

Biochemical, morphological and behavioral changes in the hippocampus of Albino Wistar rats following short-term adrenalectomy

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Abstract

Bilateral adrenalectomy (ADX) has been shown to damage the hippocampal neurons. However, the effects of short-term ADX is not studied. Therefore, we aimed to investigate the effects of short-term ADX on the levels of pro-inflammatory cytokines, response of microglia, astrocytes, neuronal cell death and oxidative stress markers (4 h, 24 h, 3 days, 1 week and 2 weeks) in the hippocampus.

Our results showed a transient significant elevation of pro-inflammatory cytokines IL-1 β and IL-6 from 4 h to 3 days in the ADX compared to sham. TNF- α levels were significantly elevated at 4 h only in ADX compared to sham. Time dependent increase in degenerated neurons in the dorsal blade of the dentate gyrus from 3 days to 2 weeks after ADX. Quantitative analysis showed significant increase in the number of microglia (3, 7 and 14 days) and astrocytes (7 and 14 days) of ADX compared to sham. A progression of microglia and astroglia activation all over the dentate gyrus and their appearance for the first time in CA3 of adrenalectomized rats hippocampi compared to sham was seen after 2 weeks. A significant decrease of GSH levels and SOD activity and increase in MDA levels were found after 2 weeks of ADX compared to sham. In order to investigate the effect of adrenalectomy on the behavior of the animals we used a passive avoidance test at 3, 7 and 14 days after adrenalectomy. Our results showed a significant reduction in the latency time in the adrenalectomized rats compared to the sham operated rats 3, 7 and 14 days after adrenalectomy. Our study showed an early increase in the pro-inflammatory cytokines followed by neurodegeneration and activation of glial cells as well as oxidative stress. Hence, early inflammatory components might contribute to the initiation of the biological cascade responsible for subsequent neuronal death and behavioral changes.

Biography:

He has a bachelor degree in biochemistry from of El Haj-Lakhdar University, Batna, Algeria in 2006. He moved to university of Constantine-1 between 2006-2009 where he obtained his Master degree in in molecular and cellular toxicology. He got his PhD from the same university. He taught as an adjunct faculty at New York institute of technology. Abu Dhabi. Since 2019 as assistant professor, he joined Life and Environmental Sciences Department. College of Natural and Health Sciences. Abu Dhabi campus. Zayed university.

Speaker Publications:

1. "Prolonged Pulmonary Exposure to Diesel Exhaust Particles Exacerbates Renal Oxidative Stress, Inflammation and DNA Damage in Mice with Adenine-Induced Chronic Renal Failure". *Cell Physiol Biochem*. 1703-13.
2. "In Vivo Protective Effects of Nootkatone against Particles-Induced Lung Injury Caused by Diesel Exhaust Is Mediated via the NF- κ B Pathway. *Nutrients*";10(3). pii: E263.
3. "Ameliorative effects of resveratrol on liver injury in streptozotocin-induced diabetic rats". *J Biochem Mol Toxicol*. 2012 Oct; 26(10):384-92.

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