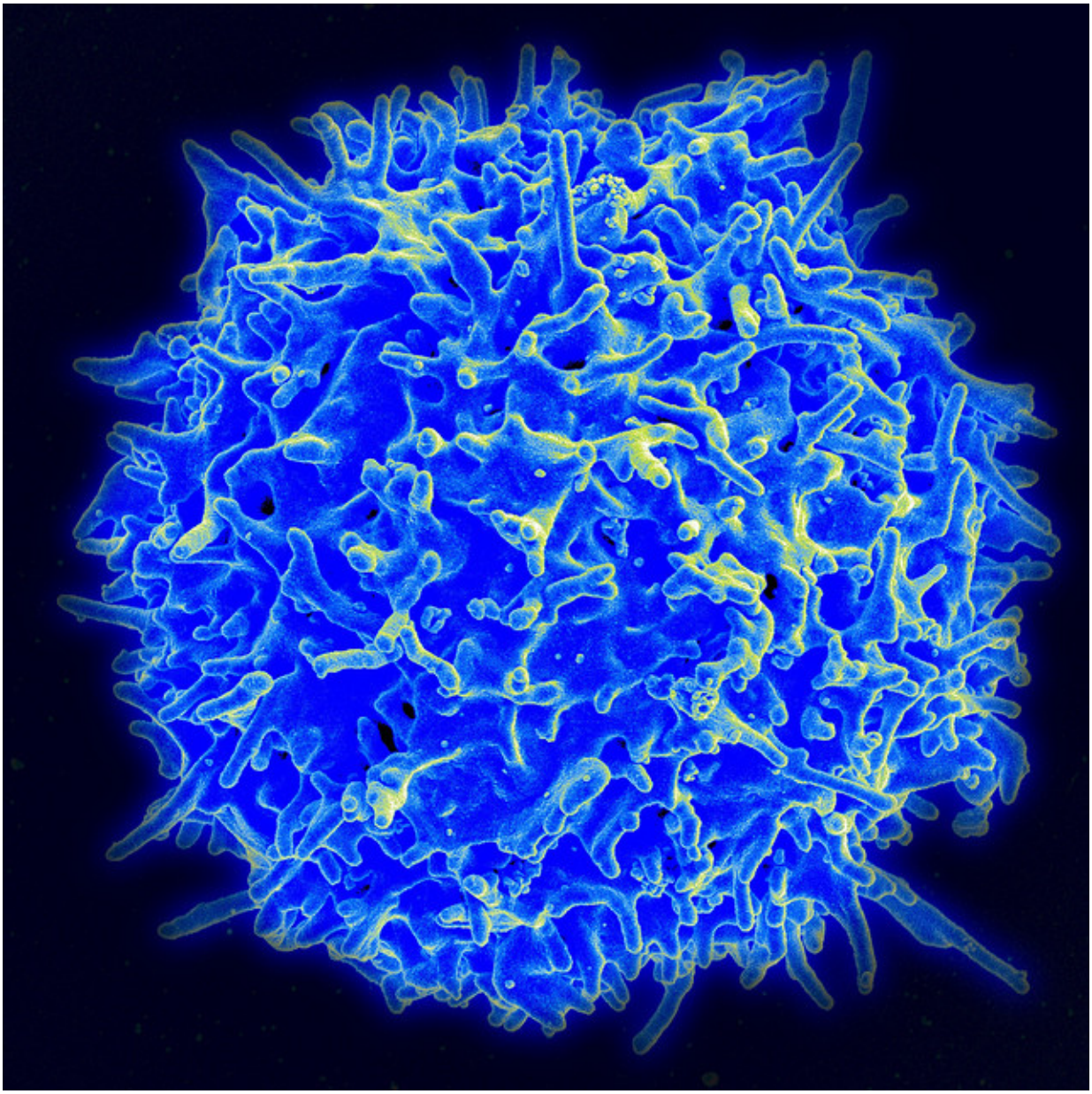
MedicalXpress

Calorie restriction rewires metabolism, immunity for longer health span

February 10 2022



Scanning electron micrograph of a human T lymphocyte (also called a T cell) from the immune system of a healthy donor. Credit: NIAID

Calorie restriction improves metabolic and immune responses that help determine both how long a person lives and how many years of good health they enjoy, a new study shows.

"Two years of modest calorie restriction reprogrammed the pathways in fat cells that help regulate the way mitochondria generate energy, the body's anti-inflammatory responses, and potentially longevity," said Eric Ravussin, Ph.D., Associate Executive Director for Clinical Science at Pennington Biomedical Research Center. "In other words, calorie restriction rewires many of the metabolic and immune responses that boost lifespan and health span."

The new study used data gathered by Pennington Biomedical's CALERIE 2 (Comprehensive Assessment of the Long-Term Effects of Reducing Intake of Energy), the longest-running calorie restriction trial in humans. The new study is published in the journal *Science*.

The study found that people who cut their calorie intake by about 14 percent over two years generated more T cells, which play a key role in immune function and slow the aging process.

"As people age, their thymuses shrink and produce fewer T cells. As a result, older people have a harder time fighting off infections and certain cancers," said Eric Ravussin, Ph.D., Associate Executive Director for Clinical Science at Pennington Biomedical Research Center. "Calorie restriction helps prevent the thymus from shrinking so the person generates more T cells."

In addition to improving immunity, an increase in T cells is associated with an improved ability to burn stores of fatty acids for energy, Dr. Ravussin said. That's important because if a person doesn't burn this fuel, the fat may build up in organs such as the muscle and liver, leading to insulin resistance, obesity, type 2 diabetes and aging.

The study had another important finding: a potential treatment to reduce age-related inflammation and improve metabolic health.

Studies have shown that restricting calories by 40 percent in rodents extended their lives. But there were tradeoffs in in growth, reproduction, and immunity.

However, calorie restriction also reduces the levels of gene encoding platelet activating factor acetyl hydrolase (PLA2G7). Reducing PLA2G7 produces health benefits that include lowering age-related inflammation and improving metabolic health.

"If researchers can find a way to harness PLA2G7, they could create a treatment to extend a person's health span, the time an individual experiences good health," said Pennington Biomedical Executive Director John Kirwan, Ph.D.

More information: O. Spadaro et al, Caloric restriction in humans reveals immunometabolic regulators of health span, *Science* (2022). DOI: 10.1126/science.abg7292

Provided by Pennington Biomedical Research Center

restriction-rewires-metabolism-immunity.html