registered. It is possible that PLDβ is not involved in any of the processes we studied or that its function in mutant plants can be fully substituted by biochemically similar PLDγ.