

# Exercise can help against insulin resistance in the brain

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Graphical abstract. Credit: *JCI Insight* (2022). DOI: 10.1172/jci.insight.161498

If the brain no longer responds correctly to the hormone insulin (insulin resistance), this also has a negative effect on the metabolism in the body and the regulation of eating behavior. A recent study shows that as little as eight weeks of exercise can help restore the brain's insulin sensitivity in severely overweight adults. This opens up new therapeutic possibilities

for reducing obesity and diabetes risk factors in the future. The study by the DZD, Tübingen University Hospital and Helmholtz Munich has now been published in *JCI Insight*.

Fourteen women and seven men aged 21–59 years with a [body mass index](#) of 27.5–45.5 took part in the study. Functional magnetic resonance imaging (MRI) was used to determine insulin sensitivity in the brain before and after eight weeks of monitored endurance training.

## **Eight weeks of exercise improved insulin sensitivity**

The result: the exercise program improved insulin action in the brain to the level of a person with a healthy weight.

"The exercise intervention increased the insulin-stimulated activity in [brain regions](#) that are responsible, among other things, for the perception of hunger and satiety and for the interaction of motivation, reward, emotion and exercise behavior," said DZD scientist PD Dr. Stephanie Kullmann, who works at the Institute of Diabetes Research and Metabolic Diseases (IDM) of Helmholtz Munich at the University of Tübingen and the Department of Diabetology and Endocrinology at Tübingen University Hospital.

The improved insulin sensitivity in the brain had positive effects on the metabolism, the sensation of hunger decreased and the unhealthy visceral fat was reduced.

## **Possible new starting point for therapies against obesity and diabetes**

"The study suggests that [insulin resistance](#) in the brain may be reversible and could be a viable therapeutic target to restore central nervous system regulation of metabolism and body weight and counteract adverse

effects of obesity," said Professor Martin Heni, last author of the study.

To verify whether improving brain [insulin sensitivity](#) in people at high risk of T2D actually has beneficial effects on metabolism and cognition, further controlled intervention studies are planned. They can also help clarify the underlying mechanisms.

**More information:** Stephanie Kullmann et al, Exercise restores brain insulin sensitivity in sedentary adults who are overweight and obese, *JCI Insight* (2022). [DOI: 10.1172/jci.insight.161498](https://doi.org/10.1172/jci.insight.161498)

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