

Bone CoFactors

Osteo Support

DESCRIPTION

Bone CoFactors is formulated to provide the necessary vitamins and minerals combined with a milk protein fraction called MBP® that helps to support bone strength. MBP® has the distinctive function of balancing osteoblast and osteoclast activity, which complements the function of other nutrients in Bone CoFactors for optimized bone health.†

FUNCTIONS

Bones are constantly being remodeled, not only during the growth stages, but also into adulthood. This process of bone turnover involves two types of cells: osteoblasts and osteoclasts. Osteoblasts promote bone formation and create collagen, so that calcium can effectively adhere to the collagen and create new tissue. Osteoclasts destroy old bone tissue by releasing acid and enzymes to dissolve calcium and collagen. However, osteoclasts can become excessive due to hormonal imbalances and other factors, leading to calcium deficiency in the bone. Therefore, nutrients that suppress excess osteoclast activity and support osteoblast activity are important to the health of the bones.

MBP® is a milk protein fraction that is found in human and bovine milk and has been clinically shown to support the formation of healthy bones. It is a highly bioactive fraction of total milk protein content consisting of 97.2% lactoferrin and lactoperoxidase, with the remaining 2.8% as other milk proteins, cystatin C, HMG-like protein, and kininogen fragment 1.2. Unlike other bone substances such as Vitamin K, MBP increases the number of bone-forming osteoblast cells *and* regulates the activity of bone-destroying osteoclast cells (see chart, page 2). Therefore, MBP is a multifunctional protein that functions by acting directly and/or indirectly on bone cells to promote the bone formation, while at the same time inhibiting excess bone destruction, called bone resorption. Because bone metabolism proceeds at an extremely gradual pace, it may take 3 to 6 months or longer to notice improved bone metabolism with supplementation. In a study conducted with 33 healthy adult women, BMD (bone mineral density) increased by 3% in the control group after 6 months of ingesting 40 mg of MBP® daily. Another clinical study performed with 32 post-menopausal women consuming MBP daily for 6 months, the mean lumbar BMD significantly increased and Urinary cross-linked N-telopeptides (NTx) of type I collagen were significantly decreased, resulting in positive bone metabolism.†

Calcium supplementation through dietary sources and supplementation is important for bones, but it is merely the material used to form bones. It is osteoblasts that actually form bones. Therefore, no matter how much calcium one ingests, if bones are not receptive to the calcium, it isn't fully incorporated into the bones. MBP can help the body utilize the calcium ingested. **Vitamin D** helps to facilitate calcium absorption and transport. Vitamin D can increase the expression of osteocalcin and other important compounds from osteoblasts to help support bone formation; it can also help to breakdown bone and mobilize calcium to other tissues in the body. Numerous scientists now feel that supplementation with vitamin D at levels greater than previously thought necessary is critical to helping maintain healthy bone remodeling as we age.†

Vitamin K2 is not commonly found in the diet. Human studies show that vitamin K plays important roles in bone health; it has been shown to decrease calcium excretion and is involved in gamma-carboxylation of osteocalcin. Osteocalcin, a protein found in the extracellular bone matrix is important for healthy bone formation as it facilitates the carrying of calcium out of blood vessels and binding it to hydroxyapatite (bone matrix). Vitamin K2 (as menaquinone-7) is more bioactive and has proven more effective than vitamin K1 and other menaquinones. Furthermore, the study showed better utilization and improved osteocalcin carboxylation for MK-7 after 6 weeks.

Calcium Microcrystalline Hydroxyapatite provides a highly beneficial source of dietary calcium together with other naturally occurring nutrients like phosphorus, amino acids, glycosaminoglycans that assist in the maintenance of healthy bone structure and function.† **Boron** affects the composition, structure, and strength of bone. It appears to be necessary for calcium and magnesium absorption, their adequate renal reabsorption,

Bone CoFactors Osteo Support

and their incorporation into the bone matrix. **Magnesium** is a mineral that is important for normal bone structure, and plays an essential role in more than 300 cellular reactions.† New research shows magnesium homeostasis is helpful for maintaining bone integrity. Vitamin D and parathyroid hormone are essential for magnesium absorption.

Trace minerals such as **zinc, manganese and copper** are also important for bone health. Some clinical research suggests that taking copper in combination with zinc, manganese, and calcium may support healthy bone metabolism in postmenopausal women.† Low serum zinc levels have been associated with low bone mineral density.

Differences in function between MBP® and other substances in Bone CoFactors

	Calcium nutrition		Promotion of bone formation			Inhibition of bone resorption	
	Provides calcium	Accelerates calcium absorption	Increases the number of osteoblasts	Promotes collagen formation by osteoblasts	Promotes bone calcification	Reduces the number of osteoclasts	Inhibits bone resorption by osteoclasts
MBP®			•	•		•	•
Vitamin D		•					
Vitamin K					•	•	
Calcium	•						
Magnesium				•			

INDICATIONS

Bone CoFactors is a dietary supplement indicated for individuals that require the nutrients necessary for healthy bone strength and metabolism.

