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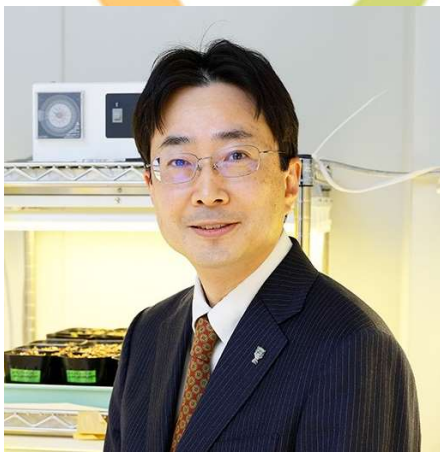
13 Jan 2025 (Mon), 4pm
The Auditorium (Level 1)

Hosted by: Dr YIN Zhongchao

Conflict in Harmony: The Interplay of AEGEUS and MEDEA in Seed Development

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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, Japan.

In seed development, parental conflict influences nutrient flow to the embryo: maternal genes tend to restrict it, while paternal genes promote it. A key player in this balance is MEDEA (MEA), a maternal Polycomb Repressive Complex 2 (PRC2) component, which limits endosperm growth. However, the paternal counterbalance has been unclear. We have now identified a new paternal gene, named “*AEGEUS*” (*AGU*) after the mythical king who married Medea, known for her fertility. *AGU*, a RING finger protein, plays a crucial role by delaying early endosperm cellularization, thus affecting seed size. *AGU* upregulates other paternal genes and, surprisingly, *MEA* as well. Together, *AGU* and *MEA* regulate seed size through their opposing yet harmoniously coordinated effects on the downstream network in seed development. I will discuss the epigenetic functions of *AGU* and potential applications for improving crop yields.

Recent publications:

1. Shirakawa M, Oguro T, Sugano S, Yamaoka S, Sagara M, Tanida M, Sunuma K, Iwami T, Nakanishi T, Horiuchi K, Kumaishi K, Yoshida S, Watanabe M, Tohge T, Suzuki T, Ichihashi Y, Takemiya A, Yamaguchi N, Kohchi T, Ito T, “Co-option and neofunctionalization of stomatal executors for defense against herbivores in Brassicales,” *Nature Plants*. 2024 in press
2. Furuta Y, Yamamoto H, Hirakawa T, Uemura A, Pelayo MA, Iimura H, Katagiri N, Takeda-Kamiya N, Kumaishi K, Shirakawa M, Ishiguro S, Ichihashi Y, Suzuki T, Goh T, Toyooka K, Ito T*, Yamaguchi N*, “Petal abscission is promoted by jasmonic acid-induced autophagy at Arabidopsis petal bases,” *Nature Commun.* 15: 1098, 2024, doi:10.1038/s41467-024-45371-3. *Co-corresponding authors
3. Pelayo M A, Morishita F, Sawada H, Matsushita K, Iimura H, He Z, Looi L S, Katagiri N, Nagamori A, Suzuki T, Širl M, Soukup A, Satake A, Ito T*, Yamaguchi N*, “AGAMOUS regulates various target genes via cell cycle-coupled H3K27me3 dilution in floral meristems and stamens.” *Plant Cell*, 35: 2821-2847, 2023, *Co-corresponding authors