



SGU &

33rd DGGR Seminar

Wednesday, March 15th, 2017 16:00-17:10

4-th floor Seminar room of Dept. of Applied Biology, Bld. No. 2

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Regulation of Cell to Cell Communication

Cell to cell communication is a fact of life for multicellular organisms. It is required during development to insure the coordinated differentiation of progenitor cells into species-specific patterns of organs and tissues. It is required for maintaining homeostasis in adults and when disrupted can lead to problems such as loss of mitotic control and cell death. In humans these problems manifest themselves as cancer and neurodegenerative disease. Thus, the importance of understanding how cell to cell communication is regulated. In a testament to the dexterity of natural selection, there are only a handful of cell to cell communication pathways. These govern countless developmental and homeostatic events in the lifetime of a single multicellular organism and the collective lifetimes of all multicellular organisms. One of these is the Transforming Growth Factor-beta pathway (TGF-beta). Highly conserved since the dawn of multicellularity, the pathway directs developmental events in all metazoan species and in humans its signal transducing Smad proteins act as tumor suppressors. Given the billion year conservation of the TGF-beta pathway, how is it that species-specificity is imposed? Utilizing molecular genetics in *Drosophila* together with bioinformatics, two examples of differential pathway regulation between flies and mammals have been discovered. These studies of epigenetic and ubiquitylation proteins identified new evolutionary regulatory mechanisms as well as novel tumor suppressors. Overall, these examples reveal that the species-specific regulation of cell to cell communication is a fundamental feature of organismal diversity and human disease.

Chairperson: TAKANO, Toshiyuki

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