Daily sauna time might help prevent menopause-related weight gain

July 1 2024

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New research performed with mice suggests that daily time in a warm environment such as a sauna might help older adults, especially women, combat age-related obesity and insulin resistance. The study shows the

potential of heat treatments as a simple way to promote healthier aging.

The researchers found that older female mice receiving a daily 30-minute whole-body heat treatment gained less weight and showed improved use of insulin, which helps control blood sugar. The investigators also identified the biological processes responsible for these beneficial effects.

"Compared to men, women have a higher likelihood of being obese or overweight," said research team leader Soonkyu Chung, Ph.D., associate professor in the Department of Nutrition at the University of Massachusetts Amherst. "This is especially true after menopause, due to the loss of estrogen in the body. Our study suggests that whole-body heat therapy could serve as an effective, non-invasive solution for managing weight gain and insulin resistance associated with menopause."

Rong Fan, a doctoral candidate advised by Chung, presented the findings at NUTRITION 2024, the flagship annual meeting of the American Society for Nutrition held June 29–July 2 in Chicago.

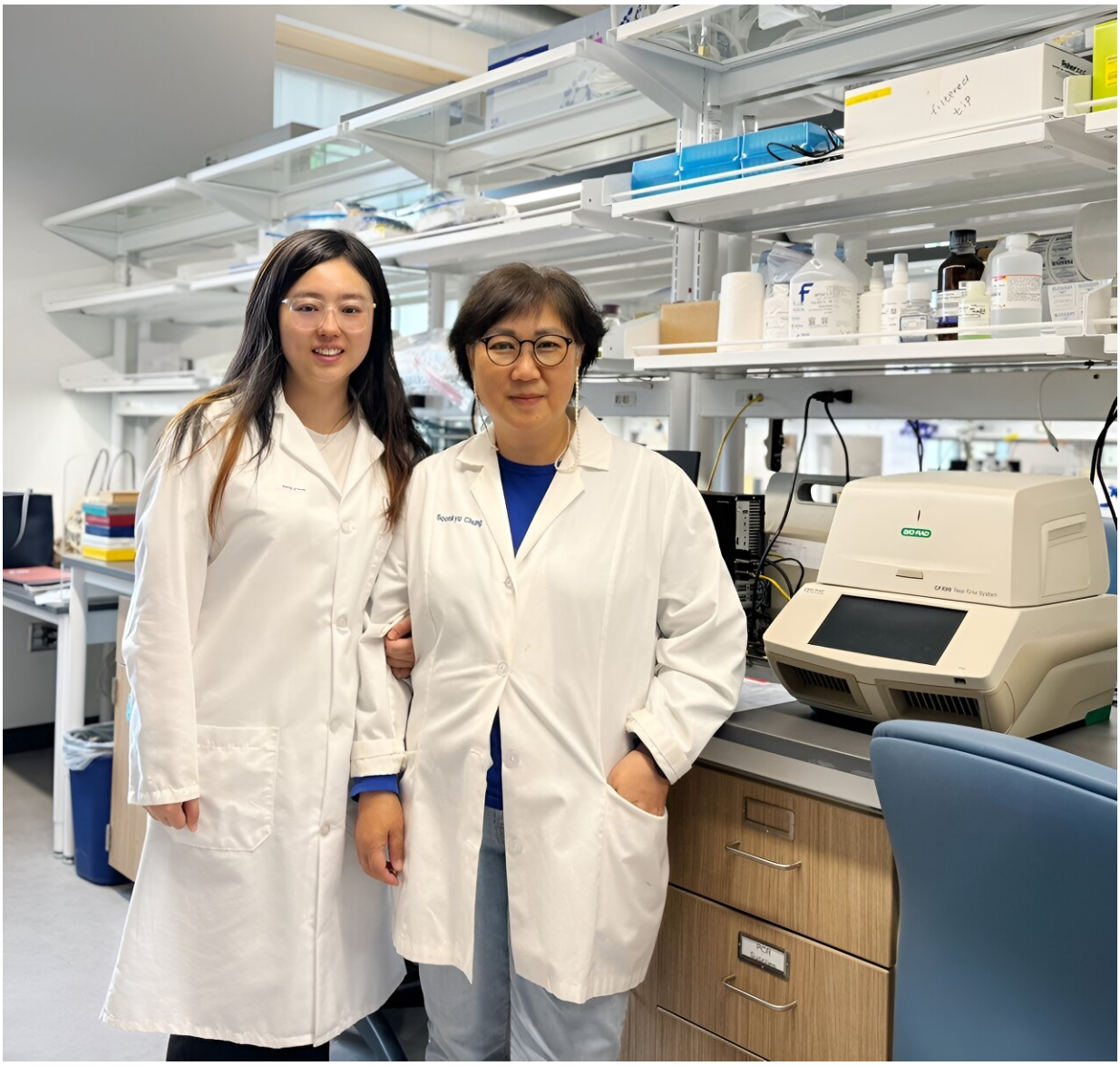
"Heat therapy could be a practical option for those with increased abdominal fat and a higher risk of metabolic diseases triggered by menopausal hormonal changes," said Fan. "It could be easily integrated into routine health care practices through regular sessions in saunas, heated baths or with specialized heat wraps."

