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TEMASEK LIFESCIENCES LABORATORY

22 January 2019 (Tuesday), 3.30pm
The Auditorium (Level 1)
Hosted by: Dr Yin Zhongchao

Memory and Induced Forgetting in Plants

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Dr Toshiro Ito received his Ph.D from Kyoto University, Japan and worked for California Institute of Technology, USA as a postdoctoral fellow (1997-2003) and as a senior research fellow (2003-2005). He worked for Temasek Life Sciences Laboratory, Singapore (2005-2017) to lead the Plant Systems Biology Group. In 2015, he started the Plant Stem Cell Regulation and Floral Patterning Laboratory in Nara Institute of Science and Technology.

Plants have evolved sophisticated adaptation mechanisms to environmental changes. For example, plants can acquire resistance to recurring high temperature conditions by memorizing the heat stress. However, under an ever-changing environmental condition, heat memory may not always confer adaptive advantages, and thus induced forgetting is also an important trait in plant adaptation. Recently epigenetic regulation has been recognized as an important basis in plant memory, but still little is known about plant memory and forgetting. Here we show that histone demethylase-mediated epigenetic histone modification plays a key role in the short memory of heat. Duration of short heat memory would be determined by the balance between “erasers” and “writers” of histone modification. I will also discuss vernalization as a long-term memory of plants. Prolonged winter coldness leads to stable silencing of the flowering repressor *FLC*. This winter memory can be erased by a high temperature stress, which is called devernalization. I will present our recent approaches to study the molecular mechanism of plant memory and induced forgetting.

Recent Publications:

1.Xu, Y., Prunet, N., Gan, E-S., Wang, Y., Stewart, D., Wellmer, F., Huang, J., Yamaguchi, N., Tatsumi, Y., Kojima, M., Kiba, T., Sakakibara, H., Jack, T.P., Meyerowitz, E.M., **Ito, T.** (2018)“SUPERMAN regulates floral whorl boundaries through control of auxin biosynthesis.” ***EMBO Journal*** DOI: 10.15252/embj.201797499

2.Uemura, A., Yamaguchi, N., Xu, X., Wee, W., Ichihashi, Y., Suzuki, T., Shibata, A., Shirasu, K., and **Ito, T.** (2018) “Regulation of floral meristem activity through the interaction of AGAMOUS, SUPERMAN, and CLAVATA3 in Arabidopsis.” ***Plant Reproduction*** 31 89-105. DOI 10.1007/s00497-017-0315-0

3.Yamaguchi, N., Huang, J., Xu, Y., Tanoi, K., and **Ito, T.** (2017) “Fine-tuning of auxin homeostasis governs the transition from floral stem cell maintenance to gynoecium formation.” ***Nature Communications*** 8:1125. DOI: 10.1038/s41467-017-01252-6