CDB SEMINAR

Speaker: Yukiko M. Yamashita
Stanford University
Department of Developmental Biology, School of Medicine

Title: " Differential segregation of mother and daughter centrosomes during asymmetric stem cell division in the Drosophila male germ line "

Date: Friday, December 2
Time: 10:30 A.M.～11:30 A.M.
Place: Auditorium of Building C, CDB

Summary

Stem cells are the source of highly-differentiated but short lived cells such as blood, skin and sperm. The critical balance between stem cell and differentiated cell populations are crucial for long-term maintenance of functional organs. Stem cells maintain this balance by choosing two alternative fates: stem cell self-renewal or commitment to differentiation. The *Drosophila* male germ line stem cells (GSCs) divide asymmetrically, giving rise to one stem cell and one gonialblast that initiates differentiation, thus keeping balance between stem cell and differentiating cell populations. In adult male testes, 8-10 germ line stem cells surround the somatic apical hub. The hub functions as stem cell niche by secreting a signalling ligand, unpaired (Upd), which activates the JAK-STAT pathway in GSCs to specify stem cell identity. In this signalling microenvironment, GSC orients its mitotic spindle perpendicular to the hub such that one daughter cell remains attached to the hub while the other is displaced away from the hub, thereby ensuring the asymmetric outcome of the division.

We have shown that stereotyped positioning of the centrosomes during interphase plays crucial role in orienting GSCs toward the hub cells: One centrosome is always positioned close to the hub, while the other centrosome migrates toward the opposite side of the nucleus during interphase, thereby setting up the perpendicular orientation of the mitotic spindle. We found that it is always that mother centrosome stays close to the hub, while the daughter migrates. This suggests that the difference(s) between mother and daughter centrosomes may be functionally exploited to achieve the asymmetric outcome of the stem cell division.

Contact: Shigeo Hayashi /Morphogenetic Signaling, CDB e-mail: shayashi@cdb.riken.jp
Tel: 078-306-3185; RIKEN Center for Developmental Biology, http://www.cdb.riken.jp/