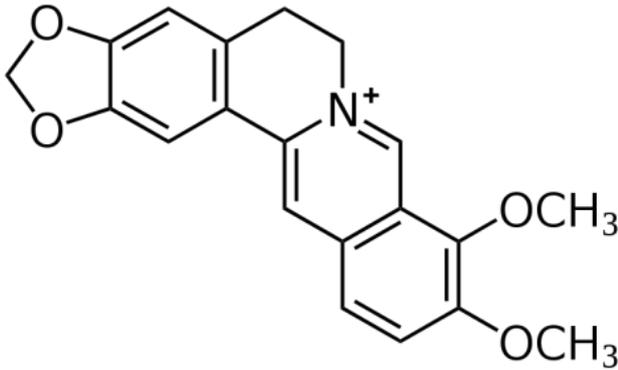


Berberine compound may play role in treating obesity

27 November 2014, by Nancy Owano



Chemical structure of berberine, a plant alkaloid. Credit: public domain

(Medical Xpress)—Weight-gain warnings are especially uncomfortable during holiday seasons with all the oversized and double helpings of calorie-rich pies, creamy dips and savory holiday stuffings. Nonetheless, problems of obesity are real and pose serious health risks linked to medical conditions such as diabetes, cardiovascular diseases and increased cancer risk. Researchers from China, with affiliations that include the Shanghai Institute of Endocrine and Metabolic Diseases, now suggest that the compound berberine (BBR), which comes from the Chinese medicinal plant *Coptis chinensis*, increases energy expenditure, limits weight gain, improves cold tolerance and enhances brown adipose tissue (BAT) activity in obese mice. Berberine could be a factor in treating obesity. This medicinal Chinese plant might contribute to those who seek such support. Their paper, "Berberine activates thermogenesis in white and brown adipose tissue," was published Tuesday in *Nature Communications*.

The authors wrote that BBR was a naturally occurring plant alkaloid present in many Chinese

herbal medicines, commonly used for diarrhoea, and it has been found to have "a variety of metabolic benefits in recent years." They pointed out that in vivo and in vitro studies have shown that BBR can bring about improvements in metabolic disorders, such as insulin resistance and hyperlipidemia. (An article about their research in *New Scientist* [said](#) people have been taking berberine in China for 2000 years.)

"The beneficial effects of BBR on metabolic improvement have evoked a substantial interest in the compound as a potential treatment for obesity and diseases such as diabetes. Our data support a clear function of BBR in regulating [energy expenditure](#) by initiating a thermogenic program." They said that "we identify BBR as a new potential drug for treating patients with obesity."

As *New Scientist* stated, the researchers "have now shown that it helps weight control in [obese mice](#) by both activating [brown fat](#) and helping turn ordinary white fat brown." Colin Barras wrote that the team gave the mice berberine every three days for a month. "Scans showed that the brown fat between the rodent's shoulder blades burned more calories than that in mice not given the extract. There were also signs that the white fat in their groin had begun to act like brown fat. As a result, the mice fed a high-fat diet had better control over their weight."

One of the authors, Guang Ning, noted in *New Scientist* that people have been taking berberine in China for 2000 years but agreed it was imperative to test its safety profile. "Toxicology must be studied for the long-term application in [obesity treatment](#)," he said.

But is obesity not just a simple matter of reducing one's calories in daily food intake? The authors said that calorie restriction is the first line of defense against obesity, but it is a critical alternative strategy to modify the metabolic efficiency and increase the energy expenditure in key metabolic

organs, such as adipose tissue.

Nature World News highlighted the benefits of such a study. "Interestingly, while past studies have linked berberine to a lowered [insulin resistance](#) in animals, [this](#) is the first time that the extract has been so directly linked to weight control."

More information: Berberine activates thermogenesis in white and brown adipose tissue, *Nature Communications* 5, Article number: 5493
[DOI: 10.1038/ncomms6493](https://doi.org/10.1038/ncomms6493)

Abstract

Obesity develops when energy intake exceeds energy expenditure. Promoting brown adipose tissue formation and function increases energy expenditure and hence may counteract obesity. Berberine (BBR) is a compound derived from the Chinese medicinal plant *Coptis chinensis*. Here we show that BBR increases energy expenditure, limits weight gain, improves cold tolerance and enhances brown adipose tissue (BAT) activity in obese db/db mice. BBR markedly induces the development of brown-like adipocytes in inguinal, but not epididymal adipose depots. BBR also increases expression of UCP1 and other thermogenic genes in white and BAT and primary adipocytes via a mechanism involving AMPK and PGC-1 β . BBR treatment also inhibits AMPK activity in the hypothalamus, but genetic activation of AMPK in the ventromedial nucleus of the hypothalamus does not prevent BBR-induced weight loss and activation of the thermogenic programme. Our findings establish a role for BBR in regulating organismal energy balance, which may have potential therapeutic implications for the treatment of obesity.

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