



Osteosine[™]

Bone Health Nutraceutical

nulivscience.com

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- The statements and claims made in this research overview have not been evaluated by the U.S. Food and Drug Administration (FDA).
- The research findings presented are based on scientific studies and should not be construed as medical advice.
- Consumers are encouraged to consult with healthcare professionals before making dietary or supplement-related decisions.
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Thank you for your interest in our research overview.



SUPPORTING HEALTHY JOINTS

6 *in-vitro* studies, 2 *in-vivo* studies

Patents:

US20040191344A1

CN 1080537A

CN 1080537

CN 1096204

CN 1112010

CN 1121810

KEY BENEFITS



100%
PLANT-BASED



PATENTED



GENDER NEUTRAL
FORMULA

DISCOVER OSTEOSINE™

Osteosine™ is NuLiv Science's proprietary bone health nutraceutical composed of extracts from *Astragalus membranaceus* and *Cuscuta chinensis* produced by a proprietary extraction technology. Through *in-vitro* and *in-vivo* studies, OsteoSine™ demonstrated:

- Increased DNA, type I collagen, osteocalcin (OCN), osteopontin (OPN), and bone morphogenetic protein 2 (BMP2) levels in the studied bone cells (MG-63), indicating more bone tissue.
- Upregulated osteoprotegerin expression, indicating a decrease in bone breakdown.
- Supported bone mineral density.
- Increase in bone ash weight, calcium, and phosphate content.
- Supported bone structure through trabecular surface area and width.

For more details, please view the scientific papers



UNDERSTANDING BONE LIFECYCLES

Exploring the lifecycle of bones offers crucial insights into maintaining skeletal health.

The processes behind bone remodeling can unveil novel approaches to bolstering bone strength. Our bodies constantly renew bone tissue through a three-phase process:

- Resorption, where old bone is broken down by cells that dissolve and reabsorb minerals, called osteoclasts.
- Reversal, marked by the appearance of mononuclear cells on bone surfaces to prepare the tissue for the final phase.
- Formation, where osteoblasts, cells that create bone matrix and mineralize the skeleton, build new bone until the old bone is completely replaced.

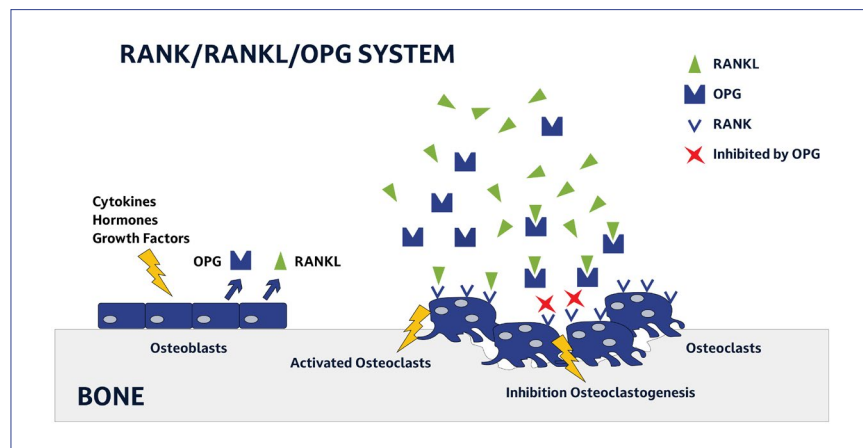
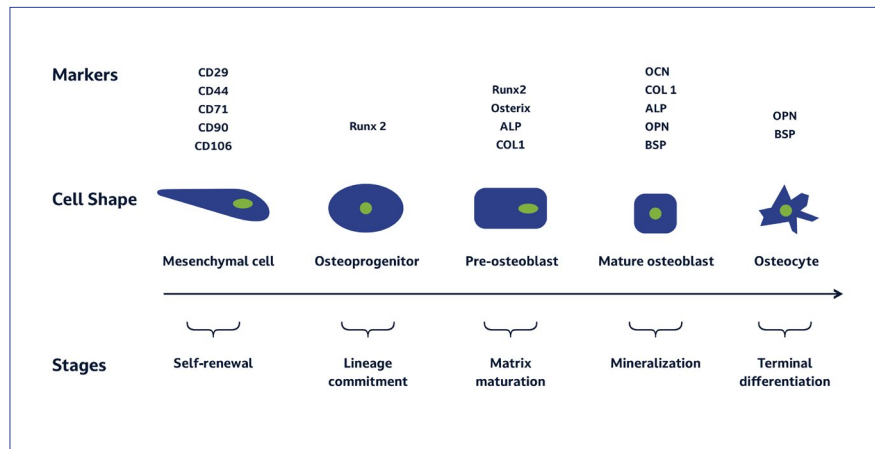
These processes occur simultaneously but at different rates across the skeleton. Up until our late twenties, bone density and strength increase as formation outpaces resorption. However, after this point, bone density and strength decline as resorption begins to outpace formation.

