- Body weight

Yo-yo weight gain explained: fat-cell 'memory' brings it back

In a experiment with mice, researchers may have discovered why patterns of weight cycling can occur. But the news may not be good for those who are already obese.

NUTRITIONAL SCIENCE

Those seeking weight loss through a fixed-period diet programme often experience the disappointment of regaining lost weight once the dieting stops. This can lead to 'weight cycling', sometimes called the yo-yo effect, as dieters repeat a pattern of losing weight and then regaining it. Hence many physicans favour a permanent balanced diet or exercise regime to achieve sustainable changes.

But why do we so rapidly lose the benefits of a diet? A new study on mice by researchers from ETH Zurich may provide part of the answer.

The researchers looked at two groups of mice that either were or had been overweight, investigating the mice's fat cells for markers that make the cells behave in certain ways. Behaviours and environmental factors can affect the way genes work without altering the DNA sequence itself: this is known as epigenetics (see p70). External factors cause cells to read the DNA in a certain way and therefore fulfil a specific role.

Such factors can include eating habits, but also obesity itself, which can activate certain genes throughout life. And the analysis showed that obesity seemed to 'turn up' some genes – and that the changes persisted for a long time, even after the mice had undergone significant weight loss.

"The fat cells 'remember' the overweight state and can return to this state more easily," says Ferdinand von Meyenn, Professor of Nutrition and Metabolic Epigenetics at ETH Zurich.

The researchers also believe they have identified a specific molecular mechanism behind the yo-yo effect in mice, while noting also that they have also found evidence that the same mechanism occurs in humans, though not answering the question of exactly how long the cells remember obesity.

But based on their results, the researchers have advice for children, adolescents, and their parents.

"It is so important to avoid being overweight in the first place," says Laura Hinte, co-author of the study. "Because that is the simplest way to combat the yo-yo phenomenon."



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