

Evaluation of Changes in Anxiety, Depression, Social Behavior, and Oxytocin mRNA Levels in Adults after Adolescent Interventions in Maternal-separated Mice

Reo HAYASHI¹⁾, Leo GOTOH^{1),2)}, Hikaru HORI¹⁾
Hitoshi IIDA¹⁾, Hiroaki KAWASAKI¹⁾

¹⁾ *Department of Psychiatry, Faculty of Medicine, Fukuoka University*

²⁾ *Laboratory of Neuroscience, Department of Psychiatry, Faculty of Medicine, Fukuoka University*

Abstract

It has been reported that the oxytocin-mediated signal transduction system is biologically altered by traumatic childhood experiences. Oxytocin has also been shown to be involved in stress, social behavior and attachment with others. The effects of oxytocin administration on abused children according to their developmental stage and the changes in the oxytocin signaling pathway due to oxytocin administration or attachment formation are largely unknown. In this study, we used maternal-separated (postnatal day [PD] 2-15) mice as a model for childhood adversity and investigated the effects of intervention during adolescence (PD 33-47) by continuously administering oxytocin (1mg/kg/day) or cohabitating them with littermates who had not experienced maternal separation. Cohabitation group was created to develop healthy relationship and attachment with other individuals. The effects of interventions on anxiety- and depression-associated behavior and social behavior in adult mice (N=57) were assessed using behavioral assays from PD60 to PD65. Oxytocin signaling was evaluated by quantification of *oxytocin (OXT)* and *oxytocin receptor (OXTR)* mRNA in the hypothalamus using RT-PCR. Results of our experimental separation and cohabitation protocols showed that the maternal-separated mice exhibited improved social behavior in social interaction test through each intervention. Biological analysis showed no significant changes in *OXT* and *OXTR* mRNA expression in the hypothalamus. Obtained result showed that oxytocin administration and cohabitation with healthy littermates to maternal-separated mice in adolescent improved social behavior in adulthood. However, the result of *OXT* and *OXTR* mRNA expression in the hypothalamus did not reveal significant changes through each intervention.

Key words: Oxytocin, Adolescence, Social behavior, *Oxytocin* mRNA