Form 2-4-2

Japan-US Brain Research Cooperative Program
The Group Joint Study Report [field: 3]

1. The Representative of Group Joint Study:
Shinji Hayashi, Professor, Yokohama City University.

2. The Project Title:
Perinatal influence of steroids and related chemicals on memory and recognition

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

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

Chief :

Victoria Luine, Professor, Hunter College, City University of New York.

Collaborator :

Keith Parker, Professor, University of Texas Southwestern Medical Center.

5. The Term of Research: From 2003.4.1 To 2006.3.31 (3 Years)

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

In the preent project, we aimed to clarify possible relrationship between conditions of steroid hormones during the critical period of brain sex differentiation and some higher brain functions such as recognition and memory at adult. It is well established that exposure of immature, undifferentiated brain to sex steroids, such as estrogen or androgen induces masculinization and/or defeminization of the brain especially related to reporductive function. In the series of experiments we have carried out in the project, we obtained data that indicate the perinatal sex-steroid environment induces male-type brain in the recongnition and memory in mice examined by object recongition test (ORT), with which we could avoid stressful condition such as Morris water maze or shattle box test. Moreover, replacement therapy by estrogen after gonadectomy improved the memory scores only in the females but not in the males and neonatally estrogenized females. Thus, estrogen-treatment during the critical period evoked a male-type brain in the recognition and memory function, too. When we examined dendritic spine densities of pyramidal neurons in CA1 of the hippocampus by applying Golgi impregnation method, significant difference between both sexes was detected. Interestingly estrogen treatment after gonadectomy recovered the number of spines only in the females but not in the males, neither in the neonatally estrogenized females. Thus, the results by the behavior tests seemed supported by the morphological examination. On the other hand, we have developed SF1-KO mice strain, which shows obesity and high anxiety. In collaboration with Keith Parker's lab in US, we have started extensive analysis of brain-specific SF1-KO mice. The results we have obtained and those we have initiated would provide us further insight on relationship of higher brain function, emotion, sex steroids and their molecular and morphological basis.

7. The Others (Other Comments):