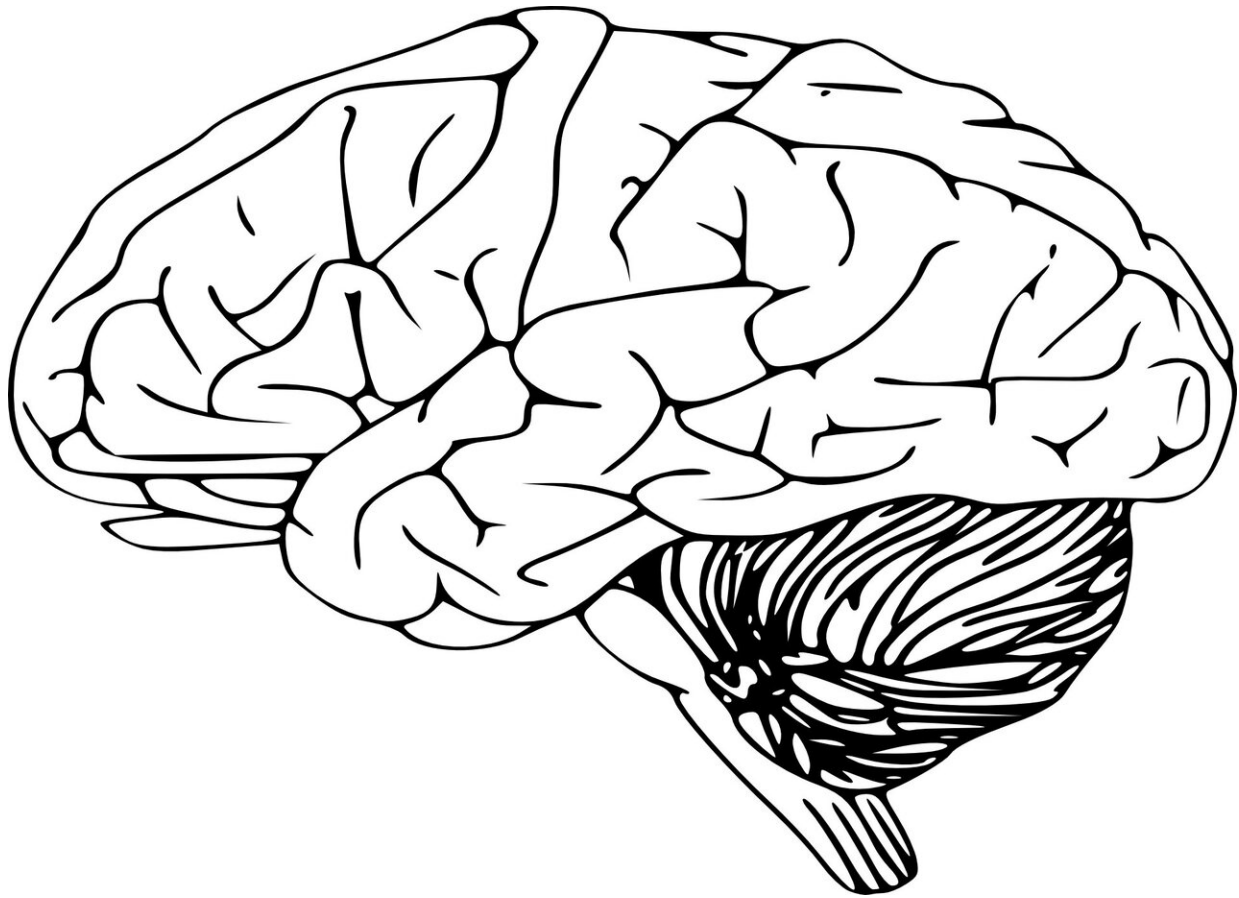


The brain already benefits from moderate physical activity

August 3 2022



Credit: Pixabay/CC0 Public Domain

Exercise keeps body and mind healthy—but little is known about exactly how and where physical activity affects our brains. "In previous

research, the brain was usually considered as a whole," says Fabienne Fox, neuroscientist and lead author of a current study. "Our goal was to take a more detailed look at the brain and find out which regions of the brain physical activity impacts most."

