

Study shows direct link between leptin and obesity-related cardiovascular disease

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Obese people who don't have high cholesterol or diabetes might think they're healthy – despite the extra pounds. But new Ohio University research suggests that obesity raises levels of the hormone leptin, which can be as big a threat to the cardiovascular system as cholesterol.

Tadeusz Malinski and colleagues have published the first study to directly observe how high levels of leptin can create a cascade of harmful biochemical changes in the body. Leptin, a peptide hormone produced by fat cells, helps regulate body weight by acting on the hypothalamus to suppress appetite and burn stored fat.

But an excess of fat in the body can produce too much of the hormone, which, in turn, can lower levels of bioavailable nitric oxide. Nitric oxide, produced by the endothelial cells, supports healthy cardiovascular function by relaxing blood vessels and maintaining good blood flow, explained Malinski, who has developed special nanosensors that can detect levels of the substance.

In addition, Malinski found that the high levels of leptin stimulate greater production of superoxide. It reacts with nitric oxide to create peroxynitrite, a very toxic molecule that can impact DNA replication and damage endothelial cells in the vascular system.

"The nanosensors provide a more direct method of determining what processes are occurring in the body. Previously, researchers didn't have a clear idea of how this works," said Malinski, the Marvin and Ann Dilley

White Distinguished Professor of Biomedical Sciences at Ohio University.

The study, which examined the process in single human cells and also obese mice models, was published in a recent issue of the *American Journal of Physiology – Heart and Circulatory Physiology*.

Though obesity is closely associated with heart failure, scientists haven't fully understood the relationship, Malinski noted. The new study suggests that increased levels of leptin alone can cause long-term cardiovascular damage similar to hypertension, atherosclerosis, diabetes and other disorders.

"Now that we know the exact molecules responsible for the damage, we can design a method to mollify the effect of obesity on the cardiovascular system," Malinski said.

Source: Ohio University

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