

Could our brain instruct our bodies to burn more fat?

January 15 2015



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By uncovering the action of two naturally occurring hormones, scientists may have discovered a way to assist in the shedding of excess fat.

The findings, published today in the journal *Cell*, give new insights into

how the brain regulates body [fat](#) and may lead to more effective ways to lose weight and prevent obesity by promoting the conversion of [white fat](#) to brown fat.

Monash University researchers unravelled a molecular mechanism that depends on the combined action of two hormones - leptin, an [appetite suppressant](#) generated in [fat cells](#), and insulin, produced in the pancreas in response to rising levels of glucose in the blood. Their research shows that the two hormones act in concert on a group of neurons in the brain to stimulate the burning of body fat via the nervous system.

Lead researcher Professor Tony Tiganis, from the Department of Biochemistry and Molecular Biology said discovering the combined action of these two hormones makes could assist in the shedding of excess fat.

"These hormones give the brain a comprehensive picture of the fatness of the body. Because leptin is produced by fat cells, it measures the level of existing fat reserves - the more fat, the more leptin. Whereas insulin provides a measure of future fat reserves because glucose levels rise when we eat," Professor Tiganis said.

Fat in adult humans is typically stored in adipocytes, specialised cells that comprise white fat. But around the neck and shoulders, there is a second form of fat made of brown adipocytes. Rather than storing fat, these cells can be induced to burn it off.

The research team discovered leptin and insulin interact with proopiomelanocortin (POMC) neurons in the brain's hypothalamus, causing them to send signals through the nervous system promoting the conversion of white fat into brown fat. This leads to burning off of [excess fat](#).

In laboratory work, researchers were able to show that the process is regulated in these neurons by enzymes known as phosphatases, which inhibit the actions of each of the hormones. When the levels of these inhibitors were reduced, the browning and burning of fat increased.

Professor Tiganis said this fundamental process normally serves to maintain body weight but in diet-induced obesity this mechanism goes awry.

"Eventually, we think we may be able to help people lose weight by targeting these two enzymes. Turning white fat into [brown fat](#) is a very exciting new approach to developing weight loss agents. But it is not an easy task, and any potential therapy is a long way off," Professor Tiganis said.

Provided by Monash University

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