

Imaging Study of Dynamic Cellular Signaling

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【Outline of survey】

Cell functions depend on the interactions of molecules that constitute the cells. The interactions are, in turn, regulated by signaling molecules in space and time. It is, therefore, indispensable to understand the spatiotemporal regulatory mechanism of intracellular signaling molecules. However, it is generally very difficult to analyze spatiotemporal dynamics of molecules within living cells, and this task is one of the major challenges to the biomedical research in the 21st century. We address this problem using multidisciplinary methods including molecular imaging techniques. We will concentrate on the calcium signaling and related signalling mechanisms.

【Expected results】

Calcium signal is involved in almost every important biological function. Our research centering on the calcium signalling will clarify various biological functions and provide new insights in wide fields of biomedical research. Our research, therefore, is expected to shed light on various cell functions especially in the central nervous system, cardiac functions and the immune system. Furthermore, our research may facilitate our understanding of the underlying mechanisms of various diseases.

【References by the principal researcher】

Okubo, Y., Kakizawa, S., Hirose, K. and Iino, M. Visualization of IP₃ dynamics reveals a novel AMPA receptor-triggered IP₃ production pathway mediated by voltage-dependent Ca²⁺ influx in Purkinje cells. *Neuron* 32, 113-122, 2001.

Tomida, T., Hirose, K., Takizawa, A., Shibasaki, F., and Iino, M. NFAT functions as a working memory of Ca²⁺ signals in decoding Ca²⁺ oscillation. *EMBO J.* 22, 3825-3832, 2003.

【Term of project】 FY 2005 - 2009

【Budget allocation】 90,500,000 yen

【Homepage address】 <http://calcium.cmp.m.u-tokyo.ac.jp/>