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Title

TNF signalling via the TNF receptors mediates the effects of exercise on cognition-like behaviours.

Authors

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Highlights

- Altered TNF is associated with cognitive impairment in neuropsychiatric conditions
- Exercise alters TNF and TNF receptor expression, and cognitive functioning
- TNF receptor signalling mediates the effects of exercise on recognition memory
- Exercise related TNF signalling mediates exercise effects on spatial learning
- TNF also notably but non-significantly impacted exercise related spatial memory

Abstract

Background: Altered TNF levels are associated with cognitive impairment in depression, schizophrenia, bipolar disorder, and Alzheimer's disease (AD). Exercise improves cognition-like behaviours, reduces the expression of tumour necrosis factor alpha (TNF), and increases expression of the soluble TNF receptors soluble TNFR1 (sTNFR1) and sTNFR2. We suggest TNF and its receptors are involved in cognitive function and dysfunction, and investigate whether exercise mediates its effects on cognitive function via TNF and its receptors.

Methods: We utilised C57BL/6, $TNF^{-/-}$, $TNFR1^{-/-}$, and $TNFR2^{-/-}$ mice to compare exercise to non-exercise control groups to investigate whether exercise exerts its effects on various types of cognition-like behaviours via TNF and its receptors.

Results: Recognition memory improved with exercise in WT mice, was impaired in $TNFR1^{-/-}$ exercise mice, showed non-significant impairment with exercise in $TNF^{-/-}$ mice, and no changes in $TNFR2^{-/-}$ mice. In spatial learning there were exercise related improvements in WT mice, non-significant but