BK21 Plus Seminar

"From pathogen comparative genomics to the identification of key Solanaceae determinants for durable resistance; the case of Ralstonia solanacearum, the bacterial wilt agent"

[Nemo PEETERS, Ph. D.]

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Ralstonia solanacearum is a soil-born, root-infecting vascular pathogen, affecting many plants in warm areas of the globe. Because of its resilience in contaminated soils and the lack of efficient plant resistance it has been classed as one of the major bacterial pathogens threatening food security. The disease affects Solanaceae crops, but also groundnut and banana in large farm operations but also in subsistence farming.

Our research aim is to better understand the molecular mechanisms controlling this devastating bacterial wilt disease to provide new selection targets to improve the tolerance/resistance in Solanaceae crops.

This work started with the in-depth knowledge of the bacterial pathogen1. We then set out to identify the conserved type III effectors among the strains from the large Ralstonia solanacearum Species Complex2 (latest updated database at www.ralsto.fr). Using these type III effectors as baits we screened a dedicated tomato root cDNA library in order to identify the plant proteins putatively targeted by these effectors during the infection. Our multiple screening resulted in the identification of a large set of candidate tomato proteins targeted by Ralstonia solanacearum type III effectors. Our next step was to test by reverse genetics (VIGS in Nicotiana benthamiana, insertion mutants in Petunia and Arabidopsis) for evidence of contribution of some of these candidate gene to the control of the bacterial wilt. Crispr/cas9 tomato plants are underway to validate and better understand the role of these genes. Our aim is to identify new susceptibility genes that could be used for Solanaceae breeding against this pathogen.

The knowledge of the distribution of the different type III effectors among different strains is also of importance when specific resistances (of the "gene for gene" type) are identified and deployed in specific geographic areas3.

Finally, I will present our latest efforts in optimising the biotic and abiotic stresses phenotyping in plants, with a specific focus on the R. solanacearum – tomato interaction. This is possible thanks to a state-of-the-art robotics facility (http://tpmp.inra.fr) dedicated to evaluate plant performance in interaction with their biotic partners, under changing abiotic environments.

- **Date: 10:00 AM/Nov. 15(Thur.)/2018**
- **Place: Conference room(#376), Postech Biotech Center**
- **Inquiry: Prof. Kee Hoon Sohn (279-2357)**

*** This seminar will be given in English.**
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