



The effect of voluntary exercise on inflammation, immune cell infiltration, and demyelination of spinal cord in mouse model of multiple sclerosis

Oral Presentation

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Abstract

Introduction: Multiple sclerosis is an inflammatory and neurodegenerative disease of the central nervous system. The immune cells attack the myelin sheath of the nerves, leading to axonal damage, inflammation, immune cell infiltration, and demyelination of the brain and spinal cord (1). Active lifestyle and environmental factors influence the clinical course of inflammatory and neurodegenerative disorders by changing the synaptic transmission and connections (2). The present study assessed the impact of 6-week voluntary exercise before disease onset on the expression of IL-17 and the degree of lymphocyte infiltration and demyelination in the spinal cord in the chronic period of the EAE.

Methods: In this experiment, 30 female C57BL/6 (9–10 weeks old) were randomly assigned into EAE, EAE + wheel running, and healthy mice. The animals in the EAE + wheel running group were submitted to wheel running for 6 Weeks 1 h per day for five consecutive days until the disease's early symptoms emerged. EAE was induced by MOG35-55 on Week four. Mice were sacrificed on day 30 post-induction, and the lumbar segments of the spinal cord were collected immunohistochemically and histopathologically (Luxal Fast blue and Hematoxylin and eosin staining) analyses.

Results: The statistical analyses revealed a significant difference between EAE + wheel running and EAE groups (gray matter: IL17, $P = 0.0001$; white matter: IL17, $P = 0.0001$, demyelination, $p = 0.0001$, rate of lymphocyte infiltration, $p = 0.0003$). The voluntary wheel running decreased the expression of IL-17, lymphocyte infiltration, and demyelination in comparison with the EAE group $**p < 0.01$.

Conclusion: We have shown that voluntary exercise decreases the rate of inflammation and immune cell infiltration in the spinal cord, thereby preventing demyelination and EAE progression in the chronic period of the disease. The active lifestyle has a significant impact on the prevention of MS.

Keywords

EAE; Wheel Running; Active lifestyle

