# PRODUCT INFORMATION

## BMP2 (recombinant)

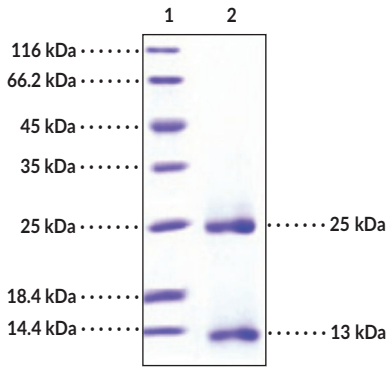
*Item No. 32050*

### Overview and Properties

| | |
|---|---|
| **Synonym:** | Bone Morphogenic Protein 2 |
| **Source:** | Active recombinant BMP2 expressed in *E. coli* |
| **Amino Acids:** | 283-396 |
| **Uniprot No.:** | P12643 |
| **Molecular Weight:** | 13 kDa |
| **Storage:** | -80°C (as supplied) |
| **Stability:** | ≥1 year |
| **Purity:** | ≥95% estimated by SDS-PAGE |
| **Supplied in:** | Lyophilized from sterile 30% CAN and 0.1% TFA, pH 2.9 |
| **Bioactivity:** | See figures for details |

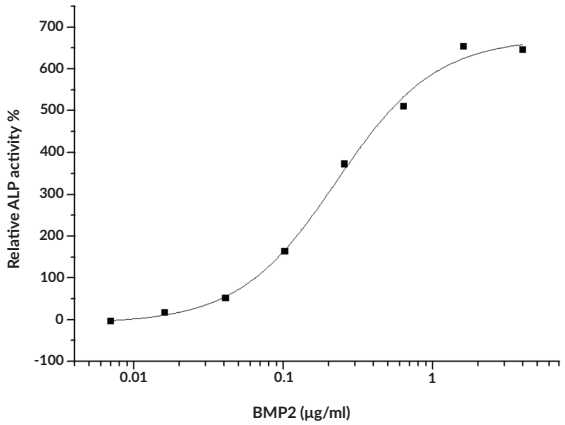
*Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.*

### Images




**Lane 1:** MW Markers
**Lane 2:** BMP2

**SDS-PAGE Analysis of BMP2.** This protein has a calculated molecular weight of 13 kDa. By SDS-PAGE, under non-reducing conditions, the protein has apparent molecular weights of approximately 13 and 25 kDa corresponding to the monomer and dimer, respectively.




**ALP Induction by BMP2.** BMP2 is measured by its ability to induce alkaline phosphatase production by MC3T3-E1 mouse osteoblastic cells. The $EC_{50}$ value for this effect is typically 0.1-0.5 µg/ml.

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## Description

Bone morphogenetic protein 2 (BMP2) is a member of the TGF-β superfamily of growth factors that has roles in osteogenesis and embryogenesis.[1] It is composed of an N-terminal prodomain that regulates BMP2 folding and secretion and a C-terminal mature domain that contains the receptor binding region. BMP2 is expressed by chondrocytes, osteocytes, osteoblasts, and vascular endothelial cells and is synthesized in the cytosol as a proprotein dimer.[2,3] Cleavage of the proprotein dimer by proprotein convertase subtilisin kexins (PCSKs) generates the N- and C-terminal domains, which remain non-covalently associated and homodimerize or heterodimerize with BMP4 or BMP7 prior to secretion.[2] BMP2 preferentially binds to BMP type 1 receptors, also known as activin receptor-like kinases (ALKs), which are expressed by mesenchymal or hematopoietic stem cells, chondrocytes, osteoblasts, osteoclasts, and myoblasts, and activates SMAD-dependent and -independent gene transcription.[1,4] BMP2 induces production of collagen type I α and alkaline phosphatase, a marker of bone formation, as well as induces differentiation and proliferation of bone marrow-derived mesenchymal stem cells *in vitro*.[5] Genome-wide deletion of *Bmp2* in mice induces amnion, chorion, and cardiac developmental defects and is embryonic lethal.[1] Limb-specific *Bmp2* conditional knockout mice exhibit spontaneous fractures and impaired fracture healing.[6] Serum and synovial fluid BMP2 levels are increased in patients with osteoarthritis and are positively correlated with disease severity.[7] Formulations containing BMP2 have been used in treatment of long bone fractures. Cayman's BMP2 (recombinant) protein can be used for cell-based assay applications. This protein consists of 115 amino acids that correspond to the mature form of human, canine, mouse, rat, and rhesus BMP2 and has a calculated molecular weight of 13 kDa. By SDS-PAGE, under non-reducing conditions, the protein has apparent molecular weights of approximately 13 and 25 kDa, corresponding to the monomer and dimer, respectively.

## References


1. Wang, R.N., Green, J., Wang, Z., *et al.* Bone morphogenetic protein (BMP) signaling in development and human diseases. *Genes Dis.* **1(1)**, 87-105 (2014).
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3. Constam, D.B. Regulation of TGFβ and related signals by precursor processing. *Semin. Cell Dev. Biol.* **32**, 85-97 (2014).
4. Lin, S., Svoboda, K.K.H., Feng, J.Q., *et al.* The biological function of type I receptors of bone morphogenetic protein in bone. *Bone Res.* **4**, 16005 (2016).
5. Lysdahl, H., Baatrup, A., Foldager, C.B., *et al.* Preconditioning human mesenchymal stem cells with a low concentration of BMP2 stimulates proliferation and osteogenic differentiation *in vitro*. *Biores. Open Access* **3(6)**, 278-285 (2014).
6. Tsuji, K., Bandyopadhyay, A., Harfe, B.D., *et al.* BMP2 activity, although dispensable for bone formation, is required for the initiation of fracture healing. *Nat. Genet.* **38(12)**, 1424-1429 (2006).
7. Liu, Y., Hou, R., Yin, R., *et al.* Correlation of bone morphogenetic protein-2 levels in serum and synovial fluid with disease severity of knee osteoarthritis. *Med. Sci. Monit.* **21**, 363-370 (2015).



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