Title of Project : Cross-talk between moving cells and microenvironment as a basis of emerging order in multicellular system

Term of Project : FY2010-2014

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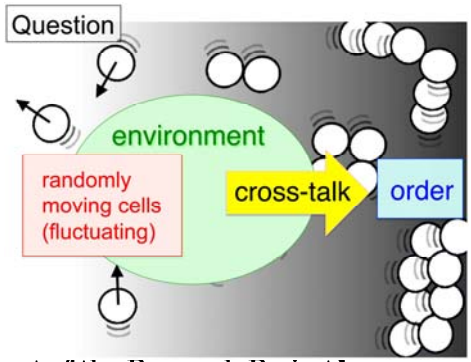
【Purpose of the Research Project】

When living dissociated cells are cultured on a dish without any specific external cues, they tend to show random movement. To construct a functional multicellular system or tissue, however, this "randomness" should be restricted through interactions with the cells' microenvironment, such as the extracellular matrix, signaling molecules, and other surrounding cells. In some cases, the microenvironment essential for the "ordered" movement is formed by the moving cells themselves.

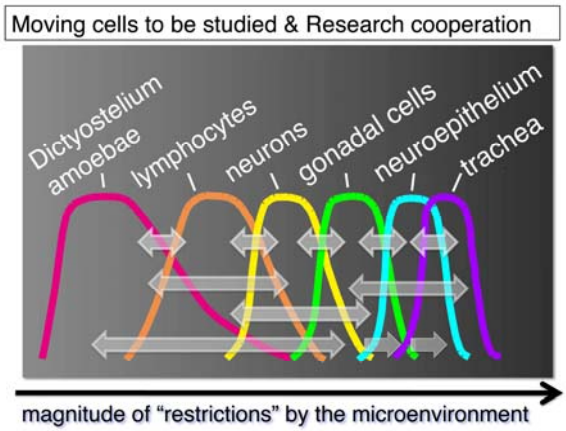
On the other hand, this randomness or movement fluctuation may be beneficial for the development of a robust multicellular system by creating errors during movement, since the system would become susceptible to unexpected perturbations if errors were not permitted.

In this research project, we will try to uncover the mechanisms that explain how moving cells with intrinsic randomness (fluctuations) can develop into an "ordered" functional multicellular system through cross-talk between themselves and their microenvironment.



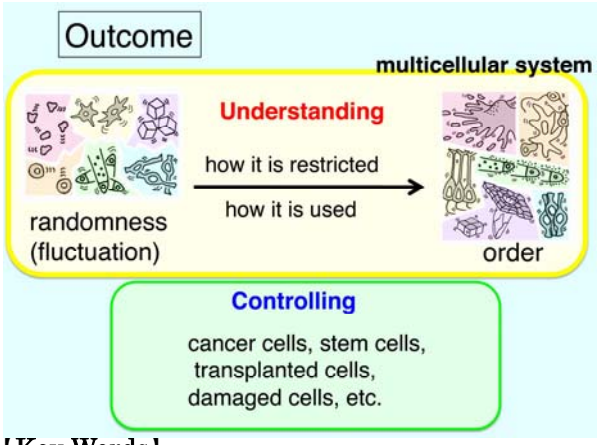
【Content of the Research Project】

The movement of different types of cells, such as lymphocytes, neurons, and epithelial cells, are restricted to various degrees by the microenvironment. In this project, researchers that share the above-mentioned point of view and are working on various cells will collaborate to understand the general rules explaining how "fluctuating" (moving) cells can form an "ordered" multicellular system. To this end, we will clarify the cell behavior in a multicellular system using high temporal and space resolutions, uncovering the cross-talk between moving cells and the microenvironment, and understanding the meaning of the "random" movements of the cells.



【Expected Research Achievements】

This research will clarify how each cell uses fluctuated movements and how the fluctuation/randomness is restricted by the microenvironment to establish a functional multicellular system. The outcome will have a general impact on, for example, strategies for controlling cancer cells and stem cells *in vivo*.



【Key Words】

Moving cell: a cell that moves to construct a multicellular system
Microenvironment: cellular environment that affects cell behavior

【Homepage Address】

http://sci-tech.ksc.kwansei.ac.jp/d_biosci/cross-talk