For the study, the ovaries of older female mice were removed to model post-menopausal conditions. To induce weight gain, the mice received a Western diet that contained 45% calories from fat. One group of mice received 30 minutes of daily heat therapy in a heat chamber set to 40°C (104°F) for 12 weeks while the other group did not receive heat treatment.

The mice receiving the heat treatment showed no tissue damage and exhibited significantly reduced lactate dehydrogenase levels, indicating less aging-related tissue damage. The therapy also effectively mitigated weight gain induced by a high fat diet.

Compared to the mice not receiving the treatment, those that underwent heat therapy showed significant improvements in insulin sensitivity and insulin signaling as well as reduced fat accumulation in key areas such as the liver and in brown fat. While adipose tissue stores energy, brown fat is a metabolically active type of fat that helps the body burn more energy.

Research has shown that people tend to lose brown fat as they age and when entering menopause, which contributes to a slower metabolism.



Researchers Rong Fan (left) and Soonkyu Chung (right) from the Department of Nutrition at the University of Massachusetts Amherst found that daily heat treatment improves metabolic health and insulin sensitivity in aging and menopause animal models. Credit: Hyunji Cho, University of Massachusetts Amherst

The researchers also explored the molecular mechanisms involved in the

beneficial effects of heat therapy. They found that the heat triggers several molecular processes that help the body use energy more efficiently and burn fat.

A key player is a protein known as TRPV1, which functions as a calcium ion channel in the cell membrane. When activated by heat, TRPV1 kicks off a process known as futile calcium cycling where the body uses up energy (in the form of ATP) to pump calcium ions across cell membranes. This process helps increase the amount of energy the body burns.

TRPV1 activation and the subsequent calcium cycling also stimulate the breakdown and burning of fats. This reduces fat accumulation in tissues like the liver and helps improve the body's insulin sensitivity, which is crucial for overall metabolic health. "This series of events suggests that regular application of heat can mimic the effects of calorie burning and fat loss," said Fan.

"It could be particularly advantageous for individuals who find physical activities challenging, providing a relaxing way to improve metabolic health."

The researchers note that more research needs to be done to determine the optimal duration and intensity of heat exposure in people for health benefits and confirm its safety and effectiveness across diverse populations.

More information: Fan presented this research at 8:08–8:12 a.m. CDT on Monday, July 1 during the Nutritional Interventions and Metabolic Insights in Aging and Obesity Poster Theater Flash Session in McCormick Place (abstract; presentation details).

Provided by American Society for Nutrition