RESEARCH REPORT - No. 1003 FY 2010-2012

Title of research project	Development of the assay system to evaluate the effects of perinatal exposure to chemical compounds on the social and emotional activities
Research project no.	(1003)
Research period	FY 2010–2012
Name of principal research Investigator（PI）	Kaoru Sato

【Abstract】

Objectives: The objective of this project is to develop the assay system to evaluate the effects of perinatal exposure to chemical compounds on the social and emotional activities.

Methods: We selected some positive-control compounds (valproic acid, ethanol, nicotine, etc.) which had already been reported to affect social and emotional activities by perinatal exposure. The 4w-7w rats which had been treated with such positive-control compounds were analyzed using behavioral tests, electrophysiological recording of amigdala, microarray analysis of amygdalae, and in vitro BBB test.

Results: The sensitivity of the behavioral tests was improved when the tests were performed after stress at the age of 7w. We established the 'excitome analysis' method based on the determination of the existence or nonexistence of the electrophysiological response to the compounds. We found the candidate probe sets in microarray analysis for PCA which is used to discriminate control group and the group exposed to a compound. We discovered the age-dependency in the penetration of the compounds into the brain. We also discovered that some compounds affect BBB function itself. Further, little difference was detected between rat in vitro BBB model and human in vitro BBB model.

Consideration/Conclusion: Based on our data, we proposed the assay system to evaluate the effects of perinatal exposure to chemical compounds on the social and emotional activities shown in the next page.