

Newly discovered hormone mimics the effects of exercise

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Scientists at the USC Leonard Davis School of Gerontology have discovered a new hormone that fights the weight gain caused by a high-fat Western diet and normalizes the metabolism - effects commonly associated with exercising.

Hormones are molecules that act as the body's signals, triggering various physiological responses. The newly discovered hormone, dubbed "MOTS-c," primarily targets muscle tissue, where it restores [insulin sensitivity](#), counteracting diet-induced and age-dependent [insulin resistance](#).

"This represents a major advance in the identification of new treatments for age-related diseases such as diabetes," said Pinchas Cohen, dean of the USC Davis school and senior author of a study on the research, which will appear in *Cell Metabolism* on March 3.

To test the effects of MOTS-c, the team injected the hormone into mice fed a high-fat diet, which typically causes them to grow obese and develop a

resistance to insulin. The injections not only suppressed both effects in mice, they also reversed age-dependent insulin-resistance, a condition that precedes diabetes.

"This discovery sheds new light on mitochondria and positions them as active regulators of metabolism," said Changhan Lee, assistant professor at USC Davis and lead author of the study.

MOTS-c is unique among hormones in that it is encoded in the DNA of mitochondria—the "powerhouses" of cells that convert food into energy. Other hormones are encoded in DNA in the nucleus.

Lee and Cohen collaborated with colleagues from the USC school as well as the David Geffen School of Medicine at UCLA and the National Institutes of Health.

While all of the experiments on MOTS-c to date have been performed on [lab mice](#), the molecular mechanisms that make it function in mice exist in all mammals, including humans. The MOTS-c intellectual property has been licensed to a biotechnology company, and clinical trials in humans could begin within the next three years, Cohen said.

Provided by University of Southern California

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