

# Antibody found to reduce weight gain and bone loss in menopausal mice

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(Medical Xpress)—A team of researchers with the Icahn School of Medicine at Mount Sinai in New York has found that giving a certain

antibody to menopausal mice resulted in less weight gain and reduced bone loss. In their paper published in the journal *Nature*, the team describes their study of the antibody and its impact on mice.

Many women find as they get older and experience menopause that it becomes more difficult to keep from gaining weight—generally due to a slowed metabolism. At the same time, many women also find that they start experiencing a loss in bone density, which happens because of decreased levels of estrogen in their bodies. In this new effort, the researchers report that they have found that menopausal mice given a certain antibody (a blood protein that is produced by the body to counteract an antigen) tend not to gain as much weight or lose as much bone mass.

The researchers found that an antibody called Hf2 tended to block the production of a follicle-stimulating hormone (FSH) produced and released by the pituitary gland. Prior research had shown that when women reach menopause, FSH levels tend to increase. To test the impact of introducing Hf2, the researchers removed the ovaries of several test mice, inducing menopause. They then injected them with Hf2 and monitored them to see what would happen. They found that levels of FSH tended to drop with a corresponding reduction in [weight gain](#) and [bone density](#) loss. They also noted an increase in oxygen consumption, an increase in physical activity and a reduction of "white fat," which prior research has suggested causes more health problems than "brown fat."

The researchers also injected the antibody into mice that were not menopausal and found that it reduced adiposity (obesity) in regular mice that were put on a [high fat diet](#).

It is not clear yet if the antibody would offer the same benefits to humans, but the researchers plan to continue their studies to find out.

They also plan to look into whether injecting [mice](#) (and possibly humans) with the antibody might reduce obesity related ailments.

**More information:** Peng Liu et al. Blocking FSH induces thermogenic adipose tissue and reduces body fat, *Nature* (2017). [DOI: 10.1038/nature22342](#)

### **Abstract**

Menopause is associated with bone loss and enhanced visceral adiposity. A polyclonal antibody that targets the  $\beta$ -subunit of the pituitary hormone follicle-stimulating hormone (Fsh) increases bone mass in mice. Here, we report that this antibody sharply reduces adipose tissue in wild-type mice, phenocopying genetic haploinsufficiency for the Fsh receptor gene *Fshr*. The antibody also causes profound beiging, increases cellular mitochondrial density, activates brown adipose tissue and enhances thermogenesis. These actions result from the specific binding of the antibody to the  $\beta$ -subunit of Fsh to block its action. Our studies uncover opportunities for simultaneously treating obesity and osteoporosis.

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