

New gene discovery links obesity to the brain

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A variation in a gene that is active in the central nervous system is associated with increased risk for obesity, according to an international study in which Albert Einstein College of Medicine of Yeshiva University played a major role. The research adds to evidence that genes influence appetite and that the brain plays a key role in obesity.

Robert Kaplan, Ph.D., associate professor of epidemiology & population health, helped direct the international study, which involved 34 research institutions and is published online in *PLoS Genetics*. Dr. Kaplan and his U.S. and European colleagues found that people who have inherited the gene variant NRXN3 have a 10-15 percent increased risk of being obese compared with people who do not have the variant.

The researchers examined data from eight studies involving [genes](#) and body weight. These studies included more than 31,000 people of European origin, ages 45 to 76, representing a broad range of dietary habits and health behaviors.

After analyzing more than two million regions of the human genome, the researchers found that the NRXN3 gene variant — previously associated with alcohol dependence, cocaine addiction, and illegal substance abuse — also predicts the tendency to become obese. Altogether, researchers found the gene variant in 20 percent of the people studied.

"We've known for a long time that obesity is an inherited trait, but specific genes linked to it have been difficult to find," says Dr. Kaplan. "A lot of factors — the types and quantity of foods you eat, how much

you exercise, and how you metabolize foods, for example — affect your body shape and size. So we are looking for genes that may have a small role to play in a complex situation."

NRXN3 is the third obesity-associated gene to be identified. The fact that all three genes are highly active in encoding brain proteins is significant, says Dr. Kaplan. "Considering how many factors are involved in obesity, it is interesting that research is increasingly pointing to the brain as being very important in its development," he said.

Identifying obesity genes could help in preventing the condition and lead to treatments for it. "Someday we may be able to incorporate several obesity genes into a genetic test to identify people at risk of becoming obese and alert them to the need to watch their diet and to exercise," Dr. Kaplan said. "Also, we may eventually see drugs that target the molecular pathways through which obesity genes exert their influence."

Since NRXN3 is active in the brain and also implicated in addiction, these traits may share some neurologic underpinnings. "Although we don't have data to suggest a direct connection between drug abuse and [obesity](#), we can indirectly infer a link because both traits have this gene in common," Dr. Kaplan said.

More information: The paper, "NRXN3 is a Novel Locus for Waist Circumference: A Genome-wide Association Study from the CHARGE Consortium," appears online in *PLoS Genetics* on June 26th.

Source: Albert Einstein College of Medicine ([news](#) : [web](#))

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