

Scientists discover new bone-forming growth factor that reverses osteoporosis in mice

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CRI Scientists Discover New Bone-Forming Growth Factor That **Reverses Osteoporosis** In Mice

A team of scientists at the Children's Medical Center Research Institute at UT Southwestern (CRI) discovered a new bone-forming growth factor, Ostelectin (Clec11a), which reverses osteoporosis in mice and has implications for regenerative medicine.

Background

Osteoporosis



Characterized By

Increased fracture risk



Decreased bone mass



Ostelectin

Certain bone marrow and bone cells make Ostelectin.



Treatment Options

Antiresorptive agents and estrogen reduce the rate of bone loss.



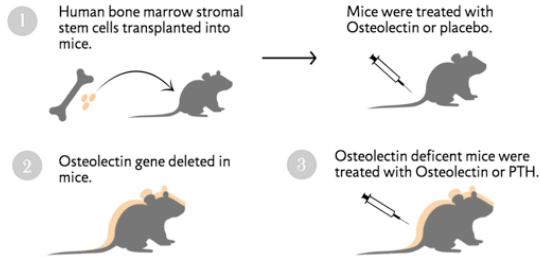
Teriparatide (PTH) is the only agent approved to promote new bone growth.






Two-year limit due to risk of osteosarcoma (bone cancer).

The Study

CRI researchers conducted three experiments to discover the role of Ostelectin (1 and 2) and determine whether treatment with Ostelectin could reverse bone loss due to osteoporosis (3).



The Results

- Ostelectin promotes the formation of new bone from skeletal stem cells in the bone marrow in vivo. 
- Deletion of Ostelectin causes bone loss and symptoms of osteoporosis. 
- Ostelectin-treated mice had significantly increased bone growth vs untreated mice. 

Ostelectin

- > Potential application as therapeutic treatment for osteoporosis.
- > Future applications in regenerative medicine.



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A team of scientists at the Children's Medical Center Research Institute at UT Southwestern (CRI) discovered a new bone-forming growth factor, Ostelectin (*Clec11a*), which reverses osteoporosis in mice and has implications for regenerative medicine. Credit: UT Southwestern

A team of scientists at the Children's Medical Center Research Institute at UT Southwestern (CRI) discovered a new bone-forming growth factor, Ostelectin (*Clec11a*), which reverses osteoporosis in mice and has implications for regenerative medicine.

Although Ostelectin is known to be made by certain [bone](#) marrow and [bone cells](#), CRI researchers are the first to show Ostelectin promotes the formation of new bone from skeletal stem cells in the bone marrow. The study, published in *eLife*, also found that deletion of Ostelectin in mice causes accelerated bone loss during adulthood and symptoms of [osteoporosis](#), such as reduced bone strength and delayed fracture healing.

"These results demonstrate the important role Ostelectin plays in new bone formation and maintaining adult bone mass. This study opens up the possibility of using this growth factor to treat diseases like osteoporosis," said Dr. Sean Morrison, who led the team that made the discovery. Dr. Morrison, CRI Director, holds the Mary McDermott Cook Chair in Pediatric Genetics at UT Southwestern Medical Center, and the Kathryne and Gene Bishop Distinguished Chair in Pediatric Research at Children's Research Institute at UT Southwestern.

Osteoporosis, a progressive bone disease characterized by decreased bone mass and an increase in fractures, affects over 200 million people worldwide. Most existing therapies such as bisphosphonate drugs reduce

the rate of bone loss, but they do not promote new bone growth. Teriparatide (PTH) is the only agent currently approved for the formation of new bone, but its use is limited to two years due to a potential risk of osteosarcoma.

To determine whether treatment with Ostelectin could reverse bone loss after the onset of osteoporosis, the CRI research team used mice that had their ovaries removed to model the type of osteoporosis that develops in postmenopausal women. Mice were given daily injections of PTH or recombinant Ostelectin. The study found that both recombinant Ostelectin- and PTH-treated mice had significantly increased bone volume compared to untreated [mice](#). Both treatments effectively reversed the [bone loss](#) that occurred after the removal of the ovaries.

"These early results are encouraging, suggesting Ostelectin might one day be a useful therapeutic option for osteoporosis and in regenerative medicine," said Dr. Morrison, also a Professor of Pediatrics at UT Southwestern, a CPRIT Scholar in Cancer Research, and a Howard Hughes Medical Institute Investigator.

Researchers in the [Hamon Laboratory for Stem Cell and Cancer Biology](#), of which Dr. Morrison is the principal investigator, plan to further test Ostelectin's therapeutic potential and to identify the receptor for Ostelectin, which is key to understanding the signaling mechanisms the protein uses to promote osteogenesis.

More information: Rui Yue et al, Clec11a/ostelectin is an osteogenic growth factor that promotes the maintenance of the adult skeleton, *eLife* (2016). [DOI: 10.7554/eLife.18782](https://doi.org/10.7554/eLife.18782)

Provided by UT Southwestern Medical Center

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