

The influence of protein tyrosine phosphatases on mouse behaviour

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Leukocyte common Antigen-Related protein (LAR) is a cell adhesion molecule-like receptor-type protein tyrosine phosphatase. We previously reported that in LAR tyrosine phosphatase deficient (LAR- $\Delta$ P) mice the number and size of basal forebrain cholinergic neurons as well as their innervation of the hippocampal area was reduced. With the hippocampus being implicated in behavioural activity aspects, including learning and memory processes, we assessed possible phenotypic consequences of LAR phosphatase deficiency using a battery of rodent behaviour tests. Motor function and coordination tests as well as spatial learning ability assays did not reveal any performance differences between wildtype and LAR- $\Delta$ P mice. A spatial learning impairment was found in the difficult variant of the Morris water maze. Exploration, nestbuilding and activity tests indicated that LAR- $\Delta$ P mice were more active than wildtype littermates. The observed hyperactivity in LAR- $\Delta$ P mice could not be explained by altered anxiety or curiosity levels, and was found to be persistent throughout the nocturnal period. In conclusion, behavioural testing of the LAR- $\Delta$ P mice revealed a spatial learning impairment and a significant increase in activity. All results together indicate that the hyperactive LAR- $\Delta$ P mice can provide an animal model to study hyperactivity related diseases, like ADHD.

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