3636486 STNS/D :MAJOR: NEUROSCIENCE; Ph.D.(NEUROSCIENCE)
KEY WORD :POSTNATAL HANDLING / CORTICOSTEROID HORMONE / GLUCOCORTICOID RECEPTOR / GENE EXPRESSION / REVERSE TRANSCRIPTASE POLYMERASE CHAIN REACTION
NUANCHAN JUTAPAKDEEGUL: ACUTE EFFECTS OF POSTNATAL HANDLING ON THE DEVELOPMENT OF GLUCOCORTICOID RECEPTOR GENE EXPRESSION IN RAT BRAIN. THESIS ADVISOR : NAIPHINICH KOTCHABHAKDI Ph.D., PIYARAT GOVITRAPONG Ph.D., STEFANO O CASALOTTI Ph.D., BASIL ARTHUR BALDWIN Ph.D. 157 p. ISBN 974-661-162-3

Postnatal handling can alter the development of the hypothalamic-pituitary-adrenal (HPA) system response to stressful stimuli in the rat. As adult, handling results in increased sensitivity of HPA system to the inhibitory effect of glucocorticoids. This effect involves a permanent altered rate of glucocorticoid receptor (GR) gene expression in hippocampus and frontal cortex. Mechanisms underlying this change are still unclear. The aim of the present work was to study the acute effects of postnatal handling on the development of HPA response. In the present study, rat pups were handled for 15 minutes daily during the first week of life. Serum corticosteroids from handled and non-handled group were determined by radioimmuno-assay, while GR gene expression in rat brain tissues were measured by semi-quantitative RT-PCR. The results show that transient high corticosteroid levels after birth in non-handled rat pups were reversed by postnatal handling. Handled rat pups showed a significant reduction (30%-36%) in serum corticosteroid secretion compared to non-handled group. The effect was observed only on the 1^{st} and 2^{nd} day of handling period. In contrast, GR gene expression determined by using semi-quantitative RT-PCR, shows a significant increase throughout the handling period in several brain areas of handled rat such as hippocampus (19-21%), frontal cortex (26-34%), and midbrain (15-24%). During the first two days of handling, there was a relationship between these two parameters in that corticosteroid levels decreased while GR gene expression increased. Thus, a possible mechanism may involve autoregulation of receptor synthesis by corticosteroid. Effects of postnatal handling on GR gene expression occurred throughout the handling period, despite no changes in corticosteroid levels in day 3 to 7 indicating that the effect seems permanent at least during the period observed in the present study. It is possible that the biological changes during this period, as an effect of postnatal handling, may somehow trigger a sustained increase in basal transcription rates of GR.

Taken together, our findings indicate that postnatal handling during the first week of life induced decrease in serum corticosteroid secretion and increase in GR gene expression in rat brain. These changes may underly the mechanisms where postnatal handling can permanently enhance negative feedback of HPA system by increases in basal transcription rate of glucocorticoid receptor gene in the hippocampus and frontal cortex of adult rats.