GMP Recombinant Human/Mouse/Rat BMP-2 (carrier-free)

Catalog# / Size	767314 / 25 µg 767316 / 100 µg
Other Names	BMP2A, BMP-2A, BMP-2, Bone Morphogenetic Protein 2A
Description	Bone morphogenetic protein 2 (BMP-2) belongs to the TGF-β superfamily. Like other members of BMP family, BMP-2 is synthesized as an inactive propeptide precursor which dimerizes and then, it is further processed into mature form by proprotein convertases (PCs). Some evidence indicated that PC5/6A and Factor VII-activating protease (FSAP) are involved in maturation of BMP-2. Mature BMP-2 is a 26 kD protein composed of 114 amino acids, forming three intramolecular and one intermolecular disulfide bond. BMP-2 forms homodimer or heterodimer with other BMP proteins, including BMP-4, BMP-6 and BMP-7. BMP-2 signal through heterodimeric serine/threonine kinase receptors composed of a type I (BMPR1a/ALK3, BMPR1b/ALK6, ActRIa/ALK2) and a type II (BMPR2, ACVR2a/ActRIIA, ACVR2b/ActRIIB). BMP-2 binds to the type I receptor with high affinity, in turn recruiting the type II receptor. BMP-2 stimulation initiates receptor shutdown, leading to receptor clustering and activation of the downstream signaling. BMP-2 signals via canonical Smad or other downstream kinase, such as p38 and JNK in a context-dependent manner. BMP-2 is involved in several processes, including cartilage and bone formation, differentiation, and embryogenesis. BMP-2 induces osteogenic differentiation in human mesenchymal stem cells and myogenic cells. BMP-2 induces cartilage repair and remodeling by stimulating chondrocyte proliferation and expression of matrix proteins. BMP-2/BMP-7 heterodimer is more potent in the induction of bone formation *in vivo* than BMP-2 homodimer. BMP-2-deficiency leads to embryonic lethality with abnormal cardiac development, malformation of the amnion/chorion, severe chondrodysplasia, and defects in myocardial patterning, suggesting that BMP-2 mediates organ morphogenesis. Noggin is an antagonist that can reverse BMP-2-mediated effect. Noggin exppression is induced by BMP-2 in osteoblasts as a negative feedback loop. In addition, BMP-2 stimulates epithelial to mesenchymal cell transformation through TGF-β type III receptor.

Product Details

Source	Human BMP-2, amino acid (Ala284-Arg396) (Accession: # P12643) was expressed in *E.coli*.
Molecular Mass	The 113 amino acid recombinant protein has a predicted molecular mass of approximately 12.8 kD. The DTT-reduced and non-reduced protein migrates at approximately 13 and 26 kD respectively by SDS-PAGE. The predicted N-terminal amino acid is Ala.
Purity	> 95%, as determined by Coomassie stained SDS-PAGE.
Formulation	0.1 µm filtered protein solution is in 4 mM HCl
Endotoxin Level	Less than 0.1 EU per µg cytokine as determined by the LAL method.
Concentration	25 µg and 100 µg sizes are bottle at 0.5 mg/mL
Storage & Handling	Unopened vial can be stored between 2°C and 8°C for up to 2 weeks, at -20°C for up to six months, or at -70°C or colder until the expiration date. For maximum results, quick spin vial prior to opening. The protein can be aliquoted and stored at -20°C or colder. Stock solutions can also be prepared at 50 - 100 µg/mL in appropriate sterile buffer, carrier protein such as 0.2 - 1% endotoxin-free BSA or HSA can be added when preparing the stock solution. Aliquots can be stored between 2°C and 8°C for up to one week or stored at -20°C or colder for up to 3 months. **Avoid repeated freeze/thaw cycles.**
Activity	Human BMP-2 induces alkaline phosphatase (ALP) production in the mouse chrondrogenic cell line ATDC5 in a dose dependent manner. The ED_{50} for this effect is 40 – 200 ng/mL.
Application	Bioassay
Application Notes	BioLegend carrier-free recombinant proteins provided in liquid format are shipped on blue-ice. Our comparison testing data indicates that when handled and stored as recommended, the liquid format has equal or better stability and shelf-life compared to commercially available lyophilized proteins after reconstitution. Our liquid proteins are verified in-house to maintain activity after shipping on blue ice and are backed by our 100% satisfaction guarantee. If you have any concerns, contact us at tech@biolegend.com.

