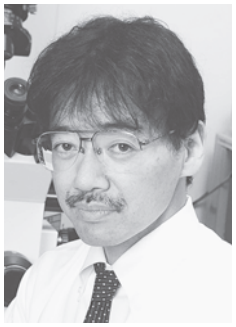
Day 3　Sunday, September 13

Plenary Lecture　特別講演



3L1　Genetically encoded tools for brain analysis

Sunday, September 13　10：00～11：00　Room A

Chairperson：Takayuki Murakoshi（村越　隆之）
Saitama Medical University, Faculty of Medicine, Department of Biochemistry（埼玉医科大学 生化学）

Atsushi Miyawaki（宮脇　敦史）
RIKEN Brain Science Institute RIKEN Center for Advanced Photonics(理化学研究所　脳科学総合研究センター　光量子工学研究領域）

The striking progress in genome science and gene technology has led to numerous discoveries and the rapid development of new technologies in the life sciences. These new technologies include "optogenetics" – a growing suite of techniques that combine optical and molecular genetic methods. The technologies employ genetically encoded tools and are becoming popular particularly in neuroscience, where the central challenge is to understand the mechanisms by which neurons process and integrate synaptic inputs and how these mechanisms are modified by activity.

Since the isolation of the green fluorescent protein from the bioluminescent jellyfish in 1992 and the subsequent development of related molecules from non-bioluminescent marine animals, genetically encoded sensors that enable fluorescence imaging of excitable cell activity have been constructed by fusing fluorescent proteins to functional proteins that are involved in physiological signaling. Because these sensors can be introduced by gene transfer techniques, they may extract neuronal signals from an intact brain more efficiently than conventional organic dyes. Also, their expression is driven in a certain population of neurons by the use of a specific promoter; this has made visualization of the connectivity between two or more different (sub) populations of neurons all the more exciting.

On the one hand, many genetically encoded sensors have been developed to investigate the function of specific signaling mechanisms in synaptic transmission, integration, and plasticity. The sensors that monitor signals resulting from electrical activity, such as free-Ca^{2+} concentration and pH, instead of transmembrane voltage, function as low-pass filters. On the other hand, optogenetic control of neuronal activity allows us to selectively activate or inactivate genetically defined populations of neurons in order to examine how the activity of these neurons contributes to the function of neural circuits in the brain. Due to recent remarkable progress in gene transfer techniques, including electroporation, virus-mediated gene transfer, and germline transmission of transgenes, the experimental animals to be studied are not limited to mice but extended to primates. Newly emerging genetically encoded tools will surely stimulate the imagination of many neuroscientists, and this is expected to spark an upsurge in the demand for them.

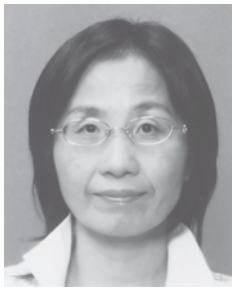
Presidential Lectures　会長招聘講演

3L2　Gliomagenesis and GRIA2-An Integrated vertical study from Gene to Disease

Sunday, September 13　11：00～11：40　Room A

Chairperson：Hideyuki Okano（岡野　栄之）
Department of Physiology, Keio University School of Medicine(慶應義塾大学医学部生理学教室）

Shogo Ishiuchi（石内　勝吾）
Department of Neurosurgery, Graduate School of Medicine, University of the Ryukyus（琉球大学院・医・脳神経外科）



3L3　Searching a novel neurotransmitter/hormone through G-protein coupled receptor：Where now and where next?

Sunday, September 13　13：20～14：00　Room A

Chairperson：Yuchio Yanagawa（柳川右千夫）
Genetic & Behavioral Neuroscienc, Division of Neuroscience, Gunma University Graduate School of Medicine（群馬大学大学院医学系研究科遺伝発達行動学分野）

Yumiko Saito（斎藤祐見子）
Lab Behav Neurosci, Grad Sch Int. Arts & Sci, Hiroshima Univ.(広島大院・総合科学研究科・生命科学領域）