

Abstract

Environmental conditions affect the formation of apoplastic barriers (endodermis and exodermis) in roots. This was shown on many species in many research papers. The exodermal layer is more variable in response to stress conditions than endodermal layer. Cadmium toxicity, as many other stresses, induces faster development of apoplastic barriers. Most of research papers published so far, however characterized only the response of main root to this type of stress factor. Lateral roots, an important part of the root system absorptive surface, are neglected and there is not much information about their response to cadmium stress. The pattern of apoplastic barriers development was therefore analysed in main and also in lateral roots of various size and position on maternal root axis. We found significant differences in response to cadmium stress among these different root types. Then we summed up the differences between these types of roots. Short lateral roots were generally more responsive to cadmium stress, cadmium affected root branching as well as differentiation of apoplastic barriers in lateral roots. These results help us to better understand the response of complex roots system to environmental conditions. In the second part of this work, the role of CASP genes in exodermal development was analysed. It is already known, that CASP genes play role in endodermal Casparian strip development, which was described for *Arabidopsis thaliana*. Our model plant was maize, because it forms also exodermal layer and the orthologues of CASP genes for maize (ZmCASP and ZmCASP) were found. Our results show, that CASP genes may also play some role in exodermal Casparian strip development. ZmCASP1 expression correlates with Casparian strip lignification in endodermis and exodermis. ZmCASP2 expression seems to be more constitutive.

Key words: exodermis, Casparian strip, lateral roots, suberin lamellae, apoplastic barriers, CASP