

Evidence found for brain injury in diet-induced obesity

December 29 2011, By Roberta Wilkes

(Medical Xpress) -- The first evidence, reported today, of structural changes in the brains of rodents and humans with diet-induced obesity may help explain one of the most vexing problems of body weight control.

Dr. Michael W. Schwartz, professor of medicine at the University of Washington, is the senior author of the study.

The well-established tendency to regain weight lost through dieting and exercise, as re-confirmed by a prominent Australian study earlier this year, is the single largest obstacle to successful [obesity treatment](#). Body weight is controlled by complex interactions between hormones and [neurons](#) in a brain area known as the [hypothalamus](#). These interactions influence appetite and [food intake](#) and , in most obese people, conspire to prevent permanent weight loss.

“Obese individuals,” said Schwartz, “are biologically defending their elevated body weight.” The mechanism for this phenomenon is the object of intense investigation by neuroendocrinologists.

Schwartz said, “To explain a biologically elevated body weight ‘set-point,’ investigators in the field have speculated about the existence of fundamental changes to brain neurocircuits that control energy balance. Our findings are the first to offer direct evidence of such a structural change, and they include evidence in humans as well as in mice and rats.”

His group studied the results of a high-fat diet in the brains of mice and rats that were bred to become obese on this diet. They found evidence of very early and lasting injury to a specific part of the hypothalamus in these animals. Using brain imaging, they also found signs of similar damage in the same area of the brain in obese humans.

“We did not prove cause and effect between the hypothalamic neuron injury and defense of elevated body weight - that comes next - but this amounts to solid evidence of a change affecting the key hypothalamic area for body weight control with the potential to explain the problem,” said Schwartz.

Dr. Josh Thaler, assistant professor of medicine, is the first author of the paper, which will be published in the January 3 issue of *Journal of Clinical Investigation* and is entitled “Obesity Is Associated with Hypothalamic Injury in Rodents and Humans.” Co-authors include Ellen A. Schur, Stephan J. Guyenet, Bang H. Hwang, Xiaolin Zhao, David A. Sarruf, T. Nguyen, Jonathan Fischer, Miles. E. Matsen, Brent E. Wisse, Gregory Morton , Denis G. Baskin, and their colleagues in the UW Department of Radiology and at Yale and the University of Cincinnati.

More information: Read the *Journal of Clinical Investigation* paper: www.jci.org/articles/view/59660

Provided by University of Washington

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