MedicalXpress

Scientists identify protein that stimulates brown fat to burn calories

May 10 2012

Scientists have identified a protein which regulates the activation of brown fat in both the brain and the body's tissues. Their research, which was conducted in mice, was published today, Friday 11 May, in the journal *Cell*.

Unlike white fat, which functions primarily to store up fat, brown fat (also known as brown adipose tissue) burns fats to generate heat in a process known as thermogenesis. The research, led by scientists at the University of Cambridge Metabolic Research Laboratories at the Institute of Metabolic Science, discovered that the protein BMP8B acts on a specific metabolic system (which operates in the brain and the tissues) to regulate brown fat, making it a potential therapeutic target.

The scientists believe that activating brown fat could help to support current weight loss programmes, which individuals often struggle to maintain.

Dr Andrew Whittle, one of the authors of the paper from the Institute of Metabolic Science, said: "Other proteins made by the body can enhance heat production in brown fat, such as thyroid hormone but often these proteins have important effects in other organs too. Therefore they are not good targets for developing new weight loss treatments. However, BMP8B seems to be very specific for regulating the heat producing activity of brown fat, making it a more ideal mechanism for new therapies."

The experiments showed that when mice lacked the protein BMP8B they found it more difficult to maintain their normal body temperature. They also became much more obese than normal mice, particularly when fed a high-fat diet. Additionally, when the researchers treated brown fat cells with BMP8B they responded more strongly to activation by the nervous system. Furthermore, when BMP8B was administered to specific parts of the brain it increased the amount of nervous activation of brown adipose tissue. The result was that these BMP8B-treated brown fat cells burned more fat and mice given BMP8B in the brain lost weight.

Professor Toni Vidal-Puig, lead author of the study from the Institute of Metabolic Science and a member of the MRC Centre for Obesity and Related Metabolic Diseases, said: "A major feature of current weight-loss strategies is that people lose a lot of weight early on, but then reach a plateau despite continuing to follow the same diet regime. This is because the human body is incredibly good at sensing a reduction in food consumption and slows the metabolic rate to compensate. A strategy to increase brown fat activity could potentially be used in conjunction with current weight loss strategies to help prevent the typical decrease in a person's metabolic rate.

"One could be sceptical that techniques to increase metabolic rate might just be compensated by the body trying to make you want to eat more, to fuel this increased metabolism. But our findings showed that treating mice with Bmp8b did not have this effect, it simply made them lose weight by burning more fat in their brown adipose tissue.

"There are obvious differences between mice and humans, and from a therapeutic perspective this work is preliminary. Validation will be necessary to see if manipulating BMP8B would be safe and effective in humans."

More information: The paper 'BMP8B Increases Brown Adipose

Tissue Thermogenesis through Both Central and Peripheral Actions' will appear in the journal *Cell* on Friday, 11 May. Volume: 149; Issue: 4; Manuscript: 6246.