



ABSTRACT

“Developmental control of cell size and ploidy in *Arabidopsis*”

Dr Keiko Sugimoto
Plant Science Center
RIKEN Yokohama Institute
JAPAN

The development of multicellular organisms requires mechanisms that pattern cell proliferation and cell expansion with temporal and spatial precision. The requirement of such patterning strategies is, for instance, evident in plant meristems, where cells divide and expand in a highly ordered fashion. Cell proliferation is driven by the mitotic cycle in which cells undergo sequential phases of DNA replication and cell division. Cell expansion, in contrast, often coincides with endocycles in which cells replicate the genomic DNA without intervening cell divisions, thus leading to an increase in ploidy levels. Although a number of cell cycle regulators that are implicated for the mitotic-to-endocycle transition have been identified, it is still largely unknown how this transition is developmentally controlled at the whole organ level. We have recently identified several new *Arabidopsis* mutants, *high ploidy (hip)*, that display severe dwarf phenotypes with their cells initiating premature expansion in the meristem. Our flow cytometry analysis revealed that these developmental phenotypes are associated with an early transition into the endocycle, suggesting that HIP proteins may function as negative regulators of endocycling and cell expansion in the meristem. Based on our recent progress, I will discuss how endocycling and accompanying cell expansion are controlled in *Arabidopsis*.