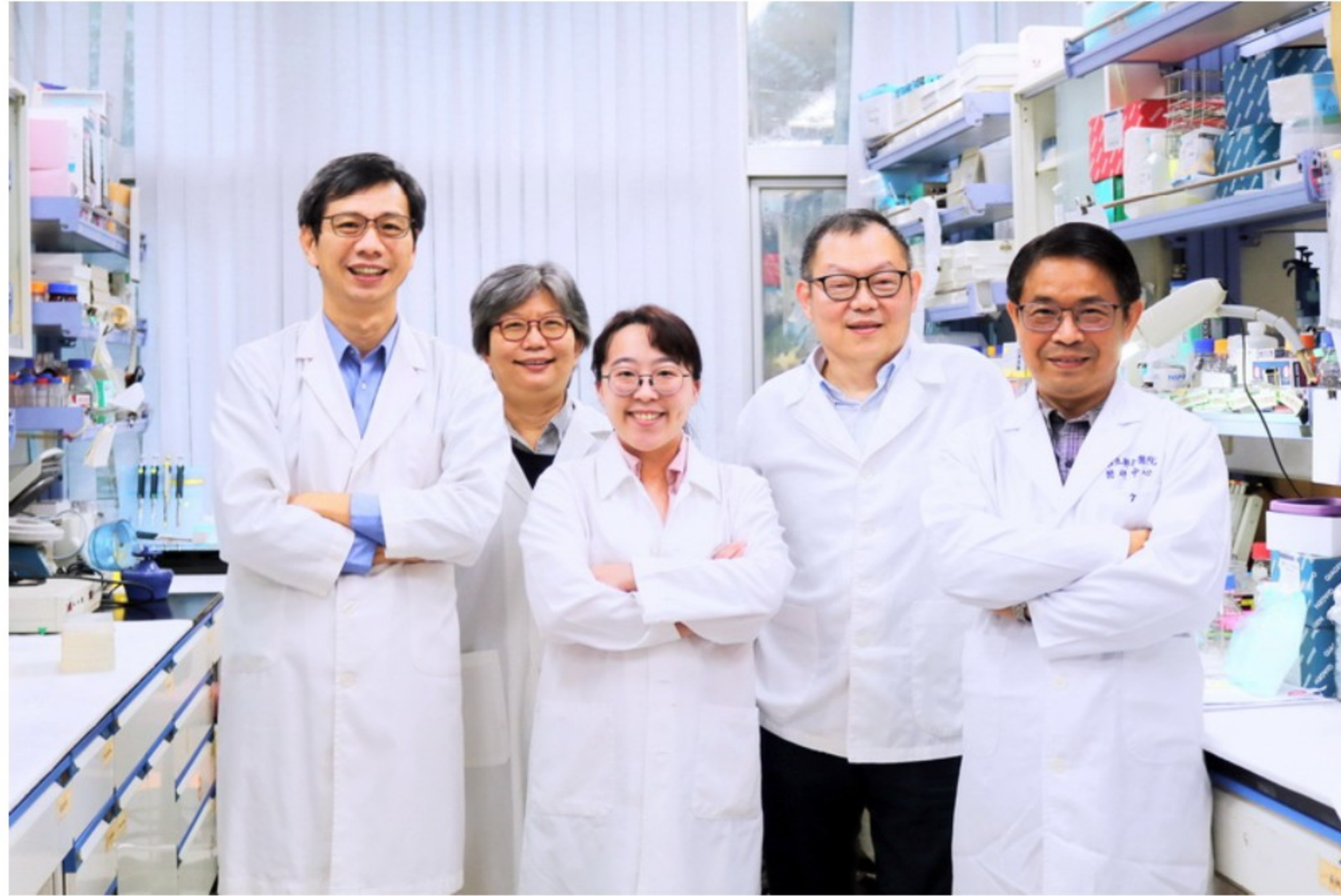


## Why do some obese people remain healthy while others become sick as soon as they gain excessive weight?

🕒 2022-12-22 · 📄 News

Obesity is a common disease in civilization. Scholars have confirmed its association with various metabolic disorders. However, a problem remains to be addressed regarding why specific obese individuals can remain healthy. Recent study has identified stomatin as a key factor causing obesity-related chronic diseases.



Stomatin is a protein encoded by the STOM gene and exists prevalently on the membranes or the organelle surface of various cells. It can be discovered in peripheral blood, embryos, and organs such as the fat, bone marrow and placenta. Previous scholars considered stomatin to be a membrane protein associated with overhydrated hereditary stomatocytosis. However, a research team from National Yang Ming Chiao Tung University (NYCU) has conducted in vitro and in vivo experiments and verified that this protein modulates adipogenesis through the ERK pathway and regulates fatty acid uptake and lipid droplet growth. It may also induce abnormal metabolic syndromes.

Through in vitro experiments, researchers in the NYCU observed that stomatin could distribute to the cell membrane and lipid droplet surface of fatty cells. They discovered that reducing the expression of stomatin caused the notable inhibition of adipocyte differentiation and further reduced lipid accumulation in cells. In contrast, high expression of stomatin accelerated lipid droplet fusion and enhanced the ability of cells to absorb fatty acid.

In subsequent in vivo experiments, the researchers fed mice with calorie-rich food for 20 weeks. They observed that the stomatin transgenic mice exhibited significantly higher body weight and fatty tissue weight than the wild-type mice and experienced abnormal metabolic syndromes such as insulin resistance and hepatic impairment. Interestingly, the transgenic mice remained healthy as long as they received regular food.

Dr. Shao-Chin Wu explained that when ingesting excessive calories, the body stores additional fat by increasing the number and size of adipose cells, which in turn causes obesity. When the body increases fat accumulation by increasing the number of adipose cells, the normal functioning of adipose cells is maintained, and the resulting obesity is considered healthy. However, when the body enlarges adipose cells to store additional fat, the excessive accumulation of fat in the cells greatly increases the likelihood of cell dysfunctions. This causes the cells to lose their ability to store fat, and free fatty acids are absorbed by other organs in the body, thereby inducing abnormal syndromes in these organs. Excessive expression of stomatin enhances the ability of adipose cells to absorb fatty acids and consequently enlarges the cells in an unhealthy manner.

The discovery explains why some obese individuals with high body fat are able to remain healthy without experiencing metabolic disorders, whereas other obese individuals have unfavorable health conditions. Metabolic syndromes induced by obesity might be associated with the regulation of adipose cell differentiation and fat absorption. The study conducted by the research team highlighted a new research direction regarding the role of stomatin in health risk assessment, preventive medicine, and pharmaceutical development.

This study was completed by Dr. Chi-Hung Lin (Biological science and Technology, NYCU; Institute of Microbiology and Immunology, NYCU), Dr. Chien-Yi Tung (Cancer Progression Research Center, NYCU) and Dr. Shao-Chin Wu (Cancer Progression Research Center, NYCU; Institute of Biophotonics, NYCU), published in Nature Communications, a subjournal of Nature Publishing Group.

