The impact of early-life stress on the expression of genes associated with the formation of the myelin sheath of neurons in the prefrontal cortex of 15-day-old male mice

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Materials and method

Results and conclusion

Motivation and Aim

MOTIVATION AND AIM

The early postnatal period is critical for the development of the central nervous system and can predetermine subsequent behavioral patterns, so stress at this age can lead to long-term consequences in adulthood.

The **aim** of this work is to study the change in the expression of Mbp, Mobp, Plp1, Mal, Mog, Enpp6, Ugt8a genes associated with the formation of the myelin sheath of neurons in the prefrontal cortex of 15 day old male mice under the influence of early postnatal stress.

MATERIALS AND METHODS

- TaqMan probe-based real-time PCR was used to evaluate the expression of *Mbp, Mobp, Plp1, Mal, Ugt8a, Enpp6* genes.
- The level of corticosterone was measured in the blood serum of pups on PND 15 by ELISA.
- In the studied groups of animals, body weight and organ index of the adrenal glands were evaluated. The organ index was calculated by the formula: OI = adrenal gland weight / body weight * 100%.

Experiment design

Photo

Experiment design

Maternal Deprivation, MD
(for a day, PND 9-10)

Maternal Separation, MS
(3 hours a day daily, 2 weeks)

Control Group

PND15

→ Mice Weight Measurement

→ Measuring corticosterone concentrations

→ Isolation of the adrenal gland and the prefrontal cortex

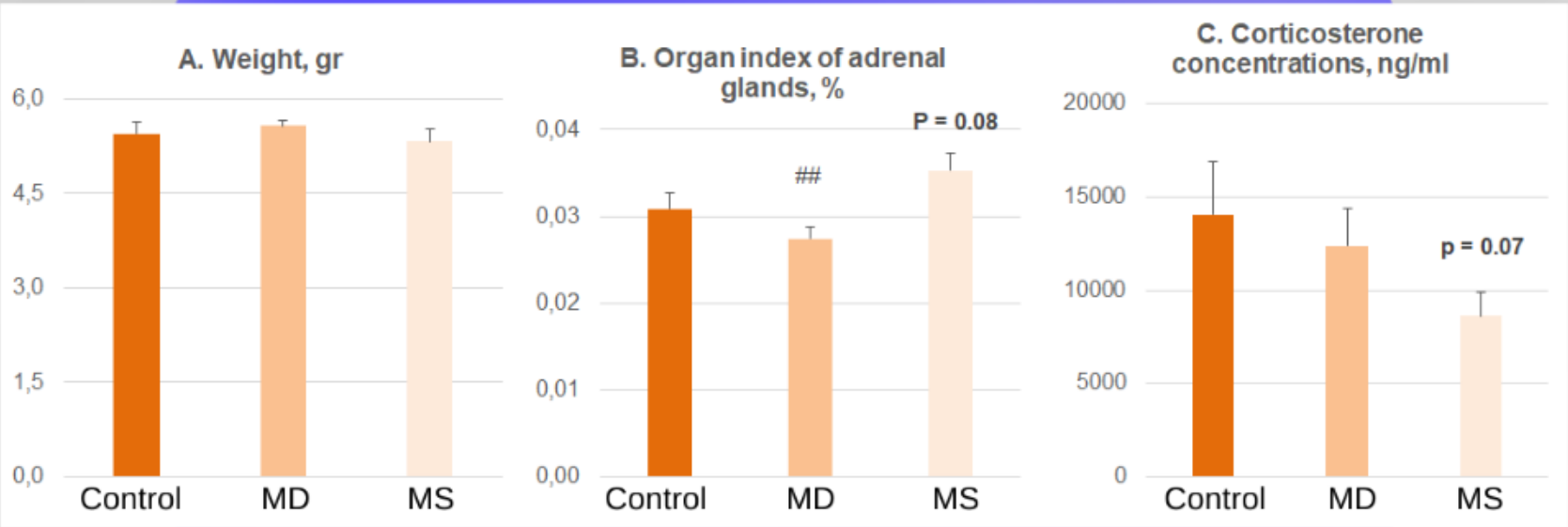
Results and conclusion

The greatest difference in the level of expression was found between groups with a maternal deprivation and a maternal separation from mothers: significant changes were shown for the Enpp6, Mal, Ugt8a genes and one of the Mobp gene transcripts. This may indicate a different extent of exposure to stressors. We can conclude that the experience of early stress affects the myelination process and can lead to impaired transmission of nerve impulses.

