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May 15, 2012

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Bone Density May Affect Immune System, Study Finds

UC Merced researchers shed light on how bone density may change a person's immune system, a finding that could impact how scientists try to combat bone-related disease, such as osteoporosis

MERCED, Calif. — Researchers at the University of California, Merced, have discovered a new way in which bone health impacts a person's immune system.

The discovery could impact how scientists try to combat bone-related disease, as drugs to improve bone quality could weaken a person's immune system.

"The bone does have an influence on the basic biology of blood development," immunology Professor Jennifer Manilay said. "This interdisciplinary research shows the need to look at the whole organ."

Manilay collaborated with Lawrence Livermore National Laboratory researcher and adjunct UC Merced Professor Gabriela G. Loots, who disabled in mice the gene sclerostin, which maintains bone density. When it's disabled, bone density increases, a condition known as sclerosteosis. It's the opposite of osteoporosis, the decay of bones.

Quick Facts

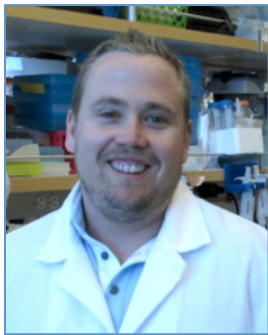
- UC Merced researchers discovered a new way in which bone influences blood development.
- In mice with high bone density, the lab found a decrease in the number of B-cells.
- The study was published in the *Journal of Bone and Mineral Research*.

Manilay's lab saw a decrease in the B-cells, a sign that the immune system may be compromised when sclerostin is disabled.

The findings are particularly important because drug maker Amgen is testing a drug to combat osteoporosis that disables sclerostin. Manilay said she was unsure whether the company has studied the drug's effect on the immune system.

The UC Merced lab's results were recently [published](#) in the Journal of Bone and Mineral Research. The paper was also given an exceptional ranking by Faculty of 1000, a post-publication peer review website, in which leading scientists and clinicians from around the world identify and evaluate the most important articles in biology and medical research publications.

"These findings have important implications for patients being treated with inhibitors of sclerostin, as they imply that there may be negative effects on B cells," wrote Sarah Dallas and Yasuyoshi Ueki of the University of Missouri-Kansas City. "The study is also exciting because it suggests a previously unknown role for osteocytes in the regulation of B cell development and survival."



Modesto native Corey Cain was the paper's lead author. He is planning to graduate with a Ph.D. this year and is securing a postdoctoral fellowship where he can continue his research into bones. He said it was helpful to be able to do research close to home.

"UC Merced has been great to me," Cain said. "I have met and worked with wonderful friends and colleagues here who continually help shape my perspective on science."

Manilay's staff research associate, Bryce McLelland, and former UC Merced student Randell Rueda were co-authors on the paper.

Manilay plans to continue her research into sclerostin and B-cells. One project will explore whether a mouse's immune system is significantly impacted with the gene disabled. Another project will explore what is happening to cause the B-cells to die, with the goal of reversing any adverse effects.

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UC Merced opened Sept. 5, 2005, as the 10th campus in the University of California system and the first American research university of the 21st century. The campus significantly expands access to the UC system for students throughout the state, with a special mission to increase college-going rates among students in the San Joaquin Valley. It also serves as a major base of advanced research and as a stimulus to economic growth and diversification throughout the region. Situated near Yosemite National Park, the university is expected to grow rapidly, topping out at about 25,000 students within 30 years.