

Brain cells determine obesity -- not lack of willpower: study

September 8 2010

An international study has discovered the reason why some people who eat a high-fat diet remain slim, yet others pile on the weight.

The study, led in Australia by the Monash Obesity and Diabetes Institute (MODI) at Monash University, found a high-fat [diet](#) causes [brain cells](#) to become insulated from the body preventing vital signals, which tell the body to stop eating and to burn energy, from reaching the brain efficiently.

MODI director and Australian Life Scientist of the Year Professor Michael Cowley said there were two clear outcomes from the findings.

'We discovered that a high-fat diet caused brain cells to become insulated from the body, rendering the cells unable to detect signals of fullness to stop eating,' Professor Cowley said.

"Secondly, the insulation also created a further complication in that the body was unable to detect signals to increase energy use and burn off calories/kilojoules."

The research showed that support cells in the brain developed overgrowth in a high-fat diet. This prevented the regular brain cells (the melanocortin system or POMC [neurons](#)) from connecting with other [neural mechanisms](#), which determine appetite and [energy expenditure](#).

Professor Cowley said the study findings provide a critical link in

addressing the obesity epidemic.

"These [neuronal circuits](#) regulate eating behaviours and energy expenditure and are a naturally occurring process in the brain. The circuits begin to form early in life so that people may have a tendency towards obesity even before they eat their first meal," Professor Cowley said.

Eating a high fat diet causes more "insulation" in the nerve cells, and makes it even harder for the brain to help a person lose weight.

"Obese people are not necessarily lacking willpower. Their brains do not know how full or how much fat they have stored, so the brain does not tell the body to stop refuelling. Subsequently, their body's ability to lose weight is significantly reduced."

Professor Cowley and fellow MODI researcher Dr Pablo Enriori collaborated with Research Chair and Professor of Comparative Medicine and Professor of Neurobiology Tamas Horvath and his team at the Yale School of Medicine in the United States, together with teams of scientists in Cincinnati, New Jersey, Mexico and Spain.

For a period of four months, the researchers monitored the eating and body composition of groups of mice and rats and found that those with a neural predisposition to [obesity](#) gained 30 per cent more weight compared to six per cent of the group with obesity-resistant cells.

More information: The publication is available online at the *Proceedings of National Academy of Sciences (PNAS)*
www.pnas.org/content/early/201.../1004282107.abstract

Provided by Monash University

Citation: Brain cells determine obesity -- not lack of willpower: study (2010, September 8)
retrieved 17 April 2024 from

<https://medicalxpress.com/news/2010-09-brain-cells-obesity-lack.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.