CV

S. Matsunaga obtained his Ph.D. in 1998 under the supervision of T. Kuroiwa (The University of Tokyo), where he studies plant sex chromosomes and sex differentiation. As a postdoc, he worked at The University of Tokyo and University of North Carolina (1998-2000). After working as an assistant professor at The University of Tokyo (2000-2002), he worked as an associate professor at Osaka University (2002-2011). He studies human and plant chromatin dynamics and epigenetics via imaging. Since 2011, he leads his lab in Tokyo University of Science (2011-2020) and The University of Tokyo (2020-present). His studies are mainly classified into three, (1) Epigenetic regulation in plant regeneration, (2) Chromatin dynamics in subnuclear space, and (3) Synthetic biology of plant-animal hybrid cells called planimal cells.

Title and Abstract

Epigenetic priming in plant regeneration

Epigenetic priming is one of the potential systems in that genes are poised for activation by external signal inputs. Although the priming does not alter the gene expression, it is considered to induce the open structure of chromatin and the poised state for future transcription. This priming is involved in stem cell differentiation, cancer development, and drug action but remains unclear in plant regeneration. We successfully identified epigenetic priming by LYSINE-SPECIFIC DEMETHYLASE 1-LIKE 3 (LDL3) that specifically eliminates H3K4me2 during the formation of callus derived from roots of *Arabidopsis thaliana*. While LDL3-mediated H3K4me2 removal does not immediately affect gene expression, it does facilitate the later activation of genes that act to form shoot progenitors after shoot induction. This finding gives insights into plant regenerative competency with epigenetic priming.

Selected recent publication

Yagi, N. *et al.* **2021** An anchoring complex recruits katanin for microtubule severing at the plant cortical nucleation sites. **Nature Commun.**, in press.

Shibuta, M. K. *et al.* **2021** A live imaging system to analyze spatiotemporal dynamics of RNA polymerase II modification in *Arabidopsis thaliana*. **Commun. Biol.**, 4, 580.

Matsuo, T. *et al*. **2021** Thiazoline-related innate fear stimuli orchestrate hypothermia and anti-hypoxia via sensory TRPA1 activation. **Nature Commun.**, 12, 2074.

Sakamoto, Y. *et al*. **2020** Subnuclear gene positioning through lamina association affects copper tolerance. **Nature Commun.**, 11, 5914.

Ishihara, H. *et al*. **2019** Primed histone demethylation regulates shoot regenerative competency. **Nature Commun.**, 10, 1786.

Sugimoto, K. *et al*. **2019** To regenerate or not to regenerate: factors that drive plant regeneration. **Curr. Opin. Plant Biol.**, 47, 138-150.

Sakamoto, T. *et al*. **2018** Proteasomal degradation of BRAHMA promotes Boron tolerance in Arabidopsis. **Nature Commun.**, 9, 5285.