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Genes That Cause Obesity

Scientists from University of Virginia have identified 14 genes that could cause weight gain and three that could prevent it. The team developed an automated pipeline to test hundreds of genes for a causal role in obesity. During the first round of experiments, the scientists have discovered more than a dozen genes that could be playing a role. This discovery could potentially accelerate the development of treatments that could help reduce the burden of obesity. The findings are published in *PLOS Genetics.*

The new research provides more information about the intersections of obesity, diet and the human DNA. Obesity is mainly driven by a high-calorie diet that includes excessive intake of high sugar and high fructose corn syrup. In addition, a sedentary lifestyle also contributes to weight gain. However, genes can also play an important role as they can have an impact on how our body stores fat and how effectively it burns food as fuel. By identifying genes that could convert excessive food into fat, it is impossible to deactivate these genes through drugs, thus preventing weight gain.

Genomicists have already identifed hundred of genes that could be associated with obesity but the real challenge was to determine which of these genes played a cause role in obesity and directly promoted weight gain. The team at University of Virginia examined worms known as *C. elegans*. These tiny worms live in rotting vegetation and feast on microbes. They also share more than 70% of our genes, and also become obese if they are fed excessive amounts of sugar.

These worms have contributed to the development of several important drugs including the antidepressant Prozac and the glucose-stabilising metformin. The discovery of cellular processes first observed in worms were also found to be critical to diseases such as cancer and neurodegeneration and the same worms and their function has played a fundamental role in the development of therapeutics based on RNA technology.

The team used these worms to screen 293 genes associated with obesity in people, with the goal of defining which of the genes were actually causing or preventing obesity. They did this by developing a worm model of obesity, feeding some a regular diet and some a high-fructose diet. This obesity model allowed them to identify 14 genes that cause obesity and three that help prevent it. The team also found that blocking the action of the three genes that prevented the worms from becoming obese also led to them living longer and having better neuro-locomotory function.

While more work still needs to be done, these findings are encouraging. As it is, there is an urgent need for anti-obesity therapies to reduce the global burden of obesity. A combination of human genomics with tests in model animals could provide a clearer path towards anti-obesity targets to develop effective anti-obesity therapies.

Source: UVA Health

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