



CDB SEMINAR

Vernadeth B. Alarcon

University of Hawaii

Thursday, March 18, 2010

15:00 - 16:00 C1F CDB Auditorium

Cell polarity regulator *Pard6b* is essential for trophectoderm formation in the preimplantation mouse embryo

In mouse preimplantation development, the first cell lineages to be established are the trophectoderm (TE) and inner cell mass. TE possesses epithelial features, including apical-basal cell polarity and intercellular junctions, which are crucial to generate a fluid-filled cavity in the blastocyst. Homologs of the *partitioning defective (Par)* genes are critical regulators of cell polarity. However, their roles in regulating TE differentiation and blastocyst formation are not known. Here, the role of *Pard6b*, a homolog of *Par6* gene and a component of the PAR-aPKC complex, was investigated. *Pard6b* expression was down-regulated by microinjecting RNA interference construct into zygotes. *Pard6b*-knockdown embryos cleaved and compacted normally but failed to form the blastocyst cavity. The cavitation failure is likely due to defective intercellular junctions, as *Pard6b* knockdown caused abnormal distribution of ZO-1 tight junction (TJ) protein and interfered with cavitation in chimeras containing cells from normal embryo. Defective TJ formation may be due to abnormal cell polarization, as the apical localization of aPKC ζ was absent in *Pard6b*-knockdown embryos. *Pard6b* knockdown also diminished the expression of *Cdx2*, a TE-lineage transcription factor, in the outer cells. *Tead4*, a transcriptional activator that is required for *Cdx2* expression and cavity formation, was not essential for the transcription of *Pard6b*. Taken together, *Pard6b* is necessary for blastocyst morphogenesis, particularly the development of TE-specific features, namely the apical-basal cell polarity, formation of TJ, and up-regulated expression of *Cdx2*.

Host:

Hiroshi Sasaki

Embryonic
Induction, CDB
sasaki@cdb.riken.jp
Tel:078-306-3147
(ext : 4431)

RIKEN CENTER for DEVELOPMENTAL BIOLOGY (CDB)