Recombinant Human BMP-2 GMP

Catalog Number: 355-GMP

DESCRIPTION

Source	Chinese Hamster Ovary cell line, CHO-derived Gln283-Arg396 Accession # P12643 Manufactured and tested under current Good Manufacturing Practice (GMP) guidelines.
N-terminal Sequence Analysis	Gln-Ala-Lys-His-Lys-Gln-Arg-Lys-Arg-Leu
Structure / Form	Disulfide-linked homodimer
Predicted Molecular Mass	13 kDa (monomer)

SPECIFICATIONS

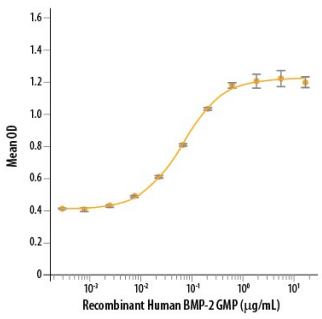
SDS-PAGE	15-16, kDa, reducing conditions
Activity	Measured by its ability to induce alkaline phosphatase production by ATDC5 mouse chondrogenic cells. Binnerts, M.E. *et al.* (2004) Biochem. Biophys. Res. Commun. **315(2)**:272. The ED_{50} for this effect is 40-200 ng/mL. The specific activity of recombinant human BMP-2 is approximately 781 units/µg, which is calibrated against human BMP-2 WHO Standard (NIBSC code: 93/574).
Endotoxin Level	<0.10 EU per 1 µg of the protein by the LAL method.
Purity	>95%, by SDS-PAGE with silver staining, under reducing conditions.
Host Cell Protein	<0.5 ng per µg of protein when tested by ELISA.
Mycoplasma	Negative when tested in a ribosomal RNA hybridization assay.
Formulation	Lyophilized from a 0.2 µm filtered solution in Glycine, Sucrose, Tween® 80 and Glutamic Acid. See Certificate of Analysis for details.

PREPARATION AND STORAGE

Reconstitution	Reconstitute at 100 µg/mL in 4 mM HCl.
Shipping	The product is shipped at ambient temperature. Upon receipt, store it immediately at the temperature recommended below.
Stability & Storage	**Use a manual defrost freezer and avoid repeated freeze-thaw cycles.** ● A minimum of 6 months when stored at ≤ -20 °C as supplied. Refer to lot specific COA for the Use by Date. ● 1 month, 2 to 8 °C under sterile conditions after reconstitution. ● 3 months, ≤ -20 °C under sterile conditions after reconstitution.

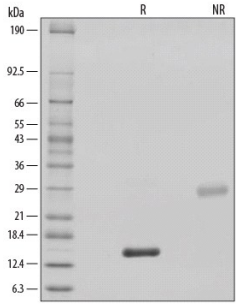
DATA

Bioactivity



GMP-grade Recombinant Human BMP-2 (Catalog # 355-GMP) induces alkaline phosphatase production in the ATDC5 mouse chondrogenic cell line. The ED_{50} for this effect is 40-200 ng/mL.

SDS-PAGE



1 µg/lane of GMP-grade Recombinant Human BMP-2 (Catalog # 355-GMP) was resolved with SDS-PAGE under reducing (R) and non-reducing (NR) conditions and visualized by silver staining, showing single bands at 15 kDa and 30 kDa, respectively.

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BACKGROUND

Bone morphogenetic protein 2 (BMP-2) is a member of the BMP subgroup of the TGF-β superfamily. It plays a dominant role in embryonic dorsal-ventral patterning, organogenesis, limb bud formation, and bone formation and regeneration (1, 2). Human BMP-2 is synthesized as a 396 amino acid (aa) preproprotein that contains a 23 aa signal sequence, a 259 aa prosegment, and a 114 aa mature region (3). Proteolytic removal of the propeptide enables mature BMP-2 to form active disulfide linked homodimers and heterodimers with BMP-7 (2). Mature monomeric BMP-2 is an 18 kDa glycosylated peptide with seven conserved cysteines that form a cystine knot structure (4). Mature human BMP-2 shares 100% aa sequence identity with mouse and rat BMP-2. It shares 85% aa sequence identity with human BMP-4 and less than 51% with other BMPs. BMP-2 signals through heterodimeric complexes composed of a type I receptor (Activin RI, BMPR-IA, or BMPR-IB) and a type II receptor (BMP RII or Activin RIIB) (2, 5). BMP-2 induces chondrocyte proliferation, endochondral bone formation, longitudinal bone growth, and bone and cartilage repair (6, 7). It induces ectopic bone formation or calcification by promoting osteogenic and chondrogenic differentiation in mesenchymal cells, stem cells, and vascular smooth muscle cells (2, 8-10). BMP-2/BMP-7 heterodimers are significantly more potent than BMP-2 homodimers at inducing bone formation *in vivo* (11). BMP-2 also promotes the maintenance and repair of colonic epithelium, suppresses neuronal dopamine synthesis and release, induces apoptosis in medulloblastoma cells, and is required for cardiac contractility (12-15).

References:

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2. Chen, D. *et al.* (2004) Growth Factors **22**:233.
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5. Sebald, W. *et al.* (2004) Biol. Chem. **385**:697.
6. De Luca, F. *et al.* (2001) Endocrinology **142**:430.
7. Davidson, E.N.B., et al. (2007) Arthritis Res. Ther. **9**:R102.
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10. Li, X. *et al.* (2008) Atherosclerosis January 5 epub.
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12. Peiris, D. *et al.* (2007) Am. J. Physiol. Gastrointest. Liver Physiol. **292**:G753.
13. Kano, Y. *et al.* (2005) Endocrinology **146**:5332.
14. Hallahan, A.R. *et al.* (2003) Nat. Med. **9**:1033.
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MANUFACTURING SPECIFICATIONS

GMP Proteins

R&D Systems, a Bio-Techne Brand's GMP proteins are produced according to relevant sections of the following documents: WHO TRS, No. 822, 1992 Annex 1, Good Manufacturing Practices for Biological Products; USP Chapter 1043, Ancillary Materials for Cell, Gene and Tissue-Engineered Products and USP Chapter 92, Growth Factors and Cytokines Used in Cell Therapy Manufacturing.

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- N-terminal amino acid analysis, SDS-PAGE analysis, and endotoxin level (as determined by LAL assay) performed on each bulk QC lot, not on individual bottlings of each QC lot
- Post-bottling lot-specific bioassay results (compliance with an established range) and results of microbial bioburden testing (using broth culture, Sabourand's dextrose and blood agar plates with results reported at 3 days and at 7 days)
- Host Cell Protein testing performed by ELISA
- Mycoplasma testing by ribosomal RNA hybridization assay

Additional testing and documentation requested by the customer can be arranged at an additional cost. Testing may include, but is not limited to, USP <61> bioburden testing, positive identity testing, testing for adventitious agents and testing for residual host cell content.

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