

Exercise improves brain function in overweight and obese individuals

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New findings out of the University of Tübingen show that, on top of its benefits for metabolism, mood, and general health, exercise also improves brain function. In recent studies, researchers learned that obese and overweight individuals are prone to insulin resistance in the brain, where it provides information about current nutritional status, as well as the rest of the body. So researchers wanted to know whether exercise can improve insulin sensitivity in the brain and improve cognition in overweight individuals.

In the current study, led by Dr. Stephanie Kullmann, 22 sedentary adults with overweight or obesity (an average BMI of 31) underwent two brain scans before and after an 8-week exercise intervention, including cycling and walking. Brain function was measured before and after using an insulin nasal spray to investigate insulin sensitivity of the brain. Participants were also assessed for cognition, mood, and peripheral metabolism.

Even though the exercise intervention only resulted in a marginal weight loss, brain functions important for metabolism "normalized" only after 8-weeks. Exercise increased regional blood flow in areas of the brain important for [motor control](#) and reward processes, both of which depend on the [neurotransmitter dopamine](#). Dopamine is an important neurotransmitter for learning new motor skills and in reward-related learning and this research shows that exercise significantly improves dopamine-related [brain function](#). One area in particular, the striatum, had enhanced sensitivity to insulin after the 8-weeks of exercise such

that the brain response of a person with obesity after exercise training resembled the response of a person with normal-weight. Interestingly, the greater the improvement in brain function, the more belly fat a person lost during the course of the exercise intervention. Behaviorally, participants reported an improvement in mood and task switching, which is an indicator for improved executive function.

"The bottom line is that exercise improves brain function", said Kullmann. "And increasing [insulin sensitivity](#) in dopamine-related brain regions through exercise may help decrease the risk of a person to develop type 2 diabetes, along with the benefits for mood and cognition".

More information: Exercise improves brain insulin action and executive function in adults with overweight and obesity, Presented July 2019, Society for the Study of Ingestive Behavior, Utrecht, Netherlands

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