

## Physical activity intervention induces a functional and structural hippocampal plasticity in rodents

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It is very common that drug addicts suffer from depression. From many studies it is described that depression is associated with decreased hippocampal volume and dysfunctional glutamate transmission. Moreover, physical activity has an antidepressant effect in humans and in animal models but to what extent physical activity can affect functional and structural hippocampal plasticity or addiction behavior is not known.

We tested how physical activity, voluntary wheel running during 5 weeks, affects hippocampal volume and structure of glutamate synapses in hippocampus in rats.

Using Magnetic Resonance Imaging and high resolution microscopy we show that wheel running increased hippocampal size and number of thin spines in dentate gyrus. Wheel running also potentiated hippocampal LTP and decreased evoked glutamate transmission. Moreover, the effects on hippocampal volume and electrophysiology were seen together with changed levels of glial glutamate transporter proteins and AMPA receptors in hippocampus after running.

We suggest that physical activity alters synaptic glutamate transmission in hippocampus in rodents. To what extent physical activity, which is likely to be antidepressant, is beneficial for treatment of addiction is now under investigation.

### Biography

Stefan Brené has completed his Ph.D. at the age of 30 years from Karolinska Institutet and postdoctoral studies from Yale School of Medicine. He is an associate professor at Karolinska Institutet and leading a research group, which is using experimental MRI as a translational tool for studies of addiction and depression. He has published more than 70 papers in reputed journals and serving as an editorial board member of the Journal of Molecular Psychiatry.

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