

Japan-US Brain Research Cooperative Program  
The Group Joint Study Report

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1. The Representative of Group Joint Study:

National Institutes for Physiological Sciences  
Professor  
Isa, Tadashi.

2. The Project Title:

Establishment of new categorization of spinal neurons in awake, behaving primate.

3. Japanese Investigator's Name, Title, Affiliation and Phone Number:

Chief:

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4. U.S. Investigator's Name, Title, and Affiliation:

Chief:

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5. The Term of Research

From April. 1, 2003 To March 31, 2006 ( 3 Years)

6. The Abstract, the Result and the Significance of Research(300 Words):

Fundamental neural circuit of vertebrate spinal cord have been extensively studied in anaesthetized, decerebrated, or in vitro preparation, but their function in normal behavior has never been examined until recently. To approach this issue, US group have established the method to record the activity of spinal neurons from awake, behaving primates, firstly in the world, and published several important papers. Based on the past collaboration between two groups, Japanese group have established the similar experimental environments for recording the activity of spinal interneurons from behaving primates in National Institute for Physiological Science, last year. Now it is an ideal timing to start new collaborative research between two groups.

Obviously, next important issue after the development of the method to record the spinal interneuronal activity is the identification of the recorded spinal interneuron. To accomplish this objective, we have started this collaborative research three years ago. We trained monkey using three different motor task, namely precision grip (Japanese group), wrist flexion-extension (US- and Japanese group), and target reaching task (US group). Variety of the motor task studied was needed to categorize the function of spinal interneuron from wide range of sensori-motor behavior. Once behavioral training was finished and recording session started, we have visited

each other, correcting some part of data together, and discussed the possible categorization of spinal interneurons. Through this collaborative project, we have established a new way to identify spinal interneurons using several different ways, including peripheral nerve stimulation under behavioral condition and spike-triggered averaging to variety of muscle during different motor behaviors. This is invaluable outcome from this project. We also found that spinal interneurons showed a variety of activity-pattern during different kind of task, suggesting their important role for preparing and executing voluntary movements. Future question for us would be to identify the information which shared in a spinal interneuron and which is not shared during performance of different motor behavior.

## 7. The Others (Other Comments):