Physiological characteristics

Gene expression

The effect of stress on the physiological characteristics of pups (PND15)

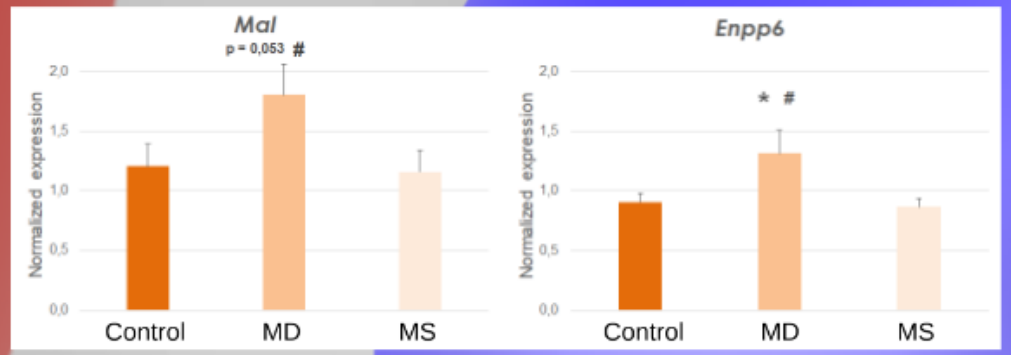


Note: ## - p <0.01 compared to the "MS" group, Fisher LSD test.

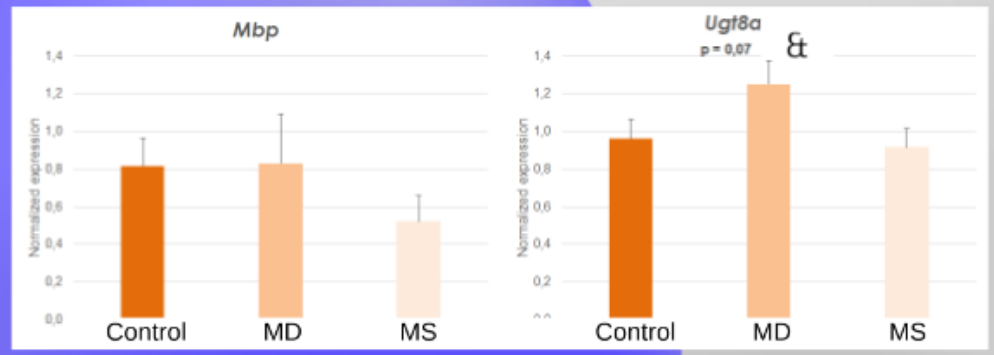
MD - maternal deprivation

MS - maternal separation

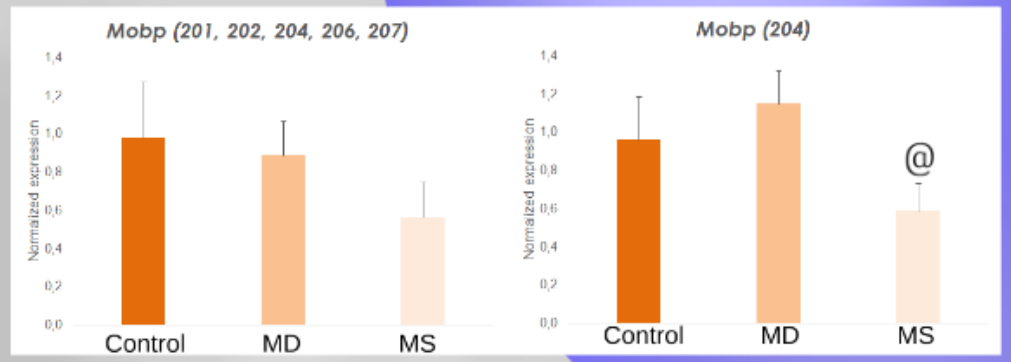
The effect of stress on gene expression in the frontal cortex



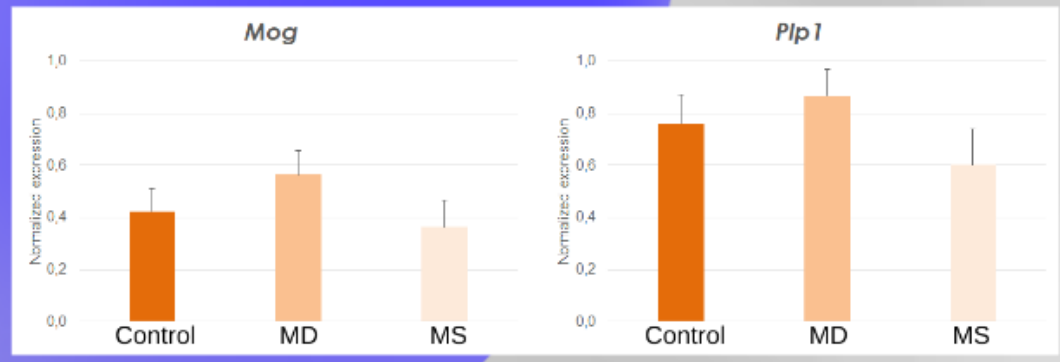
* - p <0.05 compared with the Control group, Fisher LSD test.
\# - p <0.05 compared to the "MS" group, Fisher LSD test.



& - p <0.05 compared to the "DO" group, Fisher LSD test.



@ - p <0.05 compared to the "MD" group, Fisher LSD test.
Mobp-204 - transcript of the ENSMUST00000174193.7 Mobp gene



MD - maternal deprivation
MS - maternal separation