Osteosine™ supports the “bone formation” process, encouraging the creation of new bone tissue, while simultaneously working to slow the “bone resorption” process. This combined effect supports healthy bone density. Moreover, Osteosine™ works to bolster bone structural strength by expanding the width and weight of the trabeculae, the supportive “beams” within bone tissue which helps to reinforce overall bone strength.

IN-VITRO STUDIES

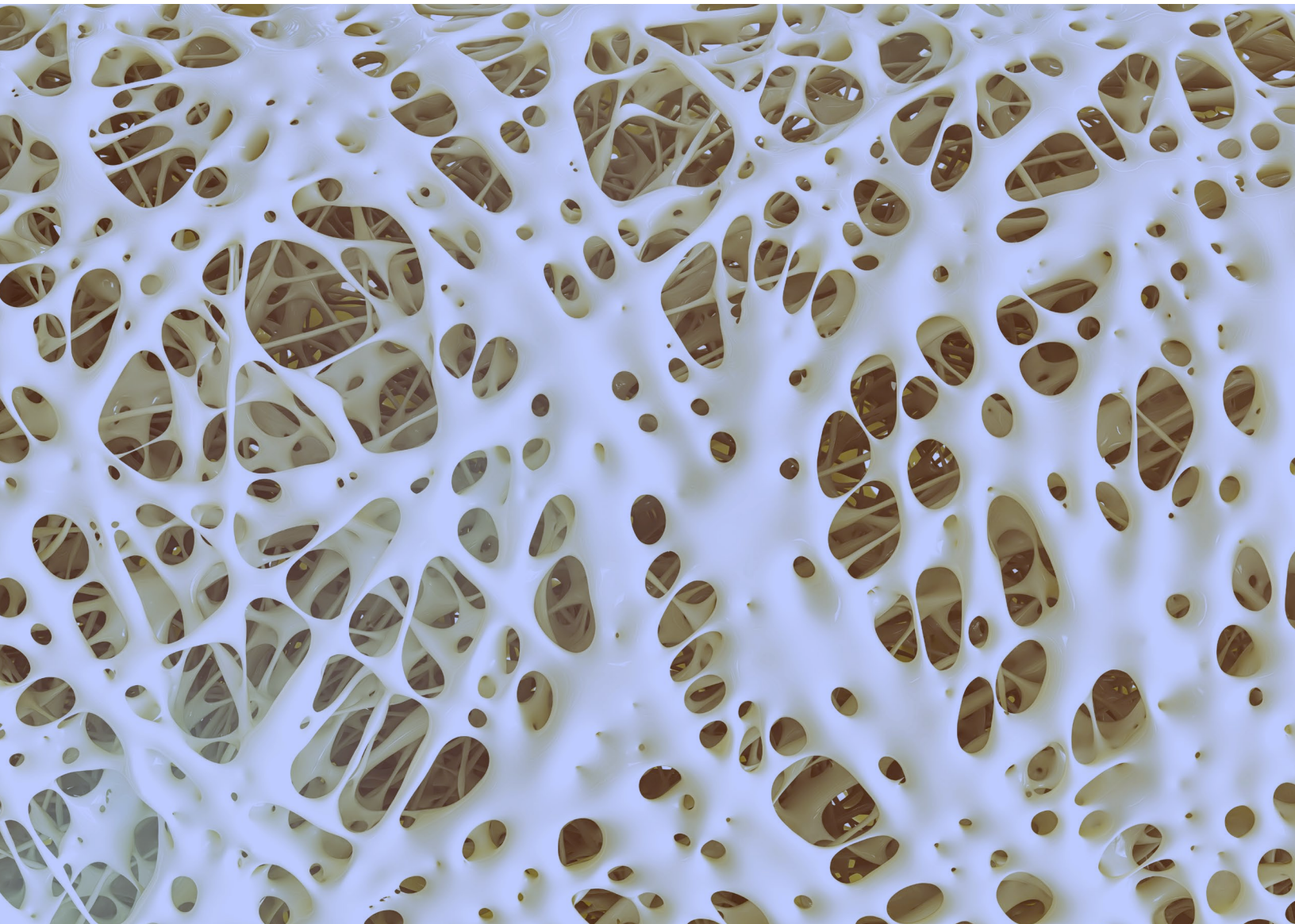
Through six *in-vitro* studies by NuLiv Science, OsteoSine™ was observed to:

