

 METABOLISM

Can BAT utilize dietary fatty acids?

“
...increasing
BAT
thermogenic
activity and
capacity by cold
acclimation
did not result
in significant
changes in how
BAT utilizes
DFAs...”

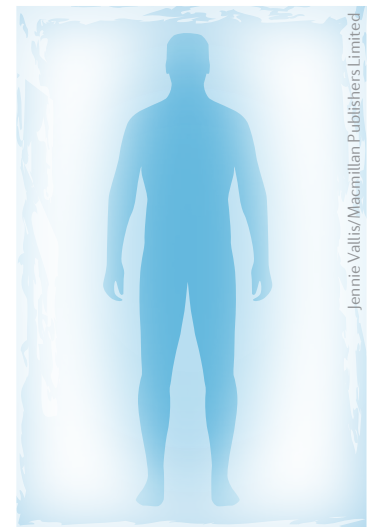
New research published in *Nature Communications* has shed light on how brown adipose tissue (BAT) in humans utilizes dietary fatty acids (DFAs) before and after cold-exposure-induced activation.

BAT is involved in lipid metabolism in rodents and has a vital function in cold-induced thermogenesis, a process that increases overall energy expenditure. BAT is being investigated as a potential therapeutic target for obesity and associated disorders owing to its metabolic actions.

Impaired storage of DFAs has implications for insulin resistance and impaired pancreatic β -cell function, contributing to associated complications such as heart failure, kidney failure and microvascular diseases. Here, investigators used a novel imaging technique and positron emission tomography to investigate the role of BAT in DFA metabolism in healthy men before and after a 4-week cold acclimation. “We found that BAT in humans is able to utilize DFAs, just as it can in rodents,” explains André Carpentier, co-corresponding author of the study.

However, the researchers found that human BAT utilizes a very small fraction of DFAs compared with the fraction used by rodent BAT. In addition, although cold-stimulated BAT is involved in clearance of DFAs from the circulation, its contribution is not as great as that of other organs, such as the liver and skeletal muscle. “Furthermore, increasing BAT thermogenic activity and capacity by cold acclimation did not result in significant changes in how BAT utilizes DFAs and did not change the whole-body DFA partitioning or postprandial thermogenic response,” says Carpentier.

In contrast to previous studies, the data reported in this study suggest that activation of BAT by cold exposure might not be a primary target for the treatment of obesity or DFA-related metabolic disorders. “We are now planning to determine whether activation of BAT using pharmacological approaches, such as treatment with β 3-adrenergic receptor agonists, can modify postprandial BAT utilization of DFAs and DFA organ partitioning,” concludes Carpentier.



Jennie Vallis/Macmillan Publishers Limited

“We are aware that BAT is unlikely to substantially contribute to DFA partitioning in humans, but even a 1% change in DFA partitioning could have significant functional impact in some organs.”

Alan Morris

ORIGINAL ARTICLE Blondin, D. P. et al. Dietary fatty acid metabolism of brown adipose tissue in cold-acclimated men. *Nat. Commun.* <https://doi.org/10.1038/ncomms14146> (2017).