

Research reveals how osteocytes form critical structures that maintain bone health

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Embedded within bone tissue are osteocytes, cells with tree-like projections called dendrites that are important for receiving communication from other cells. The loss of dendrites that occurs during aging contributes to bone fragility and osteoporosis. In a study published

in *Nature Communications*, an international team led by investigators at Massachusetts General Hospital (MGH) has revealed how osteocytes form dendrites—a discovery that might lead to strategies to maintain these projections and therefore help protect individuals' bone health throughout life.

In their study, the researchers found that deletion of Sp7, a gene linked to both rare and common skeletal diseases, in osteocytes causes severe defects in osteocyte dendrites. This gene codes for a protein called a transcription factor, which controls the expression of other genes. The team found that the Sp7 transcription factor targets a gene called osteocrin, which promotes osteocyte dendrite formation. In mice, turning the osteocrin gene on made up for the absence of Sp7 and reversed defects in osteocyte dendrites.

"In this work, we demonstrate key roles for the transcription factor Sp7 and its target osteocrin in orchestrating a gene regulatory network needed to promote healthy connections between bone cells," says senior author Marc Wein, MD, Ph.D., an investigator in the endocrine unit at MGH and an assistant professor of medicine at Harvard Medical School. "Understanding how osteocytes maintain this network of connections opens up exciting possibilities for new ways to treat osteoporosis and other diseases where bones are prone to fracture."

More information: Jialiang S. Wang et al, Control of osteocyte dendrite formation by Sp7 and its target gene osteocrin, *Nature Communications* (2021). [DOI: 10.1038/s41467-021-26571-7](https://doi.org/10.1038/s41467-021-26571-7)

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