

Form 3-3-2

Japan-US Brain Research Cooperative Program
The Report of Information Exchange Seminar in 2008 fiscal year
[field: cognition and learning]

1. The Seminar Title:
“Workshop on Receptor Trafficking and Cell Biology of Neurons: Physiology and Disease”
2. The Term: From 2008/02/24 to 2008/02/27.
3. The Location: Asilomar Conference Center, Pacific Grove, CA
4. The Representative's Name, Title and Affiliation:

Japanese Coordinator:

Haruhiko Bito
Associate Professor,
Department of Neurochemistry, University of Tokyo Graduate School of Medicine

US Coordinator:

Edward Ziff
Professor of Biochemistry,
New York University School of Medicine

5. The Participants:

Japan: The Invited participants _13_ people The others __0__ people
Name, Title and Affiliation of the Invited participants

Dr. Haruhiko Bito, Associate Professor
Department of Neurochemistry,
University of Tokyo Graduate School of Medicine

Dr. Masaki Fukata, Professor
Division of Membrane Physiology
National Institute for Physiological Sciences,

Dr. Yugo Fukazawa, Assistant Professor
Division of Cerebral Structure
National Institute for Physiological Sciences,

Dr. Mitsuharu Hattori, Associate Professor
Graduate School of Pharmaceutical Sciences,
Nagoya City University

Dr. Haruo Kasai, Professor
Division of Biophysics
Center for Disease Biology and Integrative Medicine

Faculty of Medicine, University of Tokyo

Dr. Mariko Miyata, Associate Professor
Department of Information Physiology
National Institute for Physiological Sciences

Dr. Toshihisa Ohtsuka, Associate Professor
Department of Clinical and Molecular Pathology
Faculty of Medicine/Graduate School of Medicine
University of Toyama

Dr. Kazuhiko Yamaguchi, Deputy Laboratory Head
Laboratory for Memory and Learning
Brain Science Institute, RIKEN,

Dr. Yumiko Yoshimura, Associate Professor
Department of Visual Neuroscience
Research Institute for Environmental Medicine
Nagoya University

Mr. Hajime Fujii, graduate student
University of Tokyo Graduate School of Medicine

Dr. Toshimitsu Fuse, postdoctoral researcher
Department of Neurochemistry
University of Tokyo Graduate School of Medicine

Dr. Hiroshi Kohsaka, research associate
Department of Physics
School of Science, University of Tokyo

Dr. Naofumi Uesaka, research associate
Department of Neurophysiology
University of Tokyo Graduate School of Medicine

US: The Invited participants _21_ people The others _0__ people
Name, Title and Affiliation of the Invited participants

Dr. Bertalan Andrasfalvy, Research Associate
Janelia Farm Research Campus
HHMI

Dr. Deanna Benson, Associate Professor
Mt Sinai School of Medicine
Dept of Neurobiology

Dr. Wenbiao Gan, Professor
Department of Physiology and Neuroscience
Skirball Institute

NYU School of Medicine

Dr. Craig Garner, Professor
Nancy Pritzker Laboratory
Stanford University Medical Center
Department of Psychiatry and Behavioral Sciences

Dr. John Isaac, Investigator
NINDS/NIH

Dr. Robert Malenka, Professor
Nancy Pritzker Laboratory
Stanford University Medical Center
Department of Psychiatry and Behavioral Sciences

Dr. Kimberley McAllister, Associate Professor
University of California Davis
Center for Neuroscience

Dr. Katherine W. Roche, Investigator
Receptor Biology Unit, NINDS
Porter Neuroscience Research Center

Dr. Susumu Tomita, Assistant Professor
Department of Physiology
Yale University School of Medicine

Dr. Edward Ziff, Professor
Department of Biochemistry
NYU School of Medicine

Dr. Benjamin Arenkiel, postdoctoral fellow
Duke University

Dr. Stef Barrow, postdoctoral fellow
University of California Davis

Ms. Ioana Carcea, graduate student
Mt. Sinai School of Medicine

Dr. Jainne Ferreira, postdoctoral fellow
NYU School of Medicine
jainne.ferreira@med.nyu.edu

Ms. Melanie Gainey, graduate student
Brandeis University

Ms. Giao Hang, graduate student
University of California Berkeley

Dr. Yukiko Nishimura, postdoctoral fellow
NINDS/NIH

Dr. Mike Poon, postdoctoral fellow
University of California Berkeley

Dr. Sophie Restituto, postdoctoral fellow
NYU School of Medicine

Dr. Gareth Thomas, postdoctoral fellow
John Hopkins University

Dr. Clarissa Waites, postdoctoral fellow
Stanford University

2 Industrial participants:

Scott Young, Applications Scientist
Leica Microsystems Inc.