- Promote bone DNA production.
- Increase type I collagen, constituting 90% of bone's organic mass.
- Boost osteocalcin (OCN), aiding bone matrix mineralization.
- Elevate osteopontin (OPN) levels in osteocytes.
- Raise Receptor activator of nuclear factor kappa-β ligand (RANKL), involved in osteoclast formation.
- Increase bone morphogenetic protein 2 (BMP2) for bone generation and regeneration.
- Enhance alkaline phosphatase (ALP), a regulator of bone mineralization.
- Demonstrate an increase in osteoprotegerin (OPG), which is involved in inhibiting osteoclast differentiation and function.



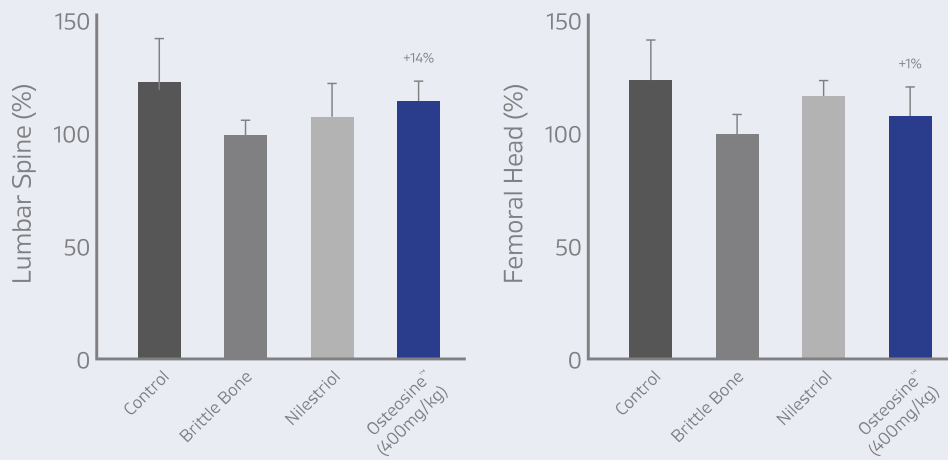
IN-VIVO STUDIES

In NuLiv's two *in-vivo* studies, the PO (post-ovariectomized) and the RA models (Retinoic Acid Induced), OsteoSine™ models demonstrated an increase in serum calcium, serum tartrate resistant acid phosphatase, serum osteocalcin, bone alkaline phosphatase, bone ash, bone calcium, bone phosphorus contents in mice in the treatment versus the control groups. More importantly, the structural strength of bone demonstrated through the trabecula surface, average surface percent and weight of trabecula, were also increased.

