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New insights into BAT activity

In humans, brown adipose tissue (BAT) activity can contribute to changes in energy expenditure and increased levels of BAT can improve insulin sensitivity. The overall effect of BAT on human metabolism, however, remains contested. Now, new data show that previous studies could have underestimated the amount of BAT in lean men following tolerable cold exposure.

To fully appreciate the effect of BAT on human metabolism, researchers first need to be able to accurately determine the metabolic activity of BAT in adults. “Quantifying the amount of BAT in humans has been difficult due to its anatomical location as well as a lack of standardization of PET and CT analysis techniques,”

explains Kong Chen, corresponding author of the study. “In our present study we created a map of human BAT using a novel image-processing technique that will serve as a reference for the anatomical distribution and metabolic capacity of BAT.”

Chen and colleagues developed a framework for estimating the amount of BAT in humans. In 20 healthy male volunteers (12 lean and 8 obese), the authors refined BAT quantification with PET and CT by determining the appropriate PET tracer uptake threshold needed to identify BAT and by defining the BAT regions of interest. The authors found active BAT only in specific non-subcutaneous fat regions (~4% of total fat in the body). In the fat depots that are capable of supporting

the growth of BAT, however, less than half of the volume was active in the study participants after acute cold exposure, which suggests that human BAT could be metabolically important.

“We now have a more detailed determination of the BAT volume and activity measures that will enable us to better investigate its contribution to whole-body metabolism,” concludes Chen. “Moving forward, we want to investigate whether BAT can serve as a therapeutic target in the treatment or prevention of diabetes mellitus and obesity.”

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