

## **Voluntary exercise after cerebral ischemia ameliorates disability and modifies dendritic spine density**

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Cerebral ischemia is one of the main causes of disability. Although many studies report that exercise improves prognosis of cerebral ischemia, the mechanisms are not revealed. The aim of this study is to reveal the underlying mechanisms of exercise on functional recovery after cerebral ischemia. We occluded the middle cerebral artery in C.B-17/Icr-<sup>+/+</sup>Jcl mice to obtain reproducible size of cerebral infarction. Mice were divided into 4 groups: Sham, Sham + exercise, Middle cerebral artery occlusion (MCAO) and MCAO + exercise. Exercise groups had free access to a running wheel. Wire hang test was performed on day 14 post-ischemia. Grid walking test was performed daily for 14 days after cerebral ischemia. Then, we visualized the neuronal processes and dendritic spines of pyramidal cells in the layer 5 by microinjection with Lucifer yellow. As a result, voluntary exercise contributed to functional recovery after cerebral ischemia and affected the number of dendritic spines. Our data suggest that functional recovery is caused by the change in dendritic spine density following voluntary exercise.