

Carnitine supplements reverse glucose intolerance in animals

August 12 2009

(PhysOrg.com) -- Supplementing obese rats with the nutrient carnitine helps the animals to clear the extra sugar in their blood, something they had trouble doing on their own, researchers at Duke University Medical Center report.

A team led by Deborah Muoio (Moo-ee-oo), Ph.D., of the Duke Sarah W. Stedman [Nutrition](#) and [Metabolism](#) Center, also performed tests on human [muscle cells](#) that showed supplementing with carnitine might help older people with prediabetes, diabetes, and other disorders that make glucose (sugar) metabolism difficult.

Carnitine is made in the liver and recycled by the kidney, but in some cases when this is insufficient, dietary carnitine from red meat and other animal foods can compensate for the shortfall.

After just eight weeks of supplementation with carnitine, the obese rats restored their cells' fuel- burning capacity (which was shut down by a lack of natural carnitine) and improved their [glucose tolerance](#), a health outcome that indicates a lower risk of diabetes.

These results offer hope for a new therapeutic option for people with glucose intolerance, older people, people with [kidney disease](#), and those with type 2 diabetes (what used to be called adult-onset diabetes).

Muoio said that soon her team of researchers will begin a small clinical trial of carnitine supplementation in people who fit the profile of those

who might benefit from additional carnitine - [older people](#) (60 to 80 years) with glucose intolerance.

The study is published in the Aug. 21 issue of the [Journal of Biological Chemistry](#).

The Duke researchers began studying carnitine more closely when abnormalities in the nutrient emerged from blood chemistry profiles of obese and old animals. These chemical profiles report on hundreds of byproducts of cell metabolism called metabolites and give scientists an opportunity to identify markers of disease states.

Carnitine is a natural compound known for helping [fatty acids](#) enter the mitochondria, the powerhouses of cells, where fatty acids are "burned" to give cells energy for their various tasks. Carnitine also helps move excess fuel from cells into the circulating blood, which then redistributes this energy source to needier organs or to the kidneys for removal. These processes occur through the formation of acylcarnitine molecules, energy molecules that can cross membrane barriers that encase all cells.

Researchers at Duke had observed that skeletal muscle of obese rats produced high amounts of the acylcarnitines, which requires free carnitine. As these molecules started to accumulate, the availability of free, unprocessed carnitine decreased. This imbalance was linked to fuel-burning problems, that is, impairments in the cells' combustion of both fat and glucose fuel.

"We suspected that persistent increases in acylcarnitines in the rats were causing problems, and we could also see that the availability of free carnitine was decreasing with weight gain and aging," said Muoio. "It appeared that carnitine could no longer do its job when chronic metabolic disruptions were stressing the system. That's when we designed an experiment to add extra carnitine to the rats' diet."

Muoio is also a professor in the departments of medicine, pharmacology and cancer biology.

Source: Duke University Medical Center ([news](#) : [web](#))

Citation: Carnitine supplements reverse glucose intolerance in animals (2009, August 12)
retrieved 20 April 2024 from
<https://phys.org/news/2009-08-carnitine-supplements-reverse-glucose-intolerance.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.