

Cell-Vive™ 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	<p>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 <i>in vivo</i> 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 expression 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.</p>

Quality Statement BioLegend Cell-Vive™ 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 in a dedicated GMP facility compliant with ISO 13485:2016. Specifications and processes include:

- Low endotoxin level (≤ 0.1 EU/µg)
- Purity ($\geq 95\%$ or higher)
- Bioburden testing
- Mycoplasma testing
- Batch-to-batch consistency
- Vendor qualification
- Raw material traceability and documentation
- Documented procedures and employee training
- Equipment maintenance and monitoring records
- Lot-specific certificates of analysis
- Quality audits per ISO 13485:2016
- QA review of released products

Product Details

Source	Human BMP-2, amino acid (Ala284-Arg396) (Accession: # P12643) was expressed in <i>E.coli</i> .
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.
N-terminal Sequence Analysis	Met-Gln-Ala-Lys-His-Lys-Gln-Arg-Lys-Arg
Purity	$\geq 95\%$, as determined by Coomassie stained SDS-PAGE.
Formulation	0.1 µM filtered protein solution is in 4 mM HCl
Endotoxin Level	Less than or equal to 0.1 EU per µg protein as determined by the LAL method.
Residual Host Cell Protein	≤ 0.500 ng/µg by ELISA

Content	
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 chondrogenic cell line ATDC5 in a dose dependent manner. The ED ₅₀ for this effect is 40 – 200 ng/mL. The specific activity of Cell-Vive™ GMP Recombinant Human/Mouse/Rat BMP-2 (carrier-free) is ≥ 1.4 x 10 ⁵ IU/mg when compared against the WHO International Standard for human BMP-2 (NIBSC code: 93/574).
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	BioLegend Cell-Vive™ GMP Recombinant proteins are for research use only. Suitable for <i>ex vivo</i> cell processing. Not for injection or diagnostic or therapeutic use. Not for resale. BioLegend will not be held responsible for patent infringement or other violations that may occur with the use of our products.

Antigen Details

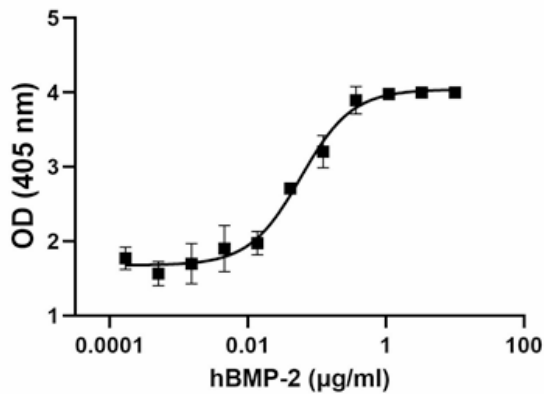
Structure	Disulfide-linked homodimer
Distribution	Abundant in lung, spleen and colon in human, low expression but detectable in heart, kidney, brain, liver, skeletal muscle, pancreases, placenta, prostate, ovary, and small intestine
Function	BMP-2 is involved in osteogenesis, cartilage repair, and organogenesis
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/ActR1a/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

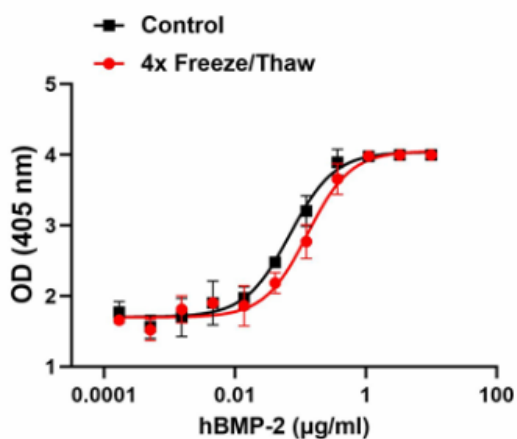
1. Bragdon B, *et al.* 2011. *Cell Signal* 23: 609.
2. Israel DI, *et al.* 1992. *Growth Factor*. 7: 139.
3. Lee SN, *et al.* 2015. *Am. J. Respir. Cell Mol. Biol.* 52: 749.
4. Roedel EK, *et al.* 2013. *J. Biol. Chem.* 288, 7193.
5. Nohe A, *et al.* 2002. *J. Biol. Chem.* 277: 5330.
6. Zhou AJ, *et al.* 2012. *Growth Factors* 30: 267.
7. Miyazono K, *et al.* 2010. *J. Biochem.* 147: 35.
8. Nohe A *et al.* 2004. *J. Cell Sci.* 118: 643.
9. Hay E, *et al.* 2001. *J. Biol. Chem.* 276: 29028.
10. Wozney JM, *et al.* 1988. *Science* 242: 1528.
11. Ryoo HM, *et al.* 2006. *Gene* 366: 51.
12. Lavery K, *et al.* 2008. *J. Biol. Chem.* 283: 20948.
13. Israel DI, *et al.* 1996. *Growth Factors* 13: 291.
14. Mundy G, *et al.* 1999. *Science* 286: 1946.
15. De Luca F *et al.* 2001. *Endocrinology* 142: 430.
16. Blaney Davidson EN, *et al.* 2007. *Arthritis Res. Ther.* 9: R102.
17. Zhang H, Bradley A. 1996. *Development* 122: 2977.
18. Pera MF, *et al.* 2004. *J. Cell Sci.* 117: 1269.
19. Wang RN, *et al.* 2014. *Genes Dis.* 87-105.
20. Kirkbride KC, *et al.* 2008. *J. Biol. Chem.* 283: 7628.

Gene ID [650](#)

Product Data



GMP recombinant human BMP-2 induces alkaline phosphatase (ALP) production in the mouse chondrogenic cell line ATDC5 in a dose dependent manner. The ED₅₀ 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 chondrogenic cell line ATDC5 in a dose dependent manner. The ED₅₀ for this effect is 40 – 200 ng/mL.

For Research Use Only. Suitable for *ex vivo* cell processing. Not for injection or diagnostic or therapeutic use.

This product is supplied subject to the terms and conditions, including the limited license, located at www.biolegend.com/terms ("Terms") and may be used only as provided in the Terms. Without limiting the foregoing, BioLegend products may not be used for any Commercial Purpose as defined in the Terms, resold in any form, used in manufacturing, or reverse engineered, sequenced, or otherwise studied or used to learn its design or composition without express written approval of BioLegend. Regardless of the information given in this document, user is solely responsible for determining any license requirements necessary for user's intended use and assumes all risk and liability arising from use of the product. BioLegend is not responsible for patent infringement or any other risks or liabilities whatsoever resulting from the use of its products.

BioLegend, the BioLegend logo, and all other trademarks are property of BioLegend, Inc. or their respective owners, and all rights are reserved.

8999 BioLegend Way, San Diego, CA 92121 www.biolegend.com
Toll-Free Phone: 1-877-Bio-Legend (246-5343) Phone: (858) 768-5800 Fax: (877) 455-9587