Disclaimer

GMP Recombinant Proteins. BioLegend GMP recombinant proteins are manufactured in a dedicated GMP facility and compliant with ISO 13485:2016. For research or *ex vivo* cell processing use. Not for use in diagnostic or therapeutic procedures. Our processes include:

- Batch-to-batch consistency
- Material traceability
- Documented procedures
- Documented employee training
- Equipment maintenance and monitoring records
- Lot-specific certificates of analysis
- Quality audits per ISO 13485:2016
- QA review of released products

BioLegend GMP recombinant proteins are manufactured and tested in accordance with USP Chapter 1043, Ancillary Materials for Cell, Gene and Tissue-Engineered Products and Ph. Eur. Chapter 5.2.12.

Antigen Details

Structure Disulfide-linked homodimer

Distribution Abundant in lung, spleen and colon in human, low expression but detectable in heart, kidney, brain, liver, skeletal muscle, pancreases, placenta, prostate, ovary, and small intestine

Function BMP-2 is involved in osteogenesis, cartilage repair, and organogenesis

Interaction Chondroblast, osteoblast, proprotein convertases, BMP family members

Ligand/Receptor BMP receptor type IA (BMPR1a/ALK3), type IB (BMPR1b/ALK6), Activin receptor type IA (ACVR1a/ActRIa/ALK2) and BMP receptor type II (BMPR2), Activin receptors type IIA (ACVR2a/ActRIIA), type IIB (ACVR2b/ActRIIB)

Bioactivity BMP-2 induces alkaline phosphatase in ATDC5 mouse chondrogenic cells.

Cell Type Embryonic Stem Cells

Biology Area Angiogenesis, Cell Biology, Neuroscience, Stem Cells, Synaptic Biology

Molecular Family Cytokines/Chemokines, Growth Factors

Antigen References

1. Bragdon B, *et al*. 2011. *Cell Signal* 23: 609.
2. Israel DI, *et al*. 1992. *Growth Factor.* 7: 139.
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10. Wozney JM, *et al*. 1988. *Science* 242: 1528.
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12. Lavery K, *et al*. 2008. *J. Biol. Chem.* 283: 20948.
13. Israel DI, *et al*. 1996. *Growth Factors* 13: 291.
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15. De Luca F *et al*. 2001. *Endocrinology* 142: 430.
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19. Wang RN, *et al*. 2014. *Genes Dis.* 87-105.
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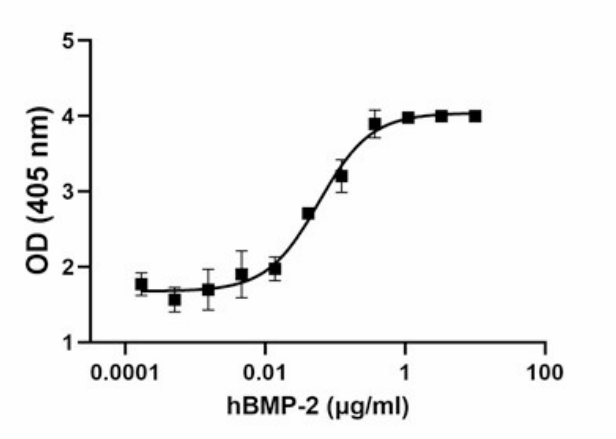
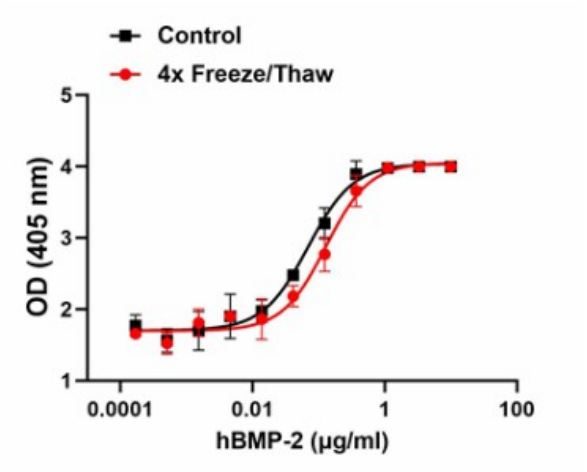
Gene ID 650

Product Data



GMP recombinant human BMP-2 induces alkaline phosphatase (ALP) production in the mouse chrondrogenic cell line ATDC5 in a dose dependent manner. The ED_{50} for this effect is 40 – 200 ng/mL.



Stability Testing for GMP Recombinant Human BMP-2. Human BMP-2 was aliquoted in 4mM HCl. One aliquot was frozen and thawed four times (4x Freeze/Thaw) and compared to the control that was kept at 4°C (Control). The samples were tested for their ability to induce alkaline phosphatase (ALP) production in the mouse chrondrogenic cell line ATDC5 in a dose dependent manner. The ED_{50} for this effect is 40 – 200 ng/mL.

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