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EFFECT OF INSULIN ON NEUROINFLAMMATORY RESPONSE AND OXIDATIVE STRESS INDUCED BY A BLOCKER OF KV1.3 CHANNEL

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Voltage-dependent potassium channels (Kv1.3), play key role in a wide variety of physiological processes, including immunity, metabolism and the stabilization of the resting potential. In brain, activation of insulin receptor is able to induce current suppression coupled to tyrosine phosphorylation of Kv1.3 channel. Moreover, insulin can reduce the production of free radicals and attenuate the inflammatory response. The Kv1.3 channel blockers, such as neurotoxins isolated from scorpion venom, are able to alter neuronal excitability leading to neurological disorders accompanied by inflammatory response. The aim of this study is to evaluate the neuroprotective effect of insulin injected by intra-cerebro-ventricular (i.c.v.) route on neuro-inflammatory response and oxidative stress induced by a blocker of Kv1.3 channel. The ability of insulin to reduce the brain injuries, inflammatory response and oxidative stress biomarkers induced by Kv1.3 channel blocker were assessed in NMRI mice at 24 h after co-injection of insulin and neurotoxin active on potassium channel. Obtained results revealed that the central administration of insulin prevents cerebral cortex injury, brain edema, cells infiltration and a change in the permeability of the blood–brain barrier induced by the Kv1.3 channel blocker. Insulin seems to also reduce significantly the pro-inflammatory cytokines (IL-6, IL-17, TNF-α), MMP-2 and MMP-9 activities and oxidative stress markers (H2O2, NO, MDA) in brain homogenates compared to those observed when animals were injected with Kv1.3 channel blocker alone. These results indicate that insulin is able to modulate the activity of potassium channels in brain by modifying their properties, which probably prevent the binding of neurotoxin to its receptor Kv channel and thus reduce the neuro-pathophysiological effects.

Biography

Zahida Taibi-Djennah has completed her PhD in Biochemistry-Immunology and Innovative Biotherapies from University of Sciences and Technology Houari Boumdiene, Faculty of Biological Sciences, Laboratory of Cellular and Molecular Biology. She is an Associate Professor level B at University of Sciences and Technology Houari and is team member of Biochemistry of Biomolecules: Mode of Action, Immunotherapy and Immunodiagnosi (http://www.lbcm.usthb.dz/spip.php?rubrique4). She has published 5 papers in reputed journals including Systemic Responses following Brain Injuries and Inflammatory Process Activation Induced by a Neurotoxin of *Androctonus* Scorpion Venom in the *Journal of Neuroimmunomodulation* and Effect of cytokine antibodies in the immunomodulation of inflammatory response and metabolic disorders induced by scorpion venom in the *Journal of International Immunopharmacology.*

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