NUS National University of Singapore | Department of Biological Sciences, Faculty of Science

SEMINAR

Tues, 17 July 2018 | 11am | DBS Conference Room 1

Hosted by Dr Chae Eunyoung

Professor Thorsten Nürnberger is Head of the Department of Plant Biochemistry at Center of Plant Molecular Biology in the University of Tübingen, Germany since 2003. His research work is on identification and structural and biochemical characterization of pathogen-associated molecular patterns and their cognate plant pattern recognition receptors, as well as structural and functional analyses of bacterial and oomycete effectors and NLP cytolysins.

Microbial NLP cytolysins - virulence and plant immunogenic activities

By **Thorsten Nürnberger**

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Necrosis and ethylene-inducing peptide 1-like (NLP) proteins constitute a superfamily of proteins produced by numerous plant pathogenic bacteria, fungi and oomycetes. Many NLPs are cytotoxins that facilitate microbial infection of eudicot, but not of monocot plants. Dicot plant-specific glycosylinositol phosphorylceramide (GIPC) sphingolipids serve as NLP toxin receptors mediating ion pore formation membrane insertion and host cell lysis (1). Insensitivity to NLP cytolysins of monocot plants may be explained by the length of the GIPC head group and the architecture of the NLP sugar-binding site. We unveil early steps in NLP cytolysin action that determine plant clade-specific toxin selectivity and propose the use of NLPs as naturally occurring dicot weed herbicides.

We further show that Arabidopsis leucine-rich repeat receptor protein (LRR-RP) RLP23 binds in vivo a conserved 20-amino-acid fragment found in most NLPs (nlp20), thereby mediating immune activation in Arabidopsis thaliana (2-4). Ectopic expression of RLP23 in potato (Solanum tuberosum) confers nlp20 pattern recognition and enhanced immunity to destructive oomycete and fungal plant pathogens, including Phytophthora infestans and Sclerotinia sclerotiorum. Individual or stacked PRRs that recognize widespread microbial patterns might be particularly suited for engineering quantitative disease resistance in crop plants.

Artwork by Ann Nee, DBS, NUS