

OSTEOSCOOP

News on current events in osteoporosis and rheumatology

Oxytocin is an anabolic bone hormone

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Oxytocin, a hypothalamic nanopeptide secreted into the circulation from the posterior pituitary, is indispensable for lactation. It acts on a G protein-coupled receptor, the expression of which in reproductive tissues is regulated by sex steroids and oxytocin itself. In humans and rodents, plasma oxytocin levels are elevated maximally during suckling.

The authors of a recent study [1] report that oxytocin is a direct regulator of bone mass. Deletion of oxytocin or its receptor in male or female mice causes osteoporosis resulting from reduced bone formation. Consistent with low bone formation, oxytocin stimulates the differentiation of osteoblasts to a mineralizing phenotype by causing the upregulation of BMP-2, which in turn controls the expression of several genes among which Osterix. In contrast, oxytocin has dual effects on the osteoclast. It stimulates osteoclast formation both directly, by activating NF- κ B and MAP kinase signaling, and indirectly through the upregulation of RANK-L and downregulation of osteoprotegerin. On the other hand, oxytocin inhibits bone resorption by mature osteoclasts by triggering cytosolic Ca²⁺ release and NO synthesis.

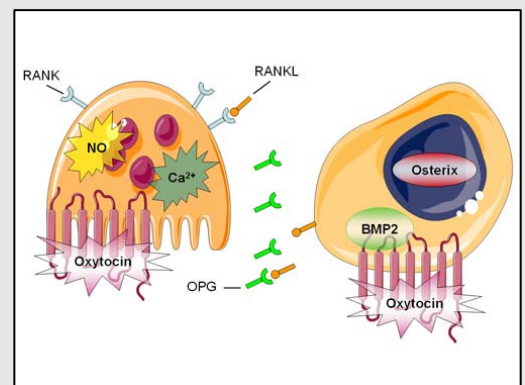
Together, the complementary genetic and pharmacologic approaches reveal oxytocin as a novel anabolic regulator of bone mass, with potential implications for osteoporosis therapy.

1. Tamma R et al. *Proc Natl Acad Sci USA*. 2009;106:7149-7154.

Oxytocin is an anabolic bone hormone

Deletion of oxytocin or its receptor in male or female mice causes osteoporosis resulting from reduced bone formation. This phenotype is related to the presence of oxytocin receptors on osteoblasts. Upon activation by oxytocin, BMP2 and Osterix are upregulated, leading to mineralization. In osteoclasts, which also express oxytocin receptors, this hormone has a dual effect: it activates NF- κ B through RANKL/RANK activation but also inhibits resorption through Ca release and NO synthesis.

Together, these approaches reveal oxytocin as a novel anabolic regulator of bone mass.



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