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[\[Medicine\] Possible Cure for Osteoporosis Found in Taiwan](#)[Medicine] Possible Cure for Osteoporosis Found in Taiwan ([Chinese Version](#))

NCKU Spotlight (2011/10/07) A National Cheng Kung University (NCKU) research team has discovered that a protein called interleukin (IL)-20 is a key to treating osteoporosis, a disease that lowers a person's bone density.

The discovery by the team led by Ming-Shi CHNG, Professor of the Department of Biochemistry and Molecular Biology, was published in the Journal of Experimental Medicine and has drawn huge attention in the academic circle and the biotechnology industry.

The chief editor of Nature Reviews Rheumatology wrote a research highlight in the September issue of Nature Reviews Rheumatology commenting on this finding while the Science-Business eXchange published a cover story reporting on the discovery in the same month.

Interleukin (IL)-20 is a protein secreted by the immune system. When it is overproduced, it causes inflammation and destroys tissue, leading to chronic diseases.

There are two types of bone cells: osteoclasts and osteoblasts. Bone mineral density is determined by the balance between osteoclasts and osteoblasts. The association between IL-20 and osteoporosis has never been explored.

CHANG's team has discovered that osteoporosis patients have higher than normal amounts of IL-20 in their blood, which suggests that IL-20 is involved in the progression of the disease. IL-20 increases the amount of two proteins important for bone metabolism—RANK on osteoclast precursors and RANKL on osteoblasts—and so stimulates osteoclast formation.

In a cell-based test, the team found that IL-20 antibody completely inhibited the formation of osteoclasts from stem cells. They then created a mouse model of osteoporosis by removing the ovaries from mice and these mice showed symptoms of osteoporosis. However, an injection of IL-20 antibody into these mice protected them from osteoporosis and increased their bone mineral density.

The team also generated what are called gene-knock-out mice by permanently removing the IL-20 receptor (IL-20 R1) gene from the mice so that IL-20 had nowhere to attach to the bone cells. These mice had higher bone mineral density and were protected from osteoporosis even after their ovaries had been removed.

Ming-Shi CHANG's team has provided evidence that IL-20 is a novel and undiscovered molecule involved in the formation of osteoclasts -- a revolutionary discovery and a significant contribution to basic medicine.

The team has also showed that IL-20 is a novel target for osteoporosis and IL-20 antibody could be a potent new anti-osteoporosis drug that will have a significant effect on biotechnology.

"IL-20 antibody not only blocks the production of IL-20, but also of the protein RANKL. Also, it affects not only osteoclast formation but also osteoblast function," said Ming-Shi CHANG. "If further developed into a therapeutic drug, IL-20 antibody should have many advantages over denosumab."

In addition, CHANG's team found that the antibody did not cause any serious side effects for the experimental mice and rats. The IL-20 antibody may thus become a potent drug for reducing the dangers of osteoporosis.

Further Information:

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