

MORPHINE EXPOSURE AND MATERNAL DEPRIVATION IN THE EARLY POSTNATAL PERIOD MODIFY NEUROMOTOR DEVELOPMENT AND NERVE GROWTH FACTOR LEVELS

Natalia P Silveira^{1,4}, Carla de Oliveira^{1,2,4}, Vanessa L Scarabelot^{1,3,4}, Rafael Vercelino^{1,4}, Lisiane S Silva^{1,4}, Gabriela G Regner^{1,4}, Andressa de Souza^{1,4}, Diego Evandro da Silva Rios^{1,4}, Wolnei Caumo^{1,2}, Iraci LS Torres^{1,2,3}

¹Laboratório de Farmacologia da Dor e Neuromodulação: Investigações Pré-Clínicas, Departamento de Farmacologia, Instituto de Ciências Básicas da Saúde, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brasil

²Programa de Pós-graduação em Medicina: Ciências Médicas, Faculdade de Medicina, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brasil

³Programa de Pós-Graduação em Ciências Biológicas: Fisiologia – ICBS/Universidade Federal do Rio Grande do Sul.

⁴Unidade de Experimentação Animal e Grupo de Pesquisa e Pós-Graduação, Hospital de Clínicas de Porto Alegre, Universidade Federal do Rio Grande do Sul, Porto Alegre, Brasil

Introduction: Adverse early life experiences can trigger a developmental delay, negatively affecting brain development. This study verified whether repeated morphine administration and maternal deprivation in early life alter neurobehavioral development and central nerve growth factor (NGF) levels.

Methods: 58 male Wistar rat pups were used in our study. From postnatal day 1 (P1), litters were daily deprived of their mother for 3 hours; this was continued for the first 10 days of life. Animals were divided into 5 groups: total control (C), did not receive any intervention; saline (S), received saline solution; morphine (M), received morphine; deprived-saline group (DS), were subjected to maternal deprivation and received saline solution; and deprived-morphine (DM), were subjected to maternal deprivation and received morphine. From P8, newborns received subcutaneous (s.c.) injections of morphine or saline (5 µg) once daily/ 7 days. Righting reflex and negative geotaxis were chosen as postural parameters to evaluate neuromotor reflexes. NGF levels in brainstem and cerebral cortex were determined by sandwich-ELISA assay. Statistical analysis was performed by Generalized estimating equation/Bonferroni to development of neuromotor reflexes tests and one-way ANOVA followed by the Student Newman-Keuls test to biochemical data. Approved by CEUA/HCPA: 2015-0614.

Results: In the righting reflex test, a delay in the development of animals was evidenced in the M group. Performance of negative geotaxis was slower in the M and DM groups. DM group presented an increase in NGF levels in the brainstem. An increase in cerebral cortex NGF levels in the M, DS, and DM groups was observed as well.

Conclusion: Our results suggest that changes in environmental conditions and the disruption of mother–infant interactions during the neonatal period can produce changes in the neurobiology, physiology, and emotional behavior of rats. This finding has important implications for the maternal-neonate interaction needed for normal brain development in newborns.

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