

New study finds therapeutic treatment option for metabolic syndrome, obesity

August 18 2021



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Metabolic syndrome is a cluster of conditions and includes obesity, and can be dangerous as it increases the risk for heart disease, stroke, diabetes and other diseases. In a recent study, published in *eLife*, researchers at Harrington Discovery Institute at University Hospitals (UH) and Case Western Reserve University have discovered a

therapeutic option for the treatment of metabolic syndrome and obesity.

"In 2016, we discovered a hormone called asprosin, which stimulates appetite and increases blood [glucose](#) levels by acting on the hypothalamus and the liver," explained Atul Chopra, senior author on the study, Harrington Investigator and associate director of the Harrington Rare Disease Program, attending medical geneticist at UH, and assistant professor of medicine, and genetics and genomics at the Case Western Reserve University School of Medicine.

"For reasons that are unclear, asprosin levels are elevated in patients with [metabolic syndrome](#), leading to even higher appetite, [body weight](#) and blood glucose," Chopra added. "We found that we can break that disease cycle by neutralizing asprosin with monoclonal antibodies."

Ila Mishra, first author on the study and research associate at Harrington Discovery Institute and Case Western Reserve University, explained:

"We already knew that genetic reduction in blood asprosin levels leads to protection from metabolic [syndrome](#) by suppressing appetite and blood glucose. In this study, we demonstrated that the same protection can be achieved by using a [drug](#) called a monoclonal antibody that inhibits asprosin. This is an important step forward in providing us with a brand-new drug for the treatment of metabolic syndrome, one of the most prevalent diseases in the world."

Through previous research, the team knew that people who have low levels of asprosin don't feel hunger like others do, and glucose and insulin are reduced in their blood.

"We already know what happens to humans when asprosin is low," emphasized Chopra. "That's a very privileged situation in biomedical science because of the confidence it creates for drug development. Many drugs succeed in mice but fail in humans. In this case, knowing that

humans with low asprosin have reduced appetite, body weight and blood glucose/insulin is tremendously helpful at designing and developing drugs to mimic this beneficial effect in patients with metabolic syndrome."

In the study, the research team tested multiple monoclonal antibodies in three different pre-clinical models with metabolic syndrome. In all models, the treatment reduced appetite, body weight and blood glucose demonstrating multiple benefits through a single drug.

"When mice were treated with [monoclonal antibodies](#) that neutralize asprosin, they ate less, lost weight, and their [blood](#) glucose levels normalized," said Mishra. "Elevated appetite, body weight and [blood glucose](#) are three critical features of metabolic syndrome, and they were all corrected with these antibody treatments."

"Progress towards clinical trials and making the drug ready for humans is the last piece of the puzzle," Chopra said. "We want to keep the dose of the drug low and don't want side effects. While we know this concept and this drug works, our next step in the process is to make it better and ready for humans."

More information: Ila Mishra et al, Asprosin-neutralizing antibodies as a treatment for metabolic syndrome, *eLife* (2021). [DOI: 10.7554/eLife.63784](#)

Provided by Case Western Reserve University

Citation: New study finds therapeutic treatment option for metabolic syndrome, obesity (2021, August 18) retrieved 4 May 2024 from <https://medicalxpress.com/news/2021-08-therapeutic-treatment-option-metabolic-syndrome.html>

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