Epidemiologist uncovers new genes linked to abdominal fat

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Kira Taylor, Ph.D., M.S. Credit: UofL

Excess abdominal fat can be a precursor to diseases such as cardiovascular disease, type 2 diabetes and cancer. A person's measure of belly fat is reflected in the ratio of waist circumference to hip circumference, and it is estimated that genetics account for about 30-60 percent of waist-to-hip ratio (WHR). Kira Taylor, Ph.D., M.S., assistant professor, University of Louisville School of Public Health and Information Sciences, and her research team have identified five new genes associated with increased WHR, potentially moving science a step

closer to developing a medication to treat obesity or obesity-related diseases.

The researchers recently published their findings in *Human Molecular Genetics*.

The team conducted an analysis of more than 57,000 people of European descent, and searched for genes that increase risk of high waist-to-hip ratio, independent of overall obesity. They investigated over 50,000 genetic variants in 2,000 genes thought to be involved in cardiovascular or metabolic traits.

Their analysis identified three new genes associated with increased WHR in both men and women, and discovered two new genes that appear to affect WHR in women only. Of the latter, one gene, SHC1, appears to interact with 17 other proteins known to have involvement in obesity, and is highly expressed in fat tissue. In addition, the genetic variant the team discovered in SHC1 is linked to another variant that causes an amino acid change in the protein, possibly changing the function or expression of the protein.

"This is the first time SHC1 has been associated with abdominal fat," Taylor said. "We believe this discovery holds great opportunity for medicinal chemistry and eventually, personalized medicine. If scientists can find a way to fine-tune the expression of this gene, we could potentially reduce the risk of excessive fat in the mid-section and its consequences, such as cardiovascular disease."

Prior research has found that mice lacking the SHC1 protein are leaner, suggesting this molecule may have a role in metabolic imbalance and premature cell deterioration by supplying too much nutrition for normal growth and development.

Additional evidence finds SHC1 activates the insulin receptor, triggering multiple signaling events that affect fat cell growth.

Provided by University of Louisville