

Research Project

Elucidation of the root immune response in a cellular and developmental context

Third-party funded project

Project title Elucidation of the root immune response in a cellular and developmental context

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Roots are the "the hidden half" of plants, buried in a soil environment in which they are incessantly exposed to a large variety of microbes. Some of these microbes are pathogens, causing devastating diseases in crop production, but others are symbionts, promoting plant growth and serving the needs of sustainable agroecosystems. Thus, plant roots should be able to mount an immune response towards pathogens, but at the same time they should not be offended by harmless rhizosphere microbes, and even open the doors to symbionts. How is this possible? We hypothesize that the precise cell-specific response to microbe-associated molecular patterns (MAMPs) and related signals has a major role to play, but there is currently a void in our knowledge about recognition, signalling and response in a cellular and developmental context. This project is a concerted effort to gain a molecular understanding of the interaction of roots with pathogens, put into the context of root structure and development. A network of four groups from three Swiss Universities will undertake pioneering work in order to elucidate the distinct wiring and compartmentalisation of immune responses in roots. The teams will combine expertise of groups in plant-pathogen interactions (Boller and Métraux groups) with that of groups that are experts in root development and cell biology (Hardtke and Geldner groups). Our aim is to undertake a molecular analysis of immune responses with cell-type and organ-specific resolution, taking into account the specific and dynamic structure of growing roots; its evolving mechanical barriers that will compartmentalise perception and response to pathogens; the molecular mechanisms that alter root growth and development upon attack and which, in turn, will influence susceptibility to pathogens.

Keywords Arabidopsis, plant pathogens, root development, endodermis

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Specify cooperation partners

ID	Kreditinhaber	Kooperationspartner	Institution	Laufzeit - von	Laufzeit - bis
2362746	Boller, Thomas	Hardtke, Christian	Département de biologie moléculaire végétale, Université de Lausanne	01.08.2011	31.07.2014
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