Form 1-5-2

Japan-U.S. Brain Research Cooperation Program
Researchers Dispatched to the U.S. FY2011: Report

Field:_____4_____

1. Researcher

Name: Takahiro A. Kato, M.D., Ph.D.
Title: Assistant Professor
Affiliation:
Department of Neuropsychiatry, Graduate School of Medical Sciences, Kyushu University
Innovation Center for Medical Redox Navigation, Kyushu University

2. Research Title:

Glial-neuronal interactions underlying the mechanisms of schizophrenia.

3. U.S. Joint Researchers/Institutes

Akira Sawa, M.D., Ph.D.
Director, Schizophrenia Center
Professor, Departments of Psychiatry and Neuroscience,
Johns Hopkins University School of Medicine, Meyer 3-166 N. Wolfe Street, Baltimore, MD 21287
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4. Research Period, from/to (mm/dd/yyyy):

8/15/2011-2/29/2012

5. Abstract, Results, and Research Significance (300 Words):

The pathophysiology of schizophrenia remains unknown, while recent brain-imaging studies have revealed brain volume loss in the progressive course of schizophrenia, which indicate some underlying biological mechanism. In order to clarify the underlying mechanism, I along with my colleagues in our laboratory have been focused on microglia, which are immunological/inflammatory cells in the brain and which contribute to various brain pathologies such as neurodegenerative diseases and neuropathic pain. We have recently reported anti-inflammatory effects of antipsychotics via inhibiting microglial activation in vitro, and proposed a therapeutic hypothesis of schizophrenia by inhibiting microglial activation in vivo.

Professor Akira Sawa at Johns Hopkins University is one of the leading neuroscience researchers in the field of psychiatry. He has been pioneering a novel schizophrenia research field, and has reported a multitude of important genetic and neurochemical findings, such as focusing on Neuregulin-1, in schizophrenia. Recently, abnormalities of trait markers such as NFκB have been revealed by molecular analysis of blood and neuronal cells of schizophrenia patients. A wide gap between clinical research and basic neuroscience research in psychiatry has existed for a long time. Now, translational research is strongly needed in order to bridge

the gap between them. Professor Sawa has recently been leading translational research in psychiatry, focusing on such trait markers and he is now integrating molecular research, genetic research, stress-related animal research and brain-imaging research using MRI and PET in order to clarify the underlying communication between genes, cells and environments in the pathophysiology of schizophrenia.

Therefore, in order to clarify our microglia hypothesis of schizophrenia, it is crucial to apply our focus on glial-neuronal interactions to professor Sawa's ongoing translational study by using trait markers of schizophrenia in collaboration with professor Sawa and his colleagues. What I learnt during my 7 months in his laboratory is as follows;

1) To attain basic experimental skills using trait markers of schizophrenia.
2) To attain basic experimental skills to clarify neuro-glial interaction in vivo and in vitro.
3) To attain essential sense of translational research directly from professor Sawa

Especially, I have leant to develop induced neuronal cells from human fibroblasts, which technology is expected to make a deeper pathologies of schizophrenia.

Based on these my valuable experience, I would like to develop my microglia hypothesis whilst striving to become a psychiatrist/neuroscientist who is translational in nature and work.

6. Other (Research concerns, particular points of note):

*Please attach any reference materials as necessary.