In flowering plants, female meiosis occurs in the ovule, a specialized organ in the flower. A cell in the distal region of an ovule primordium, is specified at stage 2-I to be the megaspore mother cell (MMC). Subsequently, this MMC enlarges, differentiates, and undergoes meiosis in ovules at stage 2-IV. This process distinguishes the MMC and its lineage from the remaining non-sporogenous (NS) cells of the ovule primordium.

In developing ovules, a dual role for ARP6 (ACTIN-RELATED PROTEIN 6) in regulating the spatial and temporal expression of *DMC1* (*DISRUPTED MEIOTIC* cDNA 1), a gene involved in meiotic recombination, was established (Qin et al. 2014, *Plant Cell* 26: 1612-1628). ARP6 inhibits *DMC1* expression in non-sporogenous cells even as it promotes *DMC1* expression in the MMC that is undergoing meiosis.

Here is shown a composite of confocal images of ovules carrying a promoter-reporter (*pDMC1:GFP*) transgene (green), and counterstained with FM4-64 to label the plasma membranes of cells (red). A wild-type ovule (left image) normally expresses *DMC1* exclusively in the MMC, whereas an *arp6*-mutant ovule (right image) does not express *DMC1* in the MMC and instead shows dramatically increased expression in the non-sporogenous ovule cells.

Methods: Ovary walls of pistils (female reproductive structure) in fresh developing buds were dissected to expose ovule primordia and stained with FM4-64 dye solution (2 μM) for 5 minutes. Stained samples were mounted in 50% glycerol and observed on a TCS SP8 confocal microscope (Leica Microsystems). Green and red fluorescence of a single optical section of ovule primordia were acquired using Leica Application Suite Advanced Fluorescence software.

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