



CDB SEMINAR

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Stowers Institute for Medical Research
Kansas City, USA

Monday, March 9, 2009
16:00~17:00 A7F Seminar Room

Stem Cells: Niche, Competition, Aging and applications

Summary

Stem cells in adult tissues have the capacity to self-renew and generate differentiated progeny that replenish lost or damaged cells. The *Drosophila* ovary is an effective system for studying relationships between the niche and stem cells because the stem cells and their associated niches are well defined and versatile genetic tools for dissecting gene functions are readily available. My lab has been using two types of stem cells in the *Drosophila* ovary, germline stem cells (GSCs) and follicular stem cells (FSCs), to study stem cell-niche relationships, niche formation, stem cell quality control and aging. Using a combination of genetic and cell biological approaches, we have studied multiple signaling transduction pathways for their roles in controlling stem cell self-renewal and differentiation, such as BMP, Wnt and JAK-STAT. In addition, we have revealed essential roles of cadherin-mediated cell adhesion in anchoring GSCs and FSCs to their niches, and have defined essential functions of ATP-dependent chromatin remodeling factors and the microRNA pathway in controlling GSC and FSC self-renewal. Recently, we have shown that Notch signaling is required for GSC niche formation during early development, and is also used by GSCs to signal back to maintain niche integrity in the adult ovary, indicating that stem cells and their niche are mutually dependent. Finally, we have also shown that stem cell competition serves as a quality control mechanism and that stem cell aging is controlled intrinsically and extrinsically. Finally, we have characterized a novel population of stem cells in the adult mouse retina, which have the potential for long-term self-renewal *in vitro* and generation of different differentiated retinal lineages following transplantation. In my presentation, I will summary our current understanding of stem cell regulation in the *Drosophila* ovary and the progress in the characterization of retinal stem cells in the mouse.

Host:

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