

Japan-U.S. Brain Research Cooperation Program
Group Joint Study Project Program FY2012 - FY2014 Report

Field: __Neurobiology of Disease__

1. Principal Researcher

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Title Associate Professor

Affiliation Department of Psychiatry Kyoto University Graduate School of Medicine

2. Project Title:

Neural basis of impaired strategic thinking in neuropsychiatric disorders

3. Japanese Group

Names, Titles and Affiliations of Principal Researcher and Collaborating Research Members

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4. U.S. Group

Names, Titles and Affiliations of Principal Researcher and Collaborating Research Members

California Institute of Technology, Professor, Colin Camerer

5. Research Period

From 4/1/2012-to3/31/2015 3 years

6. Abstract, Results, and Research Significance (300 words):

In human society, it is necessary to modulate decision-making flexibly or strategically according to the situation. However, many neuropsychiatric disorders have difficulties in the regulation of strategic decision-making. Economic games are useful to evaluate such strategic decision-making. California Institute of Technology (Caltech) is a leading institute of interdisciplinary neuroeconomics, and Prof. Colin Camerer is one of the leader in the field. On the other hand, because Caltech does not have a medical school and hospital, it was difficult to conduct clinical study despite their interest in the clinical application of neuroeconomics. Through this project, Kyoto University researchers and graduate students visited Caltech and explain the nature of decision-making impairments in psychiatric disorders. Caltech side provided their expertise to develop economic games, and to analyze data. As a result, several papers has been published (Takahata et al Plos One 2012, Yamada et al Proc Natl Acad Sci US A. 2013, Chib et al Transl Psychiatry 2013, Tsurumi et al Front Psychol 2014, Tanaka et al Front Psychol 2015). In particular, we found that low activation of the insular cortex during reward prediction in gambling disorder, and the insular activation was negatively correlated with duration of illness (Tsurumi et al Front Psychol 2014). Because this study was the first brain imaging study of the gambling disorder in Japan, the finding attracted mass media's attention. We also found that the neural activity coupling between the dorsal lateral prefrontal cortex and the medial prefrontal cortex was increased when decision-makers (healthy subjects) flexibly

modulated risk attitude depending on the context (Fujimoto et al under review). However, such modulation was not observed in gambling disorder.

7. Other (Research-related concerns, particular points of note):