CDB SEMINAR

Speaker: **Kenneth M. Yamada**

<NIDCR, NIH>

Title: **"Dynamics of Cell-Matrix Interactions"**

Date: Thursday, October 20

Time: 15:00 - 16:00

Place: 1F Auditorium of Building C, CDB

Summary:

Cells both produce the extracellular matrix and are regulated by its components. When cells encounter the matrix, they rapidly organize complexes of integrins with intracellular cytoskeletal and signaling molecules. These multi-molecular complexes mediate cell adhesion, migration, matrix assembly, and tissue organization. They also activate or modulate many signal transduction pathways. One class of adhesion complex uses integrin and cytoskeletal dynamics to generate a three-dimensional (3D) fibronectin-based matrix. Cells respond to these 3D matrices differently from their interactions in standard 2D tissue culture. Fibroblasts respond to a 3D matrix by forming a distinctive integrin complex and display altered adhesion, migration, proliferation, and signaling by FAK and Rac compared to 2D substrates. The total level of Rac activity serves as a molecular switch controlling the mode of migration of fibroblasts, but also of epithelial and tumor cells. Relatively small changes in total Rac activity switches migration patterns from random to directionally persistent by a mechanism distinct from chemotaxis. At the tissue level, developmentally regulated, local production of 3D matrix can regulate organ formation. Laser microdissection, SAGE, and immunofluorescence analyses reveal site-specific induction of fibronectin and other molecules. 3D fibronectin matrix formation helps regulate branching morphogenesis of tissues to form salivary glands, lungs, and kidneys. Remarkably dynamic cell movement dynamics occur during branching. Advances in understanding the mechanisms and regulation of these processes may permit new approaches to tissue engineering and regeneration.

Host: **Masatoshi Takeichi** **<Cell Adhesion/Tissue Patterning, CDB >**

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