CDB SEMINAR

Erika Matunis

Department of Cell Biology, Johns Hopkins University School of Medicine

Wednesday, April 25, 2007

15:00~16:00 A7F CDB Conference Room

Spermatogonial stem cell renewal in the *Drosophila* Testis

Summary

Stem cells regenerate tissue by dividing asymmetrically, producing both new stem cells (self-renewal) and daughters that differentiate. Although differentiation is typically considered irreversible, it can be altered in response to injury or aging. The conversion of a differentiated cell to a less differentiated cell type, or dedifferentiation, endows certain organisms with remarkable regenerative properties, but is not understood molecularly. We use *Drosophila* spermatogenesis as a model stem cell system, since it parallels mammalian spermatogenesis, yet we can precisely locate the sperm-producing spermatogonial stem cells and manipulate their microenvironment (niche) genetically. In this niche, local activation of the stem cell maintenance factor Signal Transducer and Activator of Transcription (STAT) prevents differentiation of germline and somatic stem cells, and a negative feedback loop maintains the correct ratio of these two stem cell populations. By conditionally manipulating either STAT, or the differentiation factor Bam (Bag-of-marbles) we have uncovered a surprising degree of plasticity in this tissue; under either condition, differentiating spermatogonia can reverse their path, break apart into single cells and dedifferentiate into functional spermatogonial stem cells. This raises the possibility that spermatogonia may also dedifferentiate into stem cells during aging, and that dedifferentiation may be a general feature of many stem cell systems. For example, dedifferentiation has long been postulated to occur in mammalian testes. We can now use genetics to gain a molecular understanding of dedifferentiation.

Host:
Akira Nakamura
Germline Development, CDB
akiran@cdb.riken.jp
Tel:078-306-0103 (ext:1442)