Yamate Evening Seminar

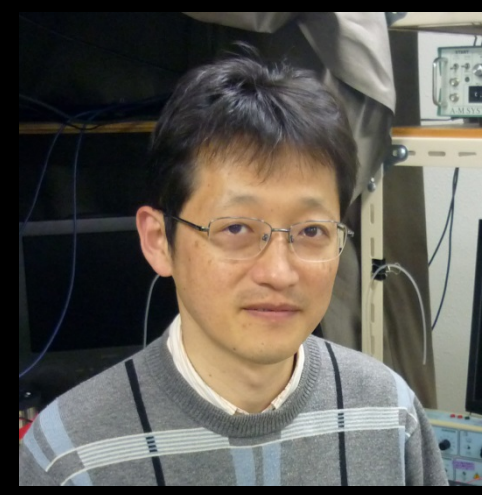
May 26th, 2016, 16:00-16:45

Large meeting room, 2nd floor, Yamate 3rd Bldg.

Prof. Shin-ichi Higashijima

(OIIB and NIBB)

Functional analysis of neuronal circuits that control locomotion in zebrafish



Locomotion in vertebrates relies on neural circuits in spinal cord. However, our knowledge of spinal locomotor circuits in mammals is extremely limited, because they are enormously complex, and thus, difficult to analyze. To make things tractable, we are investigating spinal neuronal circuits in relatively simple vertebrates, zebrafish. By studying simpler circuitry in a genetic model organism, we hope to generate significant conceptual advances regarding the function and evolution of spinal locomotor circuits. Central to our approach is the investigation of particular classes of neurons using transgenic zebrafish in which neurons are visualized by GFP. We mainly use electrophysiology for functional studies of GFP-labeled neurons. We also use transgenic transgenic zebrafish in which a particular class of neurons are labeled by genetically-encoded calcium indicators or optogenetic tools. These animals allow us to monitor neuronal activities of specific populations of neurons by calcium imaging or to artificially activate/inactivate specific populations of neurons. In this seminar, I will present several examples of our studies including functional analyses of Chx10 and En1 positive neurons.

Contact：Ryota Iino（#5230）

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Prof. Kazuhiro Aoki

(OIIB and NIBB)

Toward a quantitative understanding of intracellular signaling through experiment and simulation

A living cell must sense an information about changes in its environment and internal state, and utilize the information to respond in different ways. From a systems biology view point, cells are complex information-processing systems as well as computer and other man-made machine. How then do cells achieve the system that handles information and responses appropriately? Intracellular signaling network takes a central role in the signal-processing system, which decodes environmental and internal input, and results in appropriate outputs. Further, a dysregulation of the intracellular signaling leads to pathological outcomes such as cancer. The intracellular signaling has been extensively studied for the past few decades, and consequently many signaling molecules and pathways have been identified. However, it remains unclear how these signaling molecules process the information as a system, mainly because of the lack of quantitative data.

In this seminar, we will present our approaches to this issue by visualization, quantification and manipulation of cell signaling with live cell imaging. Recent findings of dynamic features of intracellular signaling will be introduced.

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