ABSTRACT

"Plants communicating with pathogens: membranes in motion and cellular defense"

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Cell surface receptors of plant cells constitute recognition sites to detect invading pathogens and to active defenses. Arabidopsis FLS2 encodes the receptor kinase for bacterial flagellin (flg22) and is required for immunity against a broad-spectrum of potentially pathogenic bacteria. Upon flg22 perception FLS2 accumulates at plasma membrane microdomains and is internalized. Although receptor trafficking became a focus of research in the past years, there is largely nothing known about downstream molecules and regulatory components of receptor endocytosis. I will present quantitative high throughput confocal imaging in plants and will discuss results from our current research, which addresses the identity of the FLS2 endosome, molecular components regulating FLS2 endocytosis, and the interception of FLS2 endocytosis and flg22 signaling. These results provide good evidences for a role of late endosomes/multivesicular bodies in plant immunity. To further study cellular defenses we focus on stomatal closure as a first layer of plant immunity. I will describe approaches using high throughput confocal imaging for the genetic dissection of stomata response pathways, and present exciting data how pathogens inhibit stomatal closure by interference with hormonal signaling. Altogether, these studies allow us to better understand the molecular mechanisms underlying the subcellular changes in plant-pathogen interactions.