CDB SEMINAR

Speaker: **Mark Van Doren**

< Johns Hopkins University>

Title: "Regulation of Gonad Formation and Germ Cell Development"

Date:	Monday, May 24
Time:	16:00 P.M.～17:30 P.M.
Place:	7th floor Conference Room of Building A, CDB

Summary:

A fundamental problem in biology is how the germ cells develop and are nurtured by the soma so that they can give rise to the next generation of a species. My lab studies the formation of the gonad and how interactions with somatic cells in this environment affect germ cell development. Our current work can be divided into three main areas:

Gonad Morphogenesis: how germ cells and cells of the somatic gonad are able to recognize one another and form an organ with the proper pattern and architecture. Previously, we have examined the roles of the cell adhesion molecule E-cadherin and the novel transmembrane protein Fear of Intimacy (FOI) in gonad morphogenesis. Our current work indicates that FOI is required for proper E-cadherin expression or function in the gonad, and we are exploring the relationship between FOI and E-cadherin. In addition, we have conducted a large scale genetic screen for new mutations affecting gonad morphogenesis.

Gonad Sexual Dimorphism: how the sex determination pathway controls sex-specific development of the gonad. We have identified early aspects of sexually dimorphic gonad development. In one case, a new group of cells was found to contribute to the male gonad, but undergo sex-specific apoptosis in the female. Interestingly, these cells express a Drosophila homolog of *Sox9 (Sox100B)*, a gene that is critical for sexual dimorphism in humans, and which appears to play a similar role in a variety of vertebrate species. Current work focuses on how the sex determination pathway controls sex-specific programmed cell death, and the role of *Sox100B* in sexually dimorphic development (in collaboration with Steve Russell).

We are also studying the sex-specific development of another group of cells that express markers characteristic of the testis "hub" and that organize the germ cells in the embryonic gonad in males. Thus, this appears to represent the development of the testis stem cell niche and the recruitment of male germline stem cells. We are studying how the sex determination pathway regulates both the sex-specific morphogenesis and signaling capacity of this niche.

Germ Cell Development: how germ cell development is influenced by interactions with the somatic gonad. One influence of the somatic gonad is to regulate germ cell sex determination. We have found that germ cells exhibit sexually dimorphic regulation of the cell cycle soon after gonad formation: male germ cells resume mitosis, while female germ cells remain quiescent. Our data indicate that germ cells require the somatic gonad for proper cell cycle control, and that the male soma can activate division of either XY or XX germ cells. Further, we have found that the Jak/Stat pathway is specifically activated in male germ cells, and this pathway is necessary and sufficient to promote the male pattern of germ cell division. The *unpaired* ligand for this pathway is expressed in the somatic gonad in males but not females. Our continuing work addresses how sexual dimorphism in the somatic gonad, acting in part through the Jak/Stat pathway, regulates this and other sex-specific germ cell characteristics.

Host: Akira Nakamura Germline Development ,CDB

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