

Increasing physical activity does not improve the function of brown adipose tissue

July 8 2019



The UGR research group that conducted the study. Credit: University of Granada

A study conducted by researchers from the University of Granada

(UGR) has found that, contrary to prevailing belief, higher levels of physical activity are not linked to a greater volume or activity of brown adipose tissue (BAT). BAT is a thermogenic organ that burns glucose and fats, releasing the energy in the form of heat.

When BAT is activated, it consumes glucose and lipids, partially preventing them from being stored in other tissues such as white adipose tissue (or common fat), which is located, for example, around the abdomen.

Over the last decade, several studies have unequivocally confirmed the presence of BAT in human adults. BAT is a thermogenic organ equipped to dissipate energy in the form of heat through the so-called "uncoupling protein." Therefore, it has been postulated that generating a greater volume of BAT and increasing its activity could be a potential strategy for combating [obesity](#) and associated comorbidities such as type 2 [diabetes](#).

Researchers have tended to channel their efforts into identifying strategies to help improve BAT function safely over the long term. Based on this premise, previous studies have suggested that raising levels of [physical activity](#) could be an effective strategy for increasing the volume and activity of BAT. However, the data from extant studies conducted on humans are both scarce and contradictory.

In this new study, published in the *Journal of Clinical Endocrinology and Metabolism*, the UGR scientists have investigated the link between objectively measured levels of physical activity and the quantity and activity of BAT for the first time. They measured the quantity and activity of BAT by means of proton-emission tomography combined with computed tomography (using a radiopharmaceutical known as 18F-Fluorodeoxyglucose). This study was performed on a sample of sedentary young adults comprising 87 women and 43 men, with an

average age of 22 years.

This study was part of the ACTIBATE (Activating Brown Adipose Tissue Through Exercise) project, which was implemented by the University of Granada during 2014–2017.

The authors observed that there was no link between the levels of physical activity and the volume and activity of BAT, even after adjusting the analyses for covariables that could be influencing the results. Nor was [sedentary time](#) associated with the volume and activity of BAT, they noted. The authors concluded that although physical activity is one of the main interventions recommended in the prevention of chronic diseases such as obesity and type 2 diabetes, other mechanisms beyond an increase in the volume and activity of BAT could be mediating its beneficial metabolic effects. These findings contradict the results of previous studies, and call into question the role of exercise in improving BAT function.

"Studies that analyze the effect of regular physical activity from a molecular point of view are necessary to understand the mechanisms that mediate the therapeutic effects of exercise in humans," explains the main author of the work, Francisco Miguel Acosta Manzano, doctoral student in Biomedicine at the UGR's International School for Postgraduate Studies, and member of the PROFITH-CTS977 research group.

More information: Francisco M Acosta et al. Association of objectively measured physical activity with brown adipose tissue volume and activity in young adults, *The Journal of Clinical Endocrinology & Metabolism* (2018). [DOI: 10.1210/jc.2018-01312](https://doi.org/10.1210/jc.2018-01312)

ACTIBATE (Activating Brown Adipose Tissue Through Exercise) project: profith.ugr.es/actibate

Provided by University of Granada

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