



Ovarian follicle development is essential for the propagation of species. In *Drosophila melanogaster*, follicle development occurs through a spectacularly coordinated sequence within the highly polarized ovariole (pictured). A single ovary contains more than a dozen ovarioles that cluster together to form bud-like structures. Gentle mechanical disruption of the ovary allows for the separation and visualization of individual ovarioles and, thus, the progression of follicle development.

Here, *D. melanogaster* ovarioles were isolated and stained with 4',6-diamidino-2-phenylindole (DAPI) to identify the characteristic stages of follicular maturation. Follicle development occurs in a distinct anterior-to-posterior direction, beginning in the germarium (red) and progressing through a set of egg chambers of increasing numerical stage (orange, green, blue, yellow, and magenta), before terminating at a mature oocyte (cyan). Although not shown here, mature oocytes are connected to egg chambers within the same ovarioles via dorsal appendages.

Germ-line stem cells, residing within the germarium, are a self-renewing population that divide to form a daughter stem cell, which remains in the germarium, and a cystoblast. The cystoblast undergoes sequential rounds of division to form an egg chamber housing 15 nurse cells that work in tandem to nourish a single developing oocyte. The egg chamber is additionally surrounded by numerous follicular cells. Ultimately, the developmentally competent egg will exit the assembly line several days later and enter the uterus, where it may be fertilized. A fertilized egg activates during its deposition on an exterior surface allowing embryonic development to commence externally.

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