Characterization and three-dimensional organization of nuclei within developing spermatogenic cysts in Drosophila pseudoobscura

Crystal Pristell
Seton Hall University, Crystal.Pristell@shu.edu

Angela V. Klaus
Seton Hall University, Angela.Klaus@shu.edu

Follow this and additional works at: https://scholarship.shu.edu/bio-student-work

Recommended Citation
Pristell, Crystal and Klaus, Angela V., "Characterization and three-dimensional organization of nuclei within developing spermatogenic cysts in Drosophila pseudoobscura" (2011). Biological Sciences Student Work. 1.
https://scholarship.shu.edu/bio-student-work/1
Characterization and three-dimensional organization of nuclei within developing spermatogenic cysts in *Drosophila pseudoobscura*

Crystal Pristell and Angela V. Klaus

Department of Biological Sciences, Seton Hall University, South Orange, NJ, USA

**BACKGROUND**

Previous work in our laboratory was aimed at the development of an in vitro system for culturing *Drosophila* sperm cells. The current work is aimed at analyzing spermatogenic cyst morphology so that we can accurately characterize cyst maturation in our in vitro culture system. Sperm precursor cells develop within cysts and eventually mature to produce motile, elongate sperm cells. Germine stem cells are maintained in the stem cell niche in the apical end of the testes. Germine stem cells differentiate and become encapsulated in a cyst. After encapsulation, the germine cell (called a "gonialblast") at this stage undergoes series of divisions which increase the number of sperm precursors within the cyst. In *D. pseudoobscura*, there are five mitotic divisions, followed by the two meiotic divisions, resulting in 124 haploid cells ultimately being produced.

Spermatogenesis in *D. pseudoobscura*

*Figure 1.* Schematic representation of spermatogenesis in *D. pseudoobscura*. (a) The stem cell niche showing the progression (left to right) of the encapsulation of a gonialblast (Hb cells, GSC gonads; stem cell, SSC somatic stem cell or cyst progenitor cells). (b) Close-up view of the testes showing the stages of cyst development. In *D. pseudoobscura*, spermatogenesis proceeds normally through five divisions to produce 32 cells, which grow in size and replicate their DNA to become primary spermatocytes. Primary spermatocytes enter meiosis with the first meiotic division resulting in 64 secondary spermatocytes. The final meiotic division results in 128 round haploid sperm cells that then transform into mature spermatids during spermiogenesis and become spermatozoa. Meanwhile, spermatozoa undergo mitotic divisions in cysts, forming a spermatocyte, which is capable of storing spermatozoa to surround the cystic cells.