6 - Neurobiology

PO-093 - (23912) - ASSESSMENT OF VANADIUM'S IMPACT ON THE OLFACTORY BULBS IN AN INTRANASAL DELIVERY ANIMAL MODEL

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Introduction: Epidemiological evidence suggests that prolonged exposure to neurotoxic substances may be associated with olfactory impairment. The olfactory system, as a direct interface between the environment and brain, is particularly vulnerable, making it a target for xenobiotics, potentially causing oxidative stress, neuroinflammation, and neuronal damage in the olfactory bulbs (OB). However, the detailed impact of xenobiotic intranasal delivery (IND) on the olfactory bulbs in an animal model remains unclear. This study aimed to evaluate the neurotoxic effects of vanadium on the OB using an IND model.
Methods: Fourteen adult Wistar rats were used. One group (n=7) received 30 µL of a solution with 273 µg of vanadium pentoxide per nostril, while the control (n=7) received 30 µL of distilled water, 3×/week for 4 weeks. After exposure, rats were sacrificed. OB were dissected, and analysed for oxidative stress and immunohistochemistry (tyrosine hydroxylase and glial fibrillary acidic protein expression).
Results: Vanadium exposure resulted in a significant reduction in dopaminergic neurons and an increased astroglial proliferation within the glomerular layer of the OB. Oxidative stress markers showed no major alterations, except for a significant increase in SOD activity.
Conclusions: Vanadium exposure negatively affects the OB, disrupting dopaminergic function and triggering glial proliferation, suggesting possible olfactory deficits and neuroinflammatory response. Elevated SOD activity suggests an immune response without affecting other oxidative parameters. These findings highlight the OB's vulnerability to neurotoxic exposure, emphasizing the importance of models that accurately reflect olfactory impairments, serving as a valuable tool for investigating olfactory dysfunction and its neurological implications.

Palavras-chave : Olfactory Bulbs, Intranasal Delivery, Rat