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Centromeric chromatin dynamics in the fertilization process of Arabidopsis

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In eukaryotes, epigenetic marks including histone variants are essential for chromatin maintenance and function. During reproductive processes, some epigenetic marks are dynamically reprogrammed to establish proper chromatin states for the next generation. In flowering plants, the egg cell inside the ovule is fertilized by one of two sperm cells generally delivered by a pollen tube in a species-specific manner, and develops into a zygote and then embryo. However, it remains unclear how female and male chromatin are regulated after fertilization and what is the key for a species-specific mechanism of chromatin maintenance.

To investigate dynamics and recognition mechanisms of chromatin in the fertilization processes of flowering plants, we focus on the centromere-specific histone H3 variant, CENH3, which is commonly used for chromosome segregation during mitosis and meiosis in eukaryotes and shows diverged amino-acid sequences between species. Here, we show the dynamics of CENH3 and surrounding heterochromatin marks in zygote/embryo development of *Arabidopsis thaliana* by the live-cell imaging using multiphoton-excited fluorescence microscope and ovule culture systems. Using several mutants defective in the heterochromatin formation, we are trying to understand the regulatory network among chromatin marks and its importance in zygote/embryo development.