

Cellular fuel gauge may hold the key to restricting cancer growth

27 December 2012

Researchers at McGill University have discovered that a key regulator of energy metabolism in cancer cells known as the AMP-activated protein kinase (AMPK) may play a crucial role in restricting cancer cell growth. AMPK acts as a "fuel gauge" in cells; AMPK is turned on when it senses changes in energy levels, and helps to change metabolism when energy levels are low, such as during exercise or when fasting. The researchers found that AMPK also regulates cancer cell metabolism and can restrict cancer cell growth.

The discovery was made by Russell (Rusty) Jones, an assistant professor at McGill's Goodman Cancer Research Centre and the Department of Physiology, Faculty of Medicine. Jones along with his team is the first to show that AMPK can act as a [tumour suppressor](#) in animals. The research will be published December 27 in the journal [Cell Metabolism](#).

"Cancer is a disease in which cells lose their normal restraints on growth and start to divide uncontrollably. But, in order for cells to grow quickly they need enough energy to complete the task," Jones explained. "AMPK acts like the fuel gauge in your car – it lets the body know when energy levels are low, and stops cell growth until there is enough gas in the tank. We wanted to see if this fuel gauge could affect the development and progression of cancer. We found that mice lacking AMPK developed tumours faster, suggesting that AMPK is important for keeping tumour development in check, at least for some [types of cancer](#)." For this study, Jones' team focused specifically on a type of [blood cancer](#) known as lymphoma. They discovered that the protein Myc, which is activated in more than half of all cancers, could promote lymphoma more rapidly when mice were deficient for AMPK.

One of the ways [cancer cells](#) support their enhanced rate of growth is by changing their metabolism, or how they generate energy. Cancer

cells are different from normal cells in our body because they preferentially use sugar to fuel their growth. Jones discovered that AMPK plays a specific role in restricting cancer cells' ability to use sugar to fuel their growth. "For cancer cells with low AMPK levels, their metabolism goes into overdrive," explained Prof. Jones. "They use sugar more efficiently, allowing them to grow faster. These results suggest that turning on AMPK in cancer cells may be one way that we can restrict cancer growth."

Jones' breakthrough builds on his previous discovery that the widely prescribed medication metformin, a common diabetes drug, can restrict tumour cell growth. The results bring promise that common therapeutics that turn on AMPK and alter cellular metabolism, such as metformin, may become novel tools for cancer therapy. Jones and his colleagues at McGill are currently exploring clinical applications based on this research.

Provided by McGill University

APA citation: Cellular fuel gauge may hold the key to restricting cancer growth (2012, December 27) retrieved 2 September 2022 from <https://medicalxpress.com/news/2012-12-cellular-fuel-gauge-key-restricting.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.