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PRENATAL INJECTION OF THE DEXAMETHASONE LEADS TO DECREASE OF THE HISTON H3 LYS 24 ACETYLATION IN THE NEOCORTEX AND HIPPOCAMPUS OF ADULT RATS

E. I. Tyulkova[a, *], L. A. Vataeva[b], O. V. Vetrovoy[a, c], K. V. Sarieva[a], V. A. Stratilov[a]

[a] *Pavlov Institute of Physiology RAS, St. Petersburg, 199034, Russia*

[b] *The Hertsen State Pedagogical University, St. Petersburg, 19118, Russia*

[c] *Faculty of Biology, St. Petersburg State University, St. Petersburg, 199034, Russia*

**e-mail: etyulkova@yandex.ru*

There is accumulating evidence from human and animal studies that exposure to prenatal stress may have negative effects on long-term functioning of offspring and increasing risk of developmental, neurodegenerative and neuropsychiatric disorders. In this study we apply the dexamethasone administration model to investigate the potential role of maternal stress-induced corticosteroids on fetal development. Recent studies show convincingly that the epigenetic mechanisms play a critical role in fetal programming and the etiology of adult diseases. The aim of this study was to evaluate the effect of dexamethasone treatment (0.8 mg/kg) on 14–16th or 17–19th days of gestation on histone modification in the neocortex and hippocampus in adult rats by an immunohistochemical approach. Using an antibody specific to acetylated histone H3 lysine 24 (H3K24ac), different staining pattern and intensity of acetylation of H3K24 in the neocortex and hippocampus of rats exposed to prenatal dexamethasone was observed. The main difference concerns of H3K36me3 nuclear staining intensity. Thus, dexamethasone administration on14–16th or 17–19th days of gestation resulted in a significant decrease in the number of intensely stained cells to asH3K24 in the CA1 and dentate gyrus (GI) regions of the hippocampus. The effect of dexamethasone treatment on intensity of acetylation of H3K24 in the neocortex depends on timing of administration. Dexamethasone result in pronounced changes in the number of immunopositive cells and cells with intense immunostaining to the H3 histones acetylated at lysine 24 in the fifth layer of the neocortex only when was administrated on 17–19th days of gestation. Revealed modifications of the epigenetic status of brain cells of rats who exposed to prenatal dexamethasone may underlie long-term learning and behavioral changes observed in our previous.

Keywords: gestation, acetylation of histone H3, dexamethasone, hippocampus, neocortex