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

SEMINAR

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Hosted by Emeritus Prof Wong Sek Man and Assist. Prof Long Yuchen

Mechanism that Limits the Reovirus to Vasculatures in Plant

By **Heng-Mu Zhang**

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Most plant reoviruses are limited within vasculatures but the mechanism has remained unknown for more than half a century. Southern rice black streaked dwarf virus (SRBSDV; *Fijivirus, Reoviridae*) causes phloem-derived tumors. Its virions, genomes, and proteins accumulation are used as a model to explore how its host plant limits the virus in its phloem. The virus-induced tumors are highly organized. We discovered a novel intercellular gateways, tentatively described as Flexible (FL) Gateways which is a special region that consisted of exclusively sieve elements (SEs) without the usual companion cells. High throughput volume electron microscopy revealed that only sieve plate pores and flexible gateways rather than plasmodesmata (PD) have a sufficiently large size exclusion limit (SEL) to accommodate virions and potentially serve as pathways of virion movement. The large SEL gateways are enriched within the proliferated SE layers of tumors. The lack of such connections out of the SE-enriched regions of tumors defined a size-dependent physical barrier to high flux transportation of virions. A working model is proposed to demonstrate the mechanism underlying limitation of virus within vasculatures in plant.

About the Speaker

Professor Zhang received his Doctor's degree from Zhejiang University in 2001 and conducted post-doctor at Tsinghua University in 2003. As the Principal Investigator at Zhejiang Academy of Agricultural Sciences (ZAAS) since December 2003, his research interests focus on identification of new viruses, viral pathogenicity, antiviral mechanism, and molecular interactions between viruses and plants. The projects have been funded by National '863' High-tech R&D Projects, National Science and Technology Support Plan, and National Natural Science Foundation, China. In recent years, he has achieved a series of academic progresses, published more than one hundred articles in journals including New Phytologist, Journal of Experimental Botany, Molecular Plant Pathology, Plant Communication or other academic journals, and received one National Science and Technology Award and three Zhejiang Science and Technology Awards, China. He has become a member of the Editorial Board of Scientific Reports since 2017 and a member of the Advisory Board for New Phytologist since 2020.