Extensive data from the Rhineland study

For their research, Fox and colleagues used data from the Rhineland Study, a large-scale population-based study conducted by DZNE in the Bonn city area. Specifically, they analyzed physical activity data from 2,550 volunteers aged 30 to 94 years, as well as [brain](#) images obtained by [magnetic resonance](#) imaging (MRI). To sample physical activity, the study participants wore an accelerometer on their upper thigh for seven days. The MRI scans provided information particularly on [brain volume](#) and thickness of the cortex.

The more active, the greater the effects

"We were able to show that physical activity had a noticeable effect on almost all brain regions investigated. Generally, we can say that the higher and more intense the physical activity, the larger the brain regions were, either with regard to volume or cortical thickness," Fabienne Fox summarizes the research results. "In particular, we observed this in the hippocampus, which is considered the control center of memory. Larger brain volumes provide better protection against neurodegeneration than smaller ones." However, the dimensions of the brain regions do not increase linearly with physical activity. The research team found the largest, almost sudden volume increase when comparing inactive and only moderately physically active study participants—this was particularly evident in older individuals over the age of 70.

"In principle, this is very good news—especially for those who are

reluctant to exercise," says Ahmad Aziz, who heads the research group "Population and Clinical Neuroepidemiology" at DZNE. "Our study results indicate that even small behavioral changes, such as walking 15 minutes a day or taking the stairs instead of the elevator, may have a substantial positive effect on the brain and potentially counteract age-related loss of brain matter and the development of [neurodegenerative diseases](#). In particular, [older adults](#) can already profit from modest increases of low intensity physical activity."

Young and somewhat athletic subjects who usually engaged in moderate to intense physical activity also had relatively high brain volumes. However, in even more active subjects, these brain regions were slightly larger. Also here it showed: the more active, the greater the effect, although at high levels of physical activity, the beneficial effects tended to level off.

Brain regions that benefit the most

To characterize the brain regions that benefited most from physical activity, the research team searched databases for genes that are particularly active in these brain areas. "Mainly, these were genes that are essential for the functioning of mitochondria, the power plants of our cells," says Fabienne Fox. This means that there are particularly large numbers of mitochondria in these brain regions. Mitochondria provide our body with energy, for which they need a lot of oxygen. "Compared to other brain regions, this requires increased blood flow. This is ensured particularly well during physical activity, which could explain why these brain regions benefit from exercise," says Ahmad Aziz.

Exercise protects

The bioinformatic analysis further showed that there is a large overlap

between genes whose expression is affected by physical activity and those that are impacted by neurodegenerative diseases such as Alzheimer's, Parkinson's, or Huntington's disease. This could offer a potential explanation for why physical activity has a neuroprotective effect, the research team concludes. "With our study, we were able to characterize [brain regions](#) that benefit from physical activity to an unprecedented level of detail," says Ahmad Aziz. "We hope our results will provide important leads for further research."

And also approaches for everyday use: "With our results, we want to provide a further impetus to become more physically active—to promote brain health and prevent neurodegenerative diseases," says Fabienne Fox. "Even modest [physical activity](#) can help. Thus, it's just a small effort—but with a big impact."

The research was published in *Neurology*.

More information: Fabienne A. U. Fox et al, Association Between Accelerometer-Derived Physical Activity Measurements and Brain Structure: A Population-Based Cohort Study, *Neurology* (2022). [DOI: 10.1212/WNL.0000000000200884](https://doi.org/10.1212/WNL.0000000000200884)

Provided by German Center for Neurodegenerative Diseases

Citation: The brain already benefits from moderate physical activity (2022, August 3) retrieved 6 May 2024 from <https://medicalxpress.com/news/2022-08-brain-benefits-moderate-physical.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--