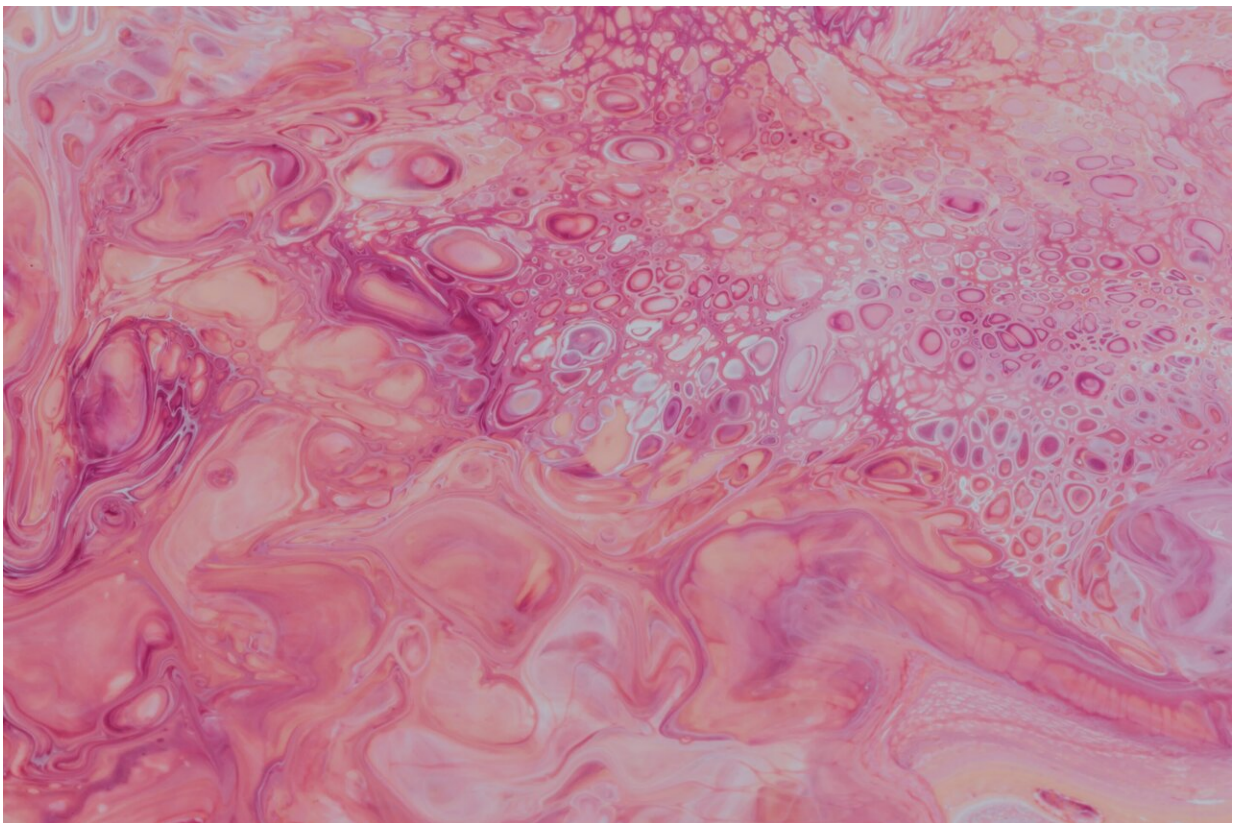


Size of a person's fat cells may hold clues to their future weight

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New research being presented at the European Congress on Obesity ([ECO 2024](#)) in Venice, Italy (12–15 May) suggests that it is possible to predict if someone is going to gain weight based on the size of their fat cells.

Individuals with large fat cells tend to lose weight over time, while those with small fat cells gain weight, the Swedish study found.

The size and number of fat cells are known to determine fat mass—how much body fat someone has. But their impact on long-term changes in body weight are unknown.

To explore this further, Professor Peter Arner, of the Department of Medicine, Karolinska Institutet, Stockholm, Sweden, Dr. Daniel P Andersson, Department of Endocrinology, Karolinska University Hospital Huddinge, Stockholm, and colleagues measured cell volume (FCV, the size of the fat cells) and fat cell number (FCN) in abdominal fat of 260 subjects (30% men) with an average age of 44 years and an average BMI of 32 kg/m².

An average of 15 years (range 5–28 years) later, the participants were seen again and body weight (BW), BMI and total body fat (BF) measured. Individuals undergoing [bariatric surgery](#) or receiving anti-obesity drugs (n=69) were excluded from the analysis.

Initial fat cell volume and fat cell number were significantly related to changes in all three measures over time—BW, BMI and BF.

Having a high number of fat cells that were large was associated with decreases in the three measures, while having few, but small, fat cells correlated with increases in weight, BMI and body fat. This was the case

whether or not individuals were living with obesity.

The effects of FCV and FCN were additive and together explained 32%–35% of the variations in changes over time in BW/BMI/BF.

The associations between FCV and changes in BW, BMI and BF was still significant when initial age, [physical activity](#), length of follow-up and sex were taken into account. In other words, large cells were linked to future weight loss and small cells to future weight gain.

Professor Arner says, "We can only speculate as to why the size of a person's fat cells seems to predict their future weight. Body weight decreases when [energy expenditure](#) exceeds intake and the body burns off fat to compensate. Our results suggest that the loss of large fat cells makes more of an impact on weight than the loss of small ones.

"It is a bit like having a room filled to the top by few large balloons or many small ones. It is easier to make empty space in the room by letting out air from the big rather than the small balloons."

As to why having small cells might make it easier to gain weight, Professor Arner says, "Conversely it is easier to fill up the room if many small balloons increase their volume a bit, as compared with having few large balloons and filling them up just a bit."

The researchers conclude that FCV has a strong influence on long-term changes in [body weight](#). Thus, measuring FCV early in life could be important for weight management later in life.

Professor Arner adds, "It could be of great clinical value to have information about fat cell size before starting a weight management program. If it is the case that those with large fat cells find it easier to lose weight, those with smaller cells could be given extra support.

"Unfortunately, there isn't an easy way of measuring fat cell size at present—but it is something we are working on and we're close to coming up with a solution."

There are advantages, however, to having small fat cells. Professor Arner says, "It is well known that people with small fat cells have a better metabolic profile than people who are the same weight but have large fat cells."

"This means that if someone with small fat cells does gain weight, it may not raise their risk of conditions such as type 2 diabetes and [high blood pressure](#) as much as if they had large fat cells."

Provided by European Association for the Study of Obesity

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