

METABOLISM

Adenosine activates human and murine brown adipose tissue

Adenosine stimulates energy expenditure in brown adipose tissue (BAT) of humans and mice, report Alexander Pfeifer and colleagues in *Nature*. These findings are in striking contrast with previous observations in hamsters and rats, in which adenosine inhibits the sympathetic activation of BAT following cold exposure.

Thermogenesis in BAT is activated by the sympathetic nervous system. Pfeifer and co-workers show that sympathetic stimulation triggers adenosine release in mice *in vivo* and that adenosine stimulates lipolysis in human and murine brown adipocytes in culture.

Genetic and pharmacological investigations in mice further showed that adenosine signalling via the adenosine receptor A_{2A} (the most prominent of the adenosine receptors in human BAT) is required for full physiological activation of BAT. Moreover, pharmacological activation or increased expression of the

adenosine receptor A_{2A} induces browning of white adipocytes. In addition, treating mice with an agonist for the adenosine receptor A_{2A} significantly increases energy expenditure and protects the animals from diet-induced obesity.

“We further show that adenosine is released by two mechanisms,” adds Pfeifer, “during sympathetic nerve stimulation together with norepinephrine and in a paracrine autocrine manner by brown adipocytes.”

“A gene therapy approach might be envisioned that aims at inducing browning of human white adipose tissue by gene transfer of adenosine receptor A_{2A} to this tissue,” Pfeifer adds.

Joana Osório

Original article Gnad, T. *et al.* Adenosine activates brown adipose tissue and recruits beige adipocytes via A_{2A} receptors. *Nature* doi:10.1038/nature13816