

# Burning fat to increase metabolic rates



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The concept of “bad cholesterol” versus “good cholesterol” has received considerable attention in both the scientific and public media. This discussion has now recently extended to adipose tissue, with the concept of “bad fat” versus “good fat.” The major storage depot of fatty acids in the body is contained within white adipose tissue, and the dramatic rise in the incidence of obesity in our society has resulted in marked increases in the amount of white adipose tissue fatty acid stores in the population. Since obesity is a risk factor for a number of diseases, including heart disease and diabetes, these white adipose tissue stores have been labeled the “bad fat.” However, a second type of adipose tissue exists, termed brown adipose tissue, that primarily burns fat as opposed to storing fat. This “good fat” has a high mitochondrial content (giving this fat its brown color), which can readily oxidize fatty acids. A high expression of uncoupling proteins in the mitochondria of this brown adipose tissue results in the production of heat rather than energy stores.

It has long been known that brown adipose tissue in many mammalian species living in cold climates is important in thermogenesis, by burning fat to produce heat. Until recently, however, it was thought that brown adipose tissue was not present in humans in any consequential degree, except during the neona-

tal period. However, with the development of more sophisticated imaging techniques, brown adipose tissue has been identified in the subscapular and cervical regions of adult humans.<sup>1</sup> Importantly, it has also been shown that the amount of brown adipose tissue is decreased in obesity, insulin resistance, and diabetes.<sup>2</sup> This raises the possibility that increasing brown adipose tissue may be an approach to treating obesity and diabetes by increasing whole-body metabolic rates. Articles in this issue of *Heart and Metabolism* review the topical area of brown adipose tissue metabolism, as well as the possible therapeutic potential of increasing brown adipose tissue stores in the body. The concept of “beiging” white adipose tissue to increase metabolic rates is also addressed. The potential of increasing stores of “good fat” provides an exciting new approach to combating obesity, diabetes, and heart disease. ■

## REFERENCES

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2. Virtanen KA, Lidell ME, Orava J, et al. Functional brown adipose tissue in healthy adults. *N Engl J Med*. 2009;360:1518-1525.