

# Weight loss surgery alters fatty liver disease genes

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Research has shown that weight loss surgery can benefit obese individuals in ways that go beyond shedding pounds, for example by causing early remission of type 2 diabetes. Now scientists have found that the surgery can also reverse the symptoms of fatty liver disease. The findings, which are to be published online on August 6 in the Cell Press journal *Cell Metabolism*, are derived from research on liver samples in normal and obese patients—some with fatty liver disease and some without fatty liver disease. The results provide another example of the DNA-altering effects of weight loss surgery.

Nonalcoholic [fatty liver disease](#) (NAFLD)—which includes a spectrum of liver disorders in people with obesity and type 2 diabetes—is the most common chronic liver disorder in industrialized countries. NAFLD has emerged as one of the dominant types of liver disease worldwide and affects one in three Americans.

In an experimental tour de force, researchers analyzed liver samples from 27 obese individuals with different stages of NAFLD, 18 healthy obese individuals without liver disease, and 18 normal-weight individuals without liver disease. Methylation—a chemical modification on DNA that regulates gene expression—was altered on various genes in patients with NAFLD. The expression levels of nine of these genes—which code for key enzymes involved in metabolism and insulin signaling—were also different from those seen in healthy individuals. Furthermore, binding sites for proteins that affect gene expression were enriched in the liver disease patients' genes.

Dr. Joseph Hampe and his colleagues also found that when they compared patients' [liver biopsies](#) before and after weight loss surgery, the NAFLD-associated methylation changes were partially reversible. The findings demonstrate that [weight loss surgery](#) changes the chemical properties of DNA, thereby affecting gene expression.

"These DNA modifications may point to the first steps in the evolution of the disease and may thus direct future research," says senior author Dr. Hampe of University Hospital Dresden, Germany. "In the very long term, they may lead to new therapeutic options."

**More information:** *Cell Metabolism*, Ahrens et al.: "DNA methylation analysis in non-alcoholic fatty liver disease suggests distinct disease-specific and remodelling signatures after bariatric surgery."

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