Wnt signaling pathway improves central inhibitory synaptic transmission in a mouse model of Duchenne muscular dystrophy

Fuenzalida, M., Espinoza, C., Pérez, M. Á., Tapia-Rojas, C., Cuitino, L., Brandan, E., & Inestrosa, N. C. (2016). Wnt signaling pathway improves central inhibitory synaptic transmission in a mouse model of Duchenne muscular dystrophy. Neurobiology of disease, 86, 109-120. <10.1016/j.nbd.2015.11.018> Accessed 03 Jan 2021.

Abstract

The dystrophin-associated glycoprotein complex (DGC) that connects the cytoskeleton, plasma membrane and the extracellular matrix has been related to the maintenance and stabilization of channels and synaptic receptors, which are both essential for synaptogenesis and synaptic transmission. The dystrophin-deficient (mdx) mouse model of Duchenne muscular dystrophy (DMD) exhibits a significant reduction in hippocampal GABA efficacy, which may underlie the altered synaptic function and abnormal hippocampal long-term plasticity exhibited by mdx mice. Emerging studies have implicated Wnt signaling in the modulation of synaptic efficacy, neuronal plasticity and cognitive function. We report here that the activation of the non-canonical Wnt-5a pathway and Andrographolide, improves hippocampal mdx GABAergic efficacy by increasing the number of inhibitory synapses and GABAA receptors or GABA release. These results indicate that Wnt signaling modulates GABA synaptic efficacy and could be a promising novel target for DMD cognitive therapy..

Keywords

Dystrophin, Mdx mice, Wnt signaling, GABA synapses.