development and circuit formation. We will describe the neurological effects of lead in mammals and how they can be studied and treated using Drosophila as a model.

Keywords: *Drosophila melanogaster*, Lead poisoning, Neurotoxicity.

https://doi.org/10.1016/j.ibror.2019.09.072

B12

Neuroecotoxicology: effects of environmental heavy metal exposure on the brain of african giant rats

I. Usende [1,2], J.O. Olopade [2,*], I. Azeez [3], A. Andrioli [3], M. Bentivoglio [3]

[1] *Department of Veterinary Anatomy, University of Abuja, Nigeria*
[2] *Department of Veterinary Anatomy, Neuroscience Unit, University of Ibadan, Nigeria*
[3] *Department of Neuroscience, Biomedicine and Movement Sciences University of Verona, Italy*
E-mail address: jkayodeolopade@yahoo.com
(J.O. Olopade).

Increased exploitation of minerals has led to pollution of confined environments as documented in the Niger Delta in Nigeria. Previous studies have indicated that animals' resident in those environments can be used to investigate the neurotoxicological effects of exposure to pollutants. However, despite the increasing industrial exploitation of minerals and its consequent environmental pollution in Nigeria, there has been poor monitoring of the adverse effects of such exposure. Due to its exploratory activities, the African giant rat (*Cricetomys gambianus*) (AGR) provides a unique model for ecotoxicological research to determine levels of animal and human exposure to different environmental pollutants. The aim of the present study is to unravel neuropathological features of this animal sampled from agro-ecological zones of Nigeria.With ethically approved procedures (Assigned Number; UAECAUR/2018/0020), the animals were collected in the field in three regions of Nigeria according to the previously determined data on heavy metal exposure: mangrove/fresh water swamp (high level of vanadium and selenium); woodland/tall grass savanna (high level of lead, selenium and zinc); rain forest (low levels of heavy metals). Immunohistochemical and immunofluorescence analyses were conducted, focusing on different neuronal cell (tyrosine hydroxylase (dopaminergic), fast spiking parvalbumin-containing interneurons, orexin-A and melanin concentrating neurons) types sensitive to oxidative stress and extracellular matrix (ECM) using *Wisteria floriunda* (WFA) stain.In high vanadium and lead zones, decreased density of immunoreactive neurons, and shrinkage of immunostained cell bodies and decreased proximal dendrites and neuropil were seen in all the neuronal types studied the substantia nigra pars compacta (SNC). While these observed pathological features were seen more in dopaminergic and parvalbumin-containing interneurons of AGR sampled in high vanadium zone, orexin-A and melanin concentrating neurons of the lateral hypothalamus showed more of the said pathologies in brain samples collected from high lead zone. Stereological cell counts of tyrosine hydroxylase cells showed a significant loss (-41.8%) of SNC dopaminergic neurons in the animals exposed to high vanadium and selenium (mangrove), and (-50.7%) in those exposed to lead, selenium and zinc (woodland/tall savanna), compared to those from rain forest zone (low metals). Similarly, a significant loss (-39.9% and -40.8% respectively) of parvalbumin-containing interneurons in the prefrontal cortex was seen in same animal groups compared to those of rain forest (low metals). Extracellular matrix (ECM) labelling with *Wisteria floribunda* (WFA) immunofluorescence in the prefrontal cortex combined with PV immunofluorescence of AGR sampled from low metal region showed diffused distribution of WFA and abundance of perineuronal nets (PNNs) around PV-immunopositive neurons while in prefrontal cortex of AGR sampled from high vanadium and high lead zones there was very scanty and loss of WFA and PNNs staining intensity. Specifically, significant decreased mean integrated density of PPNs around soma of PV + interneurons in the prefrontal cortex of the animals exposed to high vanadium and those exposed to lead, were seen compared to those from low heavy metal zone. These to our knowledge are the first "neuroecotoxicological" findings in distinct neuronal cell groups. The implications of these findings are highly relevant for the human population living in these areas, not only in Nigeria but also in similarly polluted areas elsewhere in the world.

Keywords: Ecotoxicology, African giant rats, Neuronal damage

https://doi.org/10.1016/j.ibror.2019.09.073

B13

Morphological alterations in the hypothalamus and pancreatic-islets following the use of *hypoxis hemerocallidea* in diabetic rats under antiretroviral therapy

I.O. Onanuga [1,2,*], I.A. Jegede [1,2], U. Offor [1], O.O. Ogedengbe [1], E.C.S. Naidu [1], A.I. Peter [1], O.O. Azu [1,3]

[1] *Discipline of Clinical Anatomy, School of Laboratory Medicine and Medical Sciences. Nelson R Mandela School of Medicine, University of KwaZulu-Natal, Durban, South Africa*
[2] *Department of Anatomy, School of Medicine, Copperbelt University, Kitwe, Zambia*
[3] *Department of Anatomy, School of Medicine, University of Namibia, Windhoek, Namibia*
E-mail address: onanugaismail@gmail.com
(I.O. Onanuga).

Highly active antiretroviral therapy (HAART) and HIV/AIDS have been shown to induce endocrine/metabolic dysfunction with a consequential increase in morbidity/mortality resulting from organ toxicities. This study aimed at investigating the possible protective effects of *Hypoxis hemerocallidea* (*HH*) against the morphological alterations and expression of nissl substances in the hypothalamus and pancreatic-islets of diabetic rats under HAART. Sixty-two adult male Sprague-Dawley rats were divided into a normoglycemic group A ($n = 6$) and 7 diabetic (110 mg/kg nicotinamide + 45 mg/kg streptozotocin) groups (B,C. . ..H) ($n = 8$) and treated according to protocols.

Histological and histochemical staining with cresyl violet revealed the ventromedial hypothalamus (VMH) as anatomically well-defined structures that could be easily outlined with qualitative evidence of gliosis in the VMH region. The treated sections of the VMH showed degenerative changes of neurons, glia as well as the neuropil in the co-treatment of HAART + melatonin, *HH* and HAART alone in diabetes. The parenchymes were vacuolated with evidence of hypertrophy and spaces between the axonal mesh around the sparsely distributed neurons as compared to the normoglycemic control rats. Diabetic rats demonstrated degenerative and lytic changes in the acini and the islet of Langerhans of the pancreas. The brain morphological alterations observed in diabetic animals