

Visualization of oscillation for stress signal and molecular genetic study of establishment of cell community

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【Outline of survey】

Animal development seems to progress according the scheduled process. However, if we look at the differentiation process of one particular cell, each cell differentiates through many trial and error processes. A good example is the process of neural development. Neurons extend their neurites to find their correct target through searching the physical and chemical landmark. Even if they could find their correct target, limitation of neurotrophic factor results in the elimination of certain amount of neurons. Such trial and error processes must be generally observed in organ development. During trial and error process, cells must acquire various stress signals. In this project, we will develop the system to visualize cellular stress signal in living organism and identify the oscillation of stress signal during development and provide a novel concept of the establishment of cell community.

【Expected results】

Caspase is activated by sensing the cellular stress and detection of caspase activation in cell community will enable us to visualize the stress oscillation in during animal development. Visualization of the important proteins for development is one of the most straightforward approach to study molecular basis of animal development. However, it is difficult to develop appropriate bioprobe for molecular imaging, establishment of bioimaging microscope and find an appropriate animal experimental system for bioimaging. This research project is aimed to develop the system to visualize cellular stress signal in vivo and study the molecular genetic mechanisms for establishment of the cell community during animal development. We believe our research will provide novel concept of animal development and contribute for biological as well as medical sciences.

【References by the principal investigator】

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- Kanuka, H., Kuranaga, E., Takemoto, K., Hiratou, T., Okano, H., and Miura, M.: *Drosophila* caspase transduces Shaggy/GSK-3 β kinase activity in neural precursor development. *EMBO J.* 24, 3793-3806, 2005

【Term of project】 FY2007– 2011

【Budget allocation】 18,000,000 yen

(2007 direct cost)

【Homepage address】

<http://www.f.u-tokyo.ac.jp/~genetics/index.html>