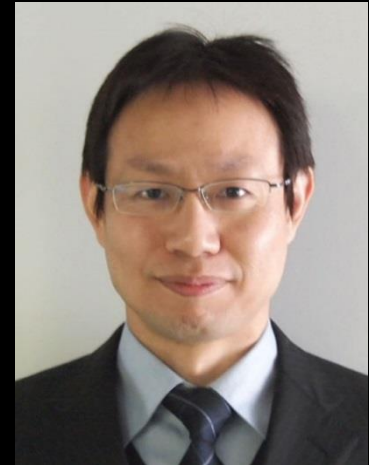# Yamate Evening Seminar
Oct. 21st, 2016, 16:00-17:00
Large meeting room, 2nd floor, Yamate 3rd Bldg.

Prof. Shigeki Kiyonaka
(Kyoto University)

Neuro Chemical Biology : Chemical approaches for visualization or activation of neurotransmitter receptors

In central nervous systems, excitatory neurotransmission is essential for our memory and learning. Glutamate, a typical excitatory neurotransmitter in animals, is recognized by glutamate receptors in synapses. Glutamate receptors are categorized into ionotropic- or metabotropic-types. These are composed of 25 subtypes, each of which has essential roles in neurotransmission and synaptic plasticity, a putative molecular mechanism of our memory. Thus, it is highly desirable to visualize or activate a glutamate receptor subtype selectively in neurons.

Recently, we succeeded in visualization of endogenous AMPA receptor, an essential glutamate receptor subtype for synaptic plasticity in live cells by chemical approach. Importantly, our methods allowed visualizing native AMPARs deep in brain tissues. Importantly, analyses of the diffusion dynamics of endogenous AMPARs by our methods revealed that diffusible component of AMPARs was markedly lower than that revealed previously by using conventional GFP tags.

With respect to subtype-selective activation of glutamate receptors, we recently developed a novel method for selective activation of the receptor subtypes using genetic manipulation and coordination chemistry, termed On-cell Coordination Chemistry (OcCC). Our method has been successfully applied for the selective activation of the mutant glutamate receptor in live neurons, initiating a subsequent signal transduction pathway.

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