The 66th iCeMS SEMINAR

2010 12. 15 (水)
14:00-15:00

演　題：Spatially Regulate Gene Expression
in Neurons during Long-term Neuronal Plasticity

講演者：王 丹 博士
JSPS 研究員
理化学研究所 基幹研究所

場 所： 京都大学 アイセムス本館 2階（東一条北西角）
セミナー室（A207）

mRNA localization and regulated translation allow gene expression to be spatially restricted to each of the thousands of synaptic compartments formed by a single neuron. During synapse-specific, transcription-dependent long-term neuronal plasticity, this cellular mechanism plays critical roles in decentralizing the function of new transcripts from nucleus to specific synapses. In this context, we have studied a synaptic mRNA that encodes sensorin, a peptide neurotransmitter in Aplysia, of its localization mechanism and local translation at synapse. Cis-elements in the 5′ and 3′UTR of sensorin are required for the mRNA localization from soma to distal processes, and to synapses. At synapse, local translation of sensorin is turned on by stimuli that induce long-term facilitation, but not by stimuli that induce short-term facilitation, or long-term depression. A trans-synaptic retrograde signal from the post-synaptic neuron is also required for up-regulating sensorin local translation. Thus, neurons can spatially regulate gene expression with remarkable precision. To facilitate gene analysis in individual neurons, we have taken photochemical approaches to develop a novel fluorescent in situ hybridization protocol that is simple, fast, and quantitative. Our analysis reveals significantly increased poly (A)+ RNA concentration in neurons connected in neuronal network of higher activities. It is our ultimate goal to understand how gene expression is regulated spatially and temporally in individual neurons during learning and memory.

主　催： 京都大学 物質ー細胞統合システム拠点（iCeMS =アイセムス）
連絡先： iCeMS 亀井 謙一郎 助教 e-mail: chen-g@icems.kyoto-u.ac.jp