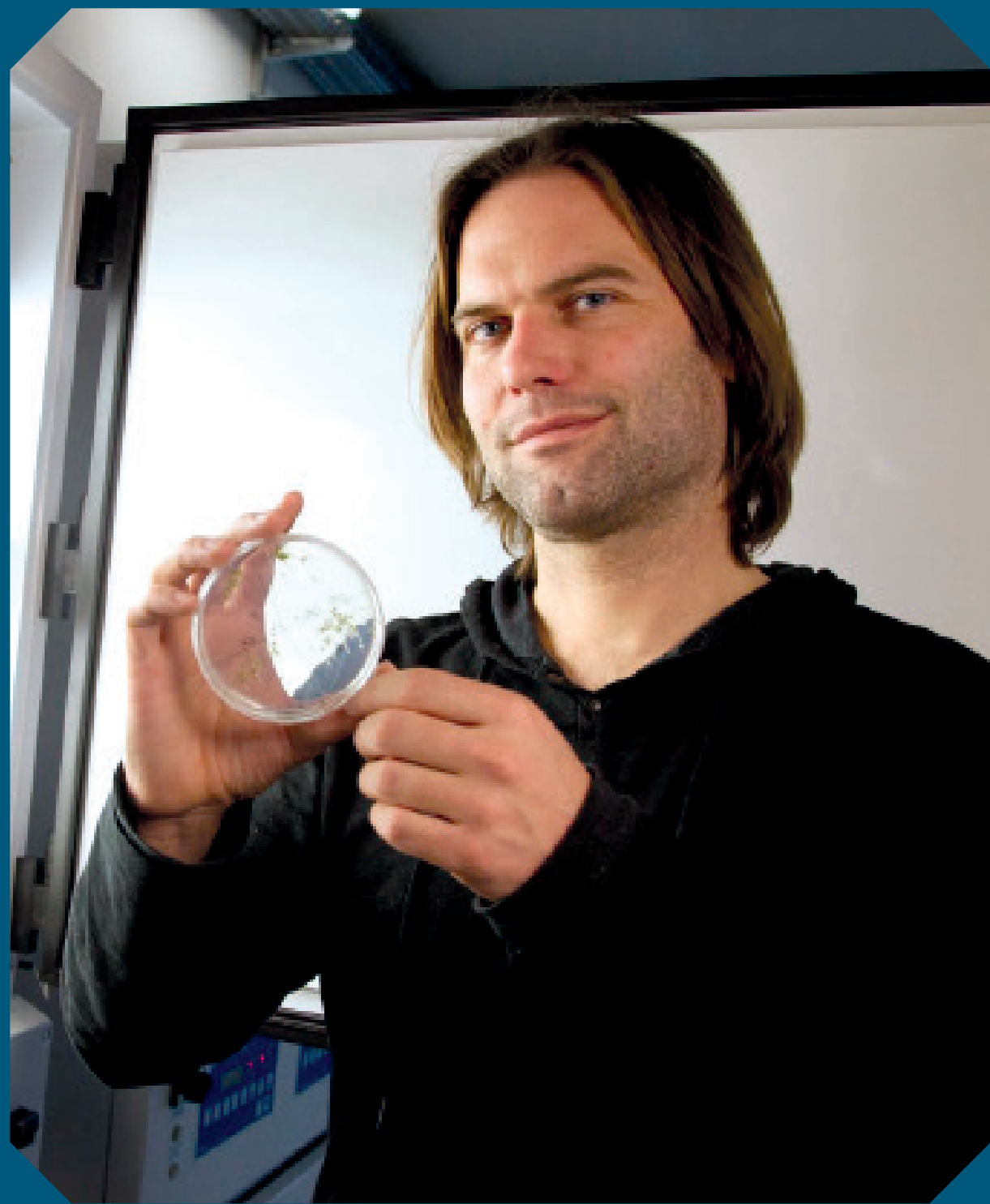


PROF. NIKO GELDNER (FBM / DBMV)



PROJECT TYPE	ERC Starting Grant (FP7)
TITLE	Plant endomembrane trafficking in physiology and development
ACRONYM	PLANT-MEMB-TRAFF
DURATION	01.04.2008 – 31.03.2013
BUDGET	1 199 889 €

Higher plants have independently developed multi-cellularity and display differently structured, but very complex cell and tissue systems. Therefore, questions fundamental to our understanding of plants - such as cell wall composition, plant nutrition, immune responses, among many others – cannot be understood by looking at what is known in animals. One cell layer of fundamental importance for root function, the endodermis, very much resembles an animal epithelium in structure and function, but has evolved entirely independently from animals. In the course of this project, we were able to identify a number of genes that are important in setting up the specific features of the endodermis, most notably the Casparian strip.

The Casparian strip is a ring-like cell wall modification without which the endodermis and, by extension, the entire plant root is thought to become dysfunctional. By inspecting more than 20.000 randomly mutagenised seeds of the model plant *Arabidopsis*, we were able to identify a whole set of genes that drives endodermal differentiation. Moreover, we have developed numerous marker lines and visualisation tools that now allow us to analyse how the endodermis and its Casparian strips are built. This now allows comparisons between plant and animals and the description of an entirely independent evolutionary pass leading to a seemingly similar solution.

Beyond this evolutionary interest, we could show that our mutants constitute invaluable tools for many plant researchers, interested in understanding diverse aspects of root function, such as nutrient and water uptake, defense against soil-borne pathogens or the formation of side roots in order to form a complex root system.