Jared Pache, BioScience Imaging Specialist
Carl Zeiss MicroImaging

6. The Abstract and the Significance of this seminar :

The goals were: 1) to have an exchange of state-of-the-art achievements by leading Japanese and American experts in the fields of synaptogenesis and plasticity, including established scientists and students and post docs from both the US and Japan; To present the current understanding of mechanisms of synapse modification and the diverse methodological approaches for spine analysis, including imaging, genetics, cell biology and physiology, carried out by US and Japanese laboratories working at the forefront of the field; 2) to support the spread of scientific information and create personal friendships and scientific contacts between members of the two scientific communities. 3) to enhance research efforts thorough a sharing of information and establishment of scientific collaboration.

Participating in the Workshop were 9 Japanese and 10 US Principal Investigators, and 4 Japanese and 11 US Postdoctoral and Predoctoral Students, for a total of 34 scientists, plus two Corporate participants.

Topics covered in the Conference were: 1) Cell Biology of Glutamatergic Synapses, 2) Phosphorylation in Glutamatergic Circuit Regulation, 3) Control of Excitability and Synaptic Plasticity, 4) Imaging Spines and Synapses. The meeting consisted of a welcoming Reception, twenty-one talks, 30 minutes each, presented in four sessions by Principal Investigators, plus a session consisting of six short talks selected from the abstracts given by students and post docs, and a concluding discussion of the Workshop. Also, the two corporate sponsors, Leica and Zeiss, each sent representatives who presented talks on new microscopes and imaging systems. Through the participation of Leica and Zeiss, we were able to cover all the expenses of the participants and to stay within budget.

7. The result of this seminar and its implication for future perspective :

The workshop provided a state-of-the-art summary of research on spines, synapses and control of excitability including, the structure of the presynaptic active zone, regulation of the sorting and trafficking of postsynaptic glutamate receptors, palmitoylating enzymes, the AMPAR auxiliary subunits,

the TARPs, and control of trafficking by receptor phosphorylation. Considerable attention was given to scaffolds and the roles of actin in trafficking of AMPA receptors. Also covered were developmental problems, including the function of Reelin, an activity-dependent requirement for protein synthesis at young synapses and regulation of circuits in the visual system and the phenomenon of synaptic scaling. Neurodegenerative diseases were also discussed, including experimental autoimmune encephalomyelitis (a model for MS) and Alzheimer's disease.

The mechanisms of formation and modification of excitatory synapses in the mammalian central nervous system are fundamental for neural development and learning and memory. They also contribute to pathological processes such as drug addiction, learning disability and to neurological diseases from schizophrenia to the excitotoxic cell death encountered in stroke. It is now possible to define synaptogenic events and mechanisms of plasticity at the molecular level and to relate these processes to higher brain functions such as circuit formation and function. This is a rapidly progressing area that promises to add much to our knowledge of the brain and also to provide the basis for medically relevant translational research.

8. The Others (Other Comments):

Students and post docs from both countries had the opportunity to meet leaders in the field in a setting that favored scientific interaction. The meeting was lively and students and post docs were especially appreciative of the opportunity to meet senior investigators on an informal basis. In addition to the extensive series of talks by PIs, posters were on display each evening and there were many opportunities for discussing science. The organizers discussed the availability of BRCP funds to support scientific exchanges including visits between labs in the US and Japan.

Current plans for immediate follow-up and continued collaborations between US and Japanese investigators are as follows:

- 1) Yugo Fukazawa is having concrete talks with two US PIs, Susumu Tomita and Deanna Benson, to try to attempt to apply his new high resolution EM methodology (SRS-FRL method) to new synaptic surface proteins.
- 2) Haruhiko Bito is supplying reagents to Ed Ziff to help establish an imaging system for actin dynamics in living neurons.
- 3) Rob Malenka is flying to Japan in July as a plenary speaker of the Japanese Neuroscience Society, and will meet with various participants of the BRCP.
- 4) Thanks to the US-Japan BRCP Workshop, Dr. Haruo Kasai and Dr. Wenbiao Gan have been communicating with each other and trying to establish collaborations. They are thinking to exchange students and postdocs to learn techniques from each other and even share a laboratory together if such an opportunity exists. They both are interested in studying abnormal spine dynamics in mouse models of mental retardation and hope to establish collaborations in this research direction in the near future.
- 5) Also, although not involving a Japanese lab, as a result of the Workshop, the Ziff and Benson labs are collaborating in studies of gamma secretase components at synapses.