

Crucial hormonal pathway to bone building uncovered

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Scientists have discovered a crucial step in hormone-triggered bone growth, a finding that could lead to new osteoporosis drugs and better bone-building therapies, according to a new study.

The research was performed at the University of Alabama at Birmingham (UAB). It showed that parathyroid hormone (PTH) given intermittently enhances the body's own bone-building action through a specific "co-receptor" on the surface of bone cells.

Previously, PTH was known to stimulate bone formation, but the exact mechanism was unknown, the UAB researchers said. The findings are published in the journal *Genes and Development*.

"Our study uncovers a novel mechanism for how parathyroid hormone signaling selectively stimulates bone formation," said Xu Cao, Ph.D., UAB professor of pathology and senior author on the study. "We have identified the protein co-receptor crucial to the whole process."

The UAB researchers focused on PTH signals in mice, testing to see which cell receptors actively recruited calcium from the blood. They uncovered the one co-receptor responsible for turning on bone building, said Mei Wan, Ph.D., UAB associate professor of molecular and cellular pathology and first author on the study.

Previously, the exact mechanism of PTH-signaled bone formation was shrouded by the joint production of osteoblasts and osteoclasts, said Jay

McDonald, M.D., pathology professor and director of UAB's Center for Metabolic Bone Disease. Both types of cells are instrumental in regulating a healthy skeleton – osteoblasts by forming new bone, and osteoclasts by resorbing old and brittle bone.

Many osteoporosis drugs now target both osteoblasts and osteoclasts, which can lead to zero or minimal bone formation, McDonald said.

"The ideal would be to have one drug to shut down the osteoclasts and turn on the osteoblasts to effectively build bone. We don't have that yet, but this study shows us the path to get there," he said.

FORTEO® is the only approved PTH drug for use in postmenopausal women with osteoporosis, and in men with hormone-linked osteoporosis. Many experts hope the approved drug is part of the next wave of medicines that work to build back bone, reduce bone loss and minimize fracture risks in the aging.

Source: University of Alabama at Birmingham

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