

Missing genes may separate couch potato from active cousin

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You may think your lack of resolve to get off the couch to exercise is because you're lazy, but McMaster University researchers have discovered it may be you are missing key genes.

The researchers made their unexpected finding while working with healthy, specially-bred mice, some of which had two genes in muscle essential for [exercise](#) removed. The genes control the protein AMP-activated protein kinase (AMPK), an enzyme that is switched on when you exercise.

"Mice love to run," said Gregory Steinberg, associate professor of medicine in the Michael G. DeGroote School of Medicine and Canada Research Chair in Metabolism and Obesity.

"While the normal mice could run for miles, those without the genes in their muscle could only run the same distance as down the hall and back. It was remarkable. The mice looked identical to their brothers or sisters but within seconds we knew which ones had the genes and which one didn't."

The researchers found the [mice](#) without the muscle AMPK genes had lower levels of [mitochondria](#) and an impaired ability for their muscles to take up glucose while they exercise.

"When you exercise you get more mitochondria growing in your muscle. If you don't exercise, the number of mitochondria goes down. By

removing these [genes](#) we identified the key regulator of the mitochondria is the enzyme AMPK," said Steinberg.

Thousands of scientists around the world are working on AMPK but the McMaster team is the first to demonstrate its essential role in exercise. Their research appears in the current issue of the [Proceedings of the National Academy of Sciences](#).

Steinberg said the findings are important for individuals who find it difficult to exercise, such as the obese, asthmatics and people in wheelchairs. Their inability to exercise may lead to other complications such as diabetes and [heart disease](#).

The study, he thinks, has a message for couch potatoes. "As we remove activity from our lives due to emerging technology, the base level of fitness in the population is going down and that is reducing the mitochondria in people's muscles. This in turn makes it so much harder for people to start exercising."

Steinberg himself runs or bikes to work. "It is the only way that I can manage to make sure I stay fit."

Provided by McMaster University

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