

Product Information

Bone Morphogenetic Protein 5 human
recombinant, expressed in mouse NSO cells
cell culture tested

Catalog Number **B9803**
Storage Temperature -20°C

Synonym: BMP-5

Product Description

Bone Morphogenetic Protein 5 (BMP-5) is produced from a DNA sequence encoding a chimeric protein containing the human BMP-2 signal peptide and propeptide (amino acid residues 1-282 of human BMP-2) fused to the human BMP-5 mature subunit (amino acid residues 323-454 of human BMP-5)¹ and expressed in mouse myeloma NSO cells. Mature human BMP-5, generated after the proteolytic removal of the signal peptide and the propeptide, is a disulfide-linked homodimeric protein containing two 167 amino acid residue subunits. Each subunit has a calculated molecular mass of ~18 kDa. Due to glycosylation, the recombinant protein migrates as a doublet of 20 kDa and 25 kDa protein under reducing conditions in SDS-PAGE.

Human Bone Morphogenetic Proteins (BMPs) are members of the TGF- β superfamily that affect bone and cartilage formation.¹⁻³ Mature BMPs are 30-38 kDa proteins that assume a TGF- β -like cysteine knot configuration. Unlike TGF- β , BMPs do not form latent complexes with their propeptide counterparts. Most BMPs are homodimers, but bioactive natural heterodimers have been reported. Recently it was found that lovastatin, widely used for lowering cholesterol, also increases bone formation by turning on the gene for BMP-2, which promotes local bone formation.⁴ BMPs create an environment conducive for bone marrow development by stimulating the production of specific bone matrix proteins and altering stromal cell and osteoclast proliferation.^{5,6} In addition to stimulating ectopic bone and cartilage development, BMPs may be an important factor for development of the viscera, with roles in cell proliferation, apoptosis, differentiation, and morphogenesis.^{1,7} BMPs appear to be responsible for normal dorsal/ventral patterning. Like TGF- β , BMPs bind to a type II receptor, which then recruits the transducing type I receptor unit, activating the SMAD protein signaling pathway.⁸⁻¹⁰ There are six TGF- β family type I receptors and four TGF- β family type II receptors.

Reagent

Supplied as a lyophilized powder from a 0.2 μm filtered solution in 30% acetonitrile, 0.1% TFA, with 5% trehalose and 50 μg of BSA per 1 μg of cytokine

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

It is recommended that sterile 4 mM HCl containing at least 0.1% human serum albumin or bovine serum albumin be added to the vial to prepare a stock solution of no less than 10 $\mu\text{g}/\text{mL}$.

Storage/Stability

Store the product at -20°C . After thawing, store at $2-8^{\circ}\text{C}$ for up to 3 months. For extended storage, freeze in working aliquots at -20°C . Repeated freezing and thawing is not recommended

Product Profile

The biological activity is measured by its ability to induce alkaline phosphatase production in ATDC5 chondrogenic cells.

Purity: >95% (SDS-PAGE, visualized with silver stain)

Endotoxin: <1.0 EU/ μg of cytokine (LAL method)

Related Product

Mevinolin (Lovastatin, Catalog Number M2147)

References

1. Hogan, B.L.M., Bone morphogenetic proteins - multifunctional regulators of vertebrate development. *Genes Dev.*, **10**, 1580-1594 (1996).
2. Reddi, A.H., Role of morphogenetic proteins in skeletal tissue engineering and regeneration. *Nature Biotechnol.*, **16**, 247-252 (1998).

3. Francis-West, P.H., *et al.*, BMP/GDF-signalling interactions during synovial joint development. *Cell Tissue Res.*, **296**, 111-119 (1999).
4. Mundy, G., *et al.*, Stimulation of bone formation *in vitro* and in rodents by statins. *Science*, **286**, 1946-1949 (1999).
5. Macias, D., *et al.*, Regulation by members of the transforming growth factor beta superfamily of the digital and interdigital fates of the autopodial limb mesoderm. *Cell Tissue Res.*, **296**, 95-102 (1999).
6. Lecanda, F., *et al.*, Regulation of bone matrix protein expression and induction of differentiation of human osteoblasts and human bone marrow stromal cells by bone morphogenetic protein-2. *J. Cell. Biochem.*, **67**, 386-398 (1997).
7. Dale, L., and Wardle, F.C., A gradient of BMP activity specifies dorsal-ventral fates in early *Xenopus* embryos. *Seminars Cell Dev. Biol.*, **10**, 319-326 (1999).
8. Massague, J., *et al.*, The TGF- β family and its composite receptors. *Trends Cell Biol.*, **4**, 172-178 (1994).
9. Derynck, R., and Feng, X.H., TGF- β receptor signaling. *Biochim. Biophys. Acta*, **1333**, F105-F150 (1997).
10. Attisano, L., *et al.*, Identification of human activin and TGF- α type I receptors that form heteromeric kinase complexes with type II receptors, *Cell*, **75**, 671-680 (1993).
11. Celeste, A.J., *et al.*, Identification of transforming growth factor β family members present in bone-inductive protein purified from bovine bone, *Proc. Natl. Acad. Sci. USA*, **87**, 9843-9847 (1990).

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