

Weight loss surgery not only shrinks waists but also affects genes

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Gastric bypass surgery can drastically reduce the body weight of obese individuals in a short timeframe. For reasons that are not entirely clear, the surgery also leads to early remission of type 2 diabetes in the vast majority of patients. Researchers report online April 11 in *Cell Reports*, published by Cell Press, the discovery of gene-expression alterations in individuals who underwent the surgery compared with obese individuals who did not.

"We provide evidence that in severely obese people, the levels of specific genes that control how fat is burned and stored in the body are changed to reflect poor metabolic health," says senior author Professor Juleen Zierath, of the Karolinska Institutet, in Stockholm, Sweden.

"After surgery, the levels of these genes are restored to a healthy state, which mirrors weight loss and coincides with overall improvement in metabolism."

When the investigators probed deeper, they found that weight loss after surgery causes changes in DNA modifications that [control gene expression](#) in response to the environment. Specifically, changes in methylation, or chemical markings, on two genes that control glucose and fat metabolism (called PGC-1alpha and PDK4) correlate with obesity but are reversed after surgery-induced weight loss. The findings suggest that the environment—in this case food intake or weight loss—can affect gene expression through this mechanism.

"The novelty of our work originates with the finding that [DNA](#)

[methylation](#) is altered by weight loss." says first author Romain Barrès, of the University of Copenhagen, in Denmark.

The findings may be useful for the design of new drugs that mimic this weight-loss-associated control of gene regulation.

More information: Barres et al.: "Weight loss after gastric bypass surgery in human obesity induces promoter methylation." *Cell Reports*, 2013. [dx.doi.org/10.1016/j.celrep.2013.03.018](https://doi.org/10.1016/j.celrep.2013.03.018)

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