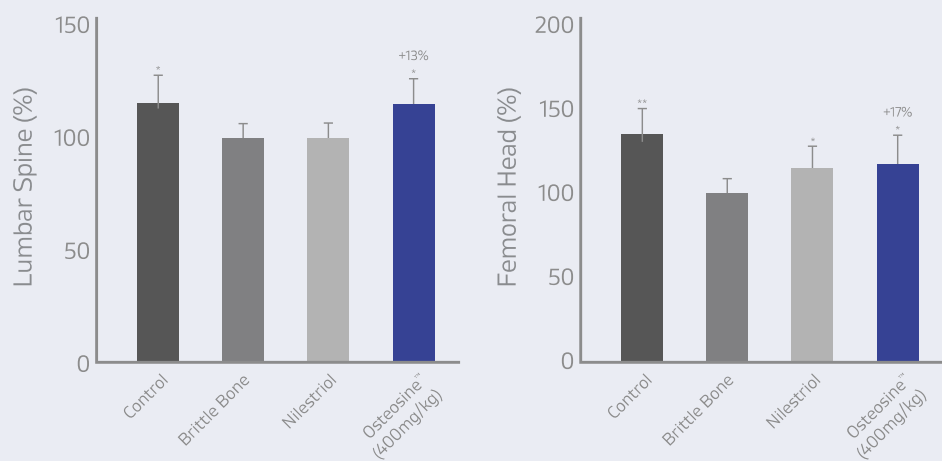


BONE MINERAL DENSITY IN-VIVO

Bone mineral density in retinoic acid-induced rat model

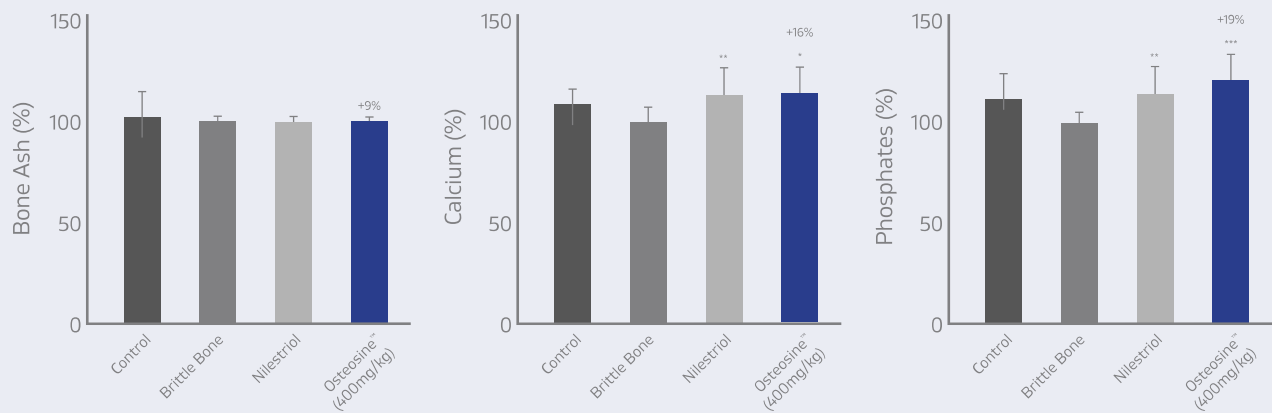


Bone mineral density in post-ovariectomized rat model

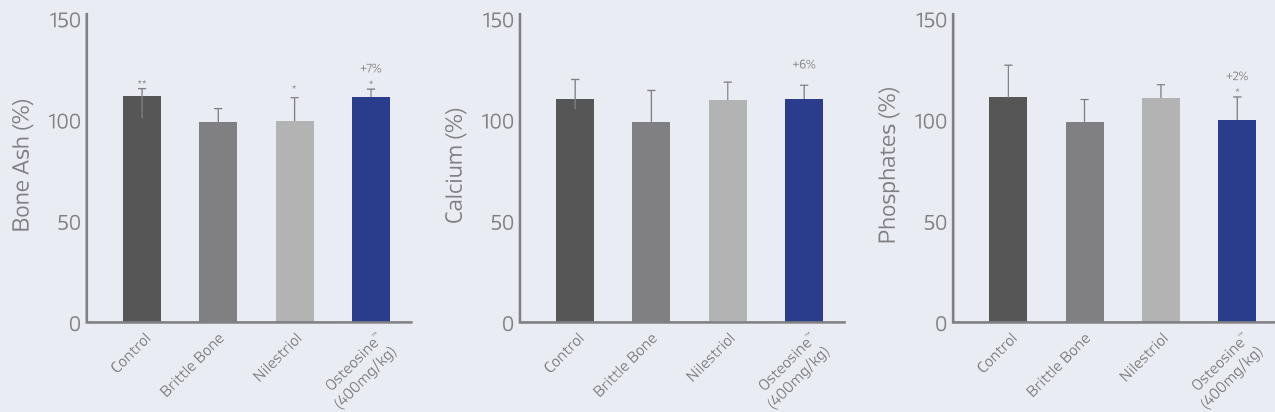


BONE ASH, CALCIUM, AND PHOSPHATE CONTENTS IN-VIVO

Bone ash contents in retinoic acid-induced rat model

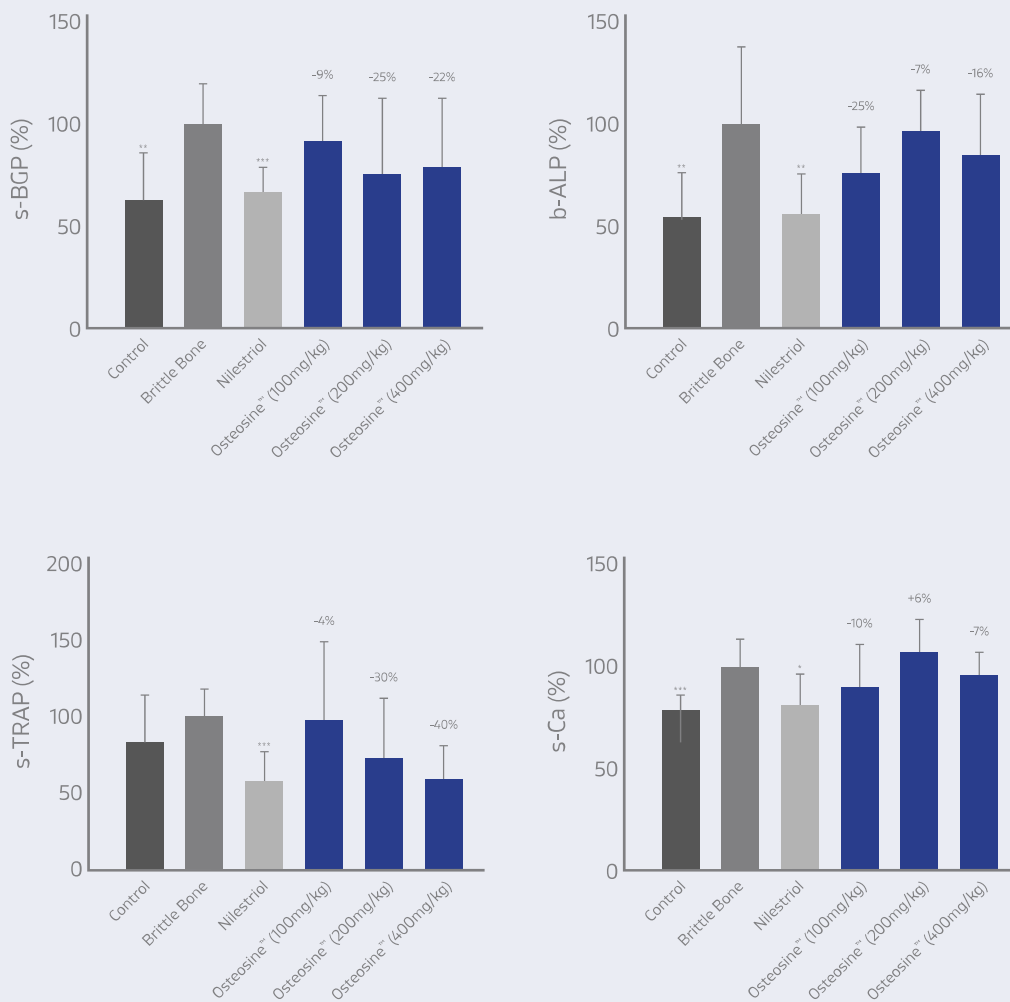


Bone ash, calcium and phosphate contents in post-ovariectomized rat model



BIOMARKERS FOR BONE REMODELING IN-VIVO

Effect of Osteosine™ on s-BGP, b-ALP, s-ALP, s-TRAP, and s-Ca in post-ovariectomized rats



s-CA: serum calcium
s-TRAP: tartrate resistant acid phosphatase in serum
s-BGP: osteocalcin in serum
b-ALP: alkaline phosphatase in bone

A woman with long, wavy brown hair is performing a yoga pose on a grey mat in a grassy park. She is wearing a blue t-shirt and dark leggings. The background shows trees and a fence, with a soft, natural light. The text 'DOSAGE' is overlaid in white, bold, sans-serif font.

DOSAGE

100MG OSTEOSINE™

REFERENCE

1. W. J. Boyle, et al. Review: Osteoclast differentiation and activation. *Nature*. 2003 May 15; 423 (6937):337-342.
2. S. I. Harada, et al. Review: Control of Osteoblast cell function and regulation of bone mass. *Nature*. 2003 May 15; 423:349-355.
3. G. A. Rodan, et al. Bisphosphonates: Mechanisms of action. *J. Clin. Invest.* 1996 97(12):2692-2696.
4. F. P. Coxon, et al. Protein synthesis is required for caspase activation and induction of apoptosis by bisphosphonate drugs. *Mol. Pharmacol.* 1998 54(4):631-638.
5. A.C. Pike, et al. Structure of the ligand-binding domain of estrogen receptor beta in the presence of a partial agonist and a full antagonist. *EMBO J.* 1999 Sept 1; 18(17):4608-4618.
6. T. Suda, et al. Modulation of Osteoclast differentiation and function by the new members of the tumor necrosis factor receptor and ligand families. *Endocrine Reviews*. 1999 20(3):345-357.
7. J. E. Fisher, et al. Alendronate mechanism of action: geranylgeraniol, an intermediate in the mevalonate pathway, prevents inhibition of osteoclast formation, bone resorption, and kinase activation *in-vitro*. *Proc. Natl. Acad. Sci. USA*. 1999 Jan 5; 96(1):133-8.

For questions and additional information please contact



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