

Calories can burn at rest with regular exercise

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It is widely known that weight gain is due to an imbalance between food intake and energy expenditure, and that exercise is vital for maintaining a healthy weight by burning calories as a result of muscular activity.

But new research from the University of Sydney published in the scientific journal [Public Library of Science ONE \(PLOS ONE\)](#), has found another positive impact of [exercise](#): it can significantly increase cellular metabolism and hence the body's ability to burn calories while at rest.

The study by Associate Professor Frank Seebacher and PhD student Elsa Glanville from the School of Biological Sciences found that even low levels of physical activity - such as a daily brisk walk for 30 minutes - is necessary to turn on the right molecular switches so that cells can metabolise and burn energy effectively.

First author of the study, Associate Professor Seebacher said the bodies of mammals, including humans, were designed to be exercising regularly.

"Our research using a mammal model shows a [sedentary lifestyle](#) is doubly bad and may lead to weight gain because energy is not used up by muscular activity and metabolic signalling is disrupted, which reduces the body's ability to burn energy," he said.

In humans and other mammals, the metabolism of a resting body will

increase as ambient temperatures decrease below 30 to 35 degrees Celsius. This means that resting bodies will burn more energy at cooler conditions, below 30 degrees Celsius. Most people and animals will experience temperatures well below this level most of the time, so in theory, our bodies should be stimulated to burn energy at everyday "cold" temperatures.

However, the results of the study, showed in tests using wild native Australian bush rats (*Rattus fuscipes*) that cold conditions did stimulate a rise in metabolism - but not in the absence of exercise.

"Rats that had exercised for half an hour a day did show a metabolic response to cold, and burnt more energy as expected," Associate Professor Seebacher said.

"But in rats that did not exercise, lowering the air temperature even down to a chilly 12 degrees Celsius did not stimulate their metabolism and energy consumption at all."

He said this research - the first of its kind to show the interaction between exercise and temperature on cellular metabolism - shows that physical activity has a subtle effect on our body's energy expenditure by opening up a number of cryptic genes that control the rate of [cellular metabolism](#).

"To take advantage of the metabolic boost we receive at temperatures below 30 degrees Celsius, we need to do some light exercise every day. In other words, you don't need to take exercise seriously, just regularly."

Provided by University of Sydney

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