

Physical exercise prevents memory impairment through modulation of CD39 and CD73 activities and A2A receptor expression in hypertension

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Abstract

Background: Central nervous system function has been emerging as an approach to understand hypertension-mediated memory dysfunction, and chronic exercise is able to modulate the purinergic system. Herein, we investigated the effect of chronic swimming training on the purinergic system in cortex and hippocampus of L-NAME-induced hypertensive rats. Method: Male Wistar rats were divided into four groups: Control, Exercise, L-NAME and Exercise L-NAME. Inhibitory avoidance test was used to assess memory status. NTPDase, CD73 and adenosine deaminase activities and expression, and P2 receptors expression were analyzed. Data were analyzed using two-way ANOVA and Kruskal–Wallis tests, considering P less than 0.05. Results: Physical exercise reduced the blood pressure and prevented memory impairment induced by L-NAME model of hypertension. L-NAME treatment promoted an increase in NTPDase1, NTPDase3 and CD73 expression and activity in the cortex. A2A expression is increased in hippocampus and cortex in the hypertension group and exercise prevented this overexpression. Conclusion: These changes suggest that hypertension increases adenosine generation, which acts through A2A receptors, and exercise prevents these effects. These data may indicate a possible mechanism by which exercise may prevent memory impairment induced by L-NAME.

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