

Could gut bacteria cause osteoporosis? New research finds connection

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Osteoporosis affects more than a third of all women ages 50 and older and more than 200 million people worldwide. Photo by iStock.

One of the most common forms of gut bacteria may be to blame for osteoporosis.

Osteoporosis — dubbed the “silent disease” — affects more than a third of all women ages 50 and older and more than 200 million people worldwide. Fractures can lead to disability or even death, and osteoporosis is expected to cost patients and the U.S. healthcare system more than \$25 billion annually by 2025.

A new [study](#) from Tulane University published in [Nature Communications](#) links the disease to the presence of *Bacterioides vulgatus*, one of the most abundant gut bacteria in the human microbiome.

The study found that these bacteria suppressed the gut's production of valeric acid, a short-chain fatty acid that enhances bone density and reduces the breaking down of tissue in bones or bone resorption. Excessive bone resorption can make bones brittle and lead to osteoporosis.

"We did a screening of the entire gut microbiome and found that the bacteria lowered the amount of valeric acid in human circulation," said senior author Hong-Wen Deng, PhD, who leads the Center for Biomedical Informatics and Genomics at Tulane University School of Medicine. "So, the logic is, if we can target these bacteria and increase valeric acid, we can increase bone density and prevent osteoporosis."

The study analyzed the gut bacteria of more than 500 peri- and post-menopausal women in China and further confirmed the link between *B. vulgatus* and a loss of bone density in a smaller cohort of non-Hispanic White women in the United States.

The findings were then tested in a small animal model, where mice that were given an increase of *B. vulgatus* in the gut showed poorer bone micro-structure. Mice that received valeric acid supplements, however, saw reduced bone resorption and stronger bones overall.

Deng said the next step is investigating whether *B. vulgatus* can be suppressed naturally or if a virus can be designed to target the bacteria.

He also hopes to study the effects of valeric acid supplements on humans to determine the effects of various dosages.

"This study established that the gut microbiome is important for our bone health and getting a healthy microbiome composition is important," Deng said. "Now that we've identified a target in *B. vulgatus*, we want to lower its abundance."

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Hong-Wen Deng