

# Eating activates the functioning of human brown fat

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The importance of the human brown adipose tissue (BAT) has become clearer over the past 10 years. Using functional imaging, positron emission tomography (PET) it was possible to show that adult humans have functional BAT. Coldness is one of the most effective activators of the BAT metabolic function, but in rodents, eating has also been shown to activate BAT. The debate on whether eating has the same effect on humans has lasted for decades. Now, the researchers at Turku PET Centre in Turku, Finland, have proved that eating increases oxygen consumption in human BAT to the same extent as coldness.

Most of us avoid repeated exposure to cold. Coldness activates [brown adipose tissue](#) (BAT) found in the neck above the clavicles and accelerates the metabolic function of BAT. People whose BAT is functionally active have more favourable metabolic health, and their circulating glucose and lipid concentrations are lower compared to people with non-active BAT.

One of the main functions of BAT is heat production. Heat production is obviously generated in cold environments, but using animal testing, it has already been proved before that eating also stimulates heat production in BAT. Even though there are few direct tools for measuring this in humans, researchers at Turku PET Centre in Finland were able to utilise non-invasive imaging to measure [oxygen](#) consumption in BAT. In Turku, there is extensive expertise and long-term experience in researching [human](#) metabolism with PET imaging. Examining BAT in humans is extremely interesting, and it seems that several basic functions of BAT

in humans remain unknown.

## Oxygen Consumption in BAT Increases after a Meal

Healthy volunteers participating in the study were given a standard and balanced meal which included vegetable lasagna, salad, bread and margarine, and a glass of milk. After the meal, a PET scan was performed on the upper thoracic region containing BAT in order to measure oxygen uptake and tissue perfusion. The PET scan was repeated on another day during exposure to cold.

"We found that BAT [oxygen consumption](#) increased as significantly after a meal as it did during exposure to cold," says Docent Kirsi Virtanen from Turku PET Centre. This indicates that eating accelerates the mechanisms related to [heat production](#) in BAT.

After eating, there is quite a hormonal storm in the human body. Insulin is one of the most significant hormonal signals, and it promotes the transferring of nutrients, glucose (sugar), and fatty acids to be oxidised in the tissues. In addition, several genes regulating fatty acid metabolism in BAT are expressed after eating.

"We were able to show that eating activates the functioning of BAT. Boosting this with regular eating may have an essential impact on weight maintenance – BAT remains active and functional and is able to participate in the regulation of metabolism," says Virtanen.

**More information:** Mueez U Din et al. Postprandial Oxidative Metabolism of Human Brown Fat Indicates Thermogenesis, *Cell Metabolism* (2018). [DOI: 10.1016/j.cmet.2018.05.020](https://doi.org/10.1016/j.cmet.2018.05.020)

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