

POSTNATAL NEURODEVELOPMENT: IMPLICATION OF LACTATIONAL NICOTINE ON OXIDATIVE STATUS AND NEUROCORTICAL ARCHITECTURE IN JUVENILE RATS

¹Omotoso GO, ¹Thomas G, ¹Kolo RM, ¹Gbadamosi IT, ²Adunmo GO, ¹Alabi AS

¹*Department of Anatomy, ²Department of Medical Biochemistry, Faculty of Basic Medical Sciences, College of Health Sciences, University of Ilorin, Ilorin, Nigeria*

Corresponding Author:

Dr. G. O. Omotoso

Department of Anatomy, Faculty of Basic Medical Sciences, College of Health Sciences, University of Ilorin, P.M.B. 1515, Ilorin, Nigeria. gabrielolaiya@yahoo.com

Abstract

Despite numerous researches demonstrating detrimental effect of nicotine on various body systems, a large percentage of women population still use tobacco products or nicotine replacement therapy, and a substantial proportion fall back to smoking during breastfeeding. This study aimed at demonstrating the effects of lactational nicotine exposure on the development of frontal cortex in young rats.

Thirty female Wistar rats weighing 160 g averagely were mated based on their estrous cycle. After littering, the rats were grouped based on their lactating periods into 3; Group A (control group) received 0.1 ml normal saline from postnatal day (PD) 1-14; Group B received 0.05 ml of nicotine from PD 1-7; while Group C received 0.05 ml nicotine from PD 1-14. Administration was intraperitoneal. The weights of the pups were observed throughout the experiment. On the 15th day of lactation, the pups were euthanized. The brain was weighed and the frontal cortex excised. The frontal cortex was then processed for quantitative analysis of glutathione peroxidase (GPx), malondialdehyde (MDA) and tissue histology.

Significant weight reduction was observed in the treatment groups compared to control. The levels of oxidative enzymes (MDA and GPx) increased in the nicotine exposed groups with variations in increment in relation to duration of postnatal exposure. The frontal cortex of longer nicotine-exposed animals was markedly disrupted.

Use of nicotine during breastfeeding period is detrimental to the development of the baby, and could result in neuromorphological disturbances.

Keywords: frontal cortex, postnatal nicotine, rat weight, GPx, MDA, histology