

Weight loss from bariatric surgery appears to reverse premature aging

8 July 2016

Weight loss from bariatric surgery appears to reverse the premature aging associated with obesity, according to research presented today at Frontiers in CardioVascular Biology (FCVB) 2016.1 Patients had longer telomeres and less inflammation two years later.

"Obese people are prematurely old," said lead author Dr Philipp Hohensinner, a researcher at the Medical University of Vienna in Vienna, Austria. "They have an increased level of inflammation, with higher levels of [inflammatory cytokines](#) (small proteins important in cell signalling) in their fat tissue. Obese people also have [shorter telomeres](#) at the end of their chromosomes."

Telomeres are the internal clock of each cell. Telomeres get shorter when a cell divides or when [oxidative stress](#) causes them to break. When the telomeres get very short the cell can no longer divide and is replenished or stays in the body as an aged cell. Previous research found that [obese women](#) had shorter telomeres compared to women with a healthy weight, which amounted to an added eight years of life.

The current study investigated whether bariatric surgery and the resulting [weight loss](#) could reverse the premature aging in [obese patients](#).

The study included 76 patients who were 40 years old on average and had a [body mass index](#) (BMI) of at least 35 kg/m². The average BMI was 44.5 kg/m². All patients had been unable to lose weight through lifestyle changes and were referred for bariatric surgery. This procedure bypasses the gastrointestinal tract and leaves only a pouch of stomach.

Dr Hohensinner said: "Bariatric surgery drastically reduces the amount of food patients can eat. People lose around 30 to 40% of their whole body weight in the first year."

The researchers collected blood samples before surgery and one and two years afterwards. They compared the levels of premature aging markers in the blood before and after surgery.

One year after surgery BMI had significantly dropped to an average of 27.5 kg/m², which amounts to a 38% reduction. This was accompanied by decreases in the pro-inflammatory cytokines plasminogen activator inhibitor-1 and interleukin-6, and an increase in the anti-inflammatory cytokine interleukin-10.

Dr Hohensinner said: "The loss of a large amount of fat seems to shift the body's system from a pro-inflammatory state towards a more healthy one."

Two years after surgery, patients had telomeres that were 80% longer than they had been before the procedure.

"Telomere length had increased two years after surgery in immune cells in the blood," said Dr Hohensinner. "These cells are replenished over time. It means that the cells we examined at two years were different cells in this new post-surgery environment. They had longer telomeres and appeared younger than the cells we measured before surgery. The cells seem to have less stress and are less forced to proliferate."

The researchers also evaluated telomere oxidation, which causes the telomeres to break and get shorter. They found that two years after [surgery](#), oxidative damage on the telomeres had reduced by three-fold.

Dr Hohensinner said: "We think the cells appear to be getting younger, with longer telomeres, because there is less breakage from telomere oxidation. Obesity, and specifically having a lot of fat tissue, seems to put the entire body under increased stress. By losing weight and therefore adipose tissue, that stress reduces, and the body becomes

younger."

He concluded: "This is positive news for patients who have [bariatric surgery](#) because it shows that the damage from obesity can be reversed. Surgery is the last resort for these patients and it is good to see that not only do they lose weight, but they also reduce the stress on their body and reduce the [premature aging](#)."

More information: Dr Hohensinner will present the abstract 'Reversal of premature aging markers after bariatric surgery' during Poster session 1: Aging which takes place on 8 July from 09:00 to 18:00 in the Poster Area.

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