FORMULA (#201940-180X)

Serving size 6 capsules

Vitamin D-3	2,000 IU
Vitamin K-2	90 mcg
(as Menaquinone-7, soy-free)	
Calcium.....	500 mg
(from Microcrystalline Hydroxyapatite)	
Phosphorus	225 mg
(from Microcrystalline Hydroxyapatite)	
Magnesium.....	200 mg
(as Magnesium Glycinate Chelate Complex)	
Zinc.....	10 mg
(as zinc monomethionine, OptiZinc®)	
Copper.....	1 mg
(as Copper Amino Acid Chelate)	
Manganese.....	2 mg
(as Manganese Amino Acid Chelate)	
Boron.....	3 mg

Bone CoFactors

Osteo Support

(as Boron Amino Acid Chelate)

MBP® (Milk Protein*)..... 40 mg

Other Ingredients: Gelatin (capsule, from bovine), cellulose, vegetable stearate, silica.

*97.2% lactoferrin and lactoperoxidase, 2.8% other milk proteins

MBP® is a registered trademark of MEGMILK SNOW BRAND Co., Ltd. in the U.S.A.

SUGGESTED USE

Adults take 6 capsules daily in divided doses with meals, or as directed by a healthcare professional.

Warning: This product contains Vitamin K, which interferes with the prescription drug Coumadin (Warfarin), if taking this drug, consult your physician prior to use.

SIDE EFFECTS

No adverse effects have been reported.

STORAGE

Store in a cool, dry place, away from direct light. Keep out of reach of children.

REFERENCES

- Unishi K., et al. Milk basic protein increases bone mineral density and improves bone metabolism in healthy young women. *Osteoporos Int.* 2007. 18:385–390
- Yamamura J., et al. Milk basic protein (MBP) increases radial bone mineral density in healthy adult women. *Biosci. Biotechnol. Biochem.* 2002. 66(3):702–704
- Aoyagi Y., et al. Interactive effects of milk basic protein supplements and habitual physical activity on bone health in older women: A 1-year randomized controlled trial. *International Dairy Journal* 2010. 20:724–730
- Toba, Y., et al. Milk basic protein, a novel protective function of milk against osteoporosis. *Bone*, 27, 403408 (2000).
- Takada, Y., et al.: Milk basic protein (MBP) promotes bone formation and suppresses bone resorption, In *Nutritional Aspects of Osteoporosis*. pp. 141–153. Academic Press, New York, NY (2001).
- Aoe S., et al. A controlled trial of the effect of milk basic protein (MBP) supplementation on bone metabolism in healthy menopausal women. *Osteoporos Int.* 2005. 16:2123–2128
- Gillespie WJ, Henry DA, O'Connell DL, Robertson J. Vitamin D and vitamin D analogues for preventing fractures associated with involutional and post-menopausal osteoporosis. *Cochrane Database Syst Rev.* 2000;(2):CD000227
- Knapen MH, Schurgers LJ, Vermeer C. Vitamin K(2) supplementation improves hip bone geometry and bone strength indices in postmenopausal women. *Osteoporos Int.* 2007 Feb 8
- Prabhoo R, Prabhoo TR. Vitamin K2: a novel therapy for osteoporosis. *J Indian Med Assoc.* 2010 Apr;108(4):253-4, 256-8.
- Yamauchi M, Yamaguchi T, Nawata K, Takaoka S, Sugimoto T. Relationships between undercarboxylated osteocalcin and vitamin K intakes, bone turnover, and bone mineral density in healthy women. *Clin Nutr.* 2010 Dec;29(6):761-5.
- Castiglioni S, Cazzaniga A, Albisetti W, Maier JA. Magnesium and osteoporosis:current state of knowledge and future research directions. *Nutrients.* 2013 Jul 31;5(8):3022-33.
- Rude RK, Singer FR, Gruber HE. Skeletal and hormonal effects of magnesium deficiency. *J Am Coll Nutr.* 2009 Apr;28(2):131-41. Review.
- Strause L, Saltman P, Smith KT, Bracker M, Andon MB. Spinal bone loss in postmenopausal women supplemented with calcium and trace minerals. *J Nutr.* 1994Jul;124(7):1060-4.

Bone CoFactors

Osteo Support

Hyun TH, Barrett-Connor E, Milne DB. Zinc intakes and plasma concentrations in men with osteoporosis: the Rancho Bernardo Study. Am J Clin Nutr. 2004 Sep;80(3):715-21.

For more information on Bone CoFactors, visit douglaslabs.com

† These statements have not been evaluated by the Food and Drug Administration.
This product is not intended to diagnose, treat, cure, or prevent any disease.

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