

## BMP-1 Protein, Human (His)

<b>Cat. No.:</b>	HY-P72106
<b>Synonyms:</b>	BMP 1; BMP-1; BMP1; BMP1_HUMAN; Bone morphogenetic protein 1; Mammalian tolloid protein; mTld; OI13; PCOLC; PCP; PCP2; Procollagen C endopeptidase; Procollagen C proteinase; Procollagen C-proteinase; TLD; Tolloid; Drosophila; homolog of
<b>Species:</b>	Human
<b>Source:</b>	E. coli
<b>Accession:</b>	P13497 (A121-K986)
<b>Gene ID:</b>	649
<b>Molecular Weight:</b>	Approximately 102 kDa

### PROPERTIES

#### AA Sequence

A A T S R P E R V W	P D G V I P F V I G	G N F T G S Q R A V	F R Q A M R H W E K
H T C V T F L E R T	D E D S Y I V F T Y	R P C G C C S Y V G	R R G G G P Q A I S
I G K N C D K F G I	V V H E L G H V V G	F W H E H T R P D R	D R H V S I V R E N
I Q P G Q E Y N F L	K M E P Q E V E S L	G E T Y D F D S I M	H Y A R N T F S R G
I F L D T I V P K Y	E V N G V K P P I G	Q R T R L S K G D I	A Q A R K L Y K C P
A C G E T L Q D S T	G N F S S P E Y P N	G Y S A H M H C V W	R I S V T P G E K I
I L N F T S L D L Y	R S R L C W Y D Y V	E V R D G F W R K A	P L R G R F C G S K
L P E P I V S T D S	R L W V E F R S S S	N W V G K G F F A V	Y E A I C G G D V K
K D Y G H I Q S P N	Y P D D Y R P S K V	C I W R I Q V S E G	F H V G L T F Q S F
E I E R H D S C A Y	D Y L E V R D G H S	E S S T L I G R Y C	G Y E K P D D I K S
T S S R L W L K F V	S D G S I N K A G F	A V N F F K E V D E	C S R P N R G G C E
Q R C L N T L G S Y	K C S C D P G Y E L	A P D K R R C E A A	C G G F L T K L N G
S I T S P G W P K E	Y P P N K N C I W Q	L V A P T Q Y R I S	L Q F D F F E T E G
N D V C K Y D F V E	V R S G L T A D S K	L H G K F C G S E K	P E V I T S Q Y N N
M R V E F K S D N T	V S K K G F K A H F	F S D K D E C S K D	N G G C Q Q D C V N
T F G S Y E C Q C R	S G F V L H D N K H	D C K E A G C D H K	V T S T S G T I T S
P N W P D K Y P S K	K E C T W A I S S T	P G H R V K L T F M	E M D I E S Q P E C
A Y D H L E V F D G	R D A K A P V L G R	F C G S K K P E P V	L A T G S R M F L R
F Y S D N S V Q R K	G F Q A S H A T E C	G G Q V R A D V K T	K D L Y S H A Q F G
D N N Y P G G V D C	E W V I V A E E G Y	G V E L V F Q T F E	V E E E T D C G Y D
Y M E L F D G Y D S	T A P R L G R Y C G	S G P P E E V Y S A	G D S V L V K F H S
D D T I T K K G F H	L R Y T S T K F Q D	T L H S R K	

**Biological Activity** Measured by its ability to cleave a fluorogenic peptide substrate Mca-YVADAPK(Dnp)-OH. The specific activity is 4.879 pmol/min/μg.

**Appearance** Lyophilized powder.

**Formulation** Lyophilized from a 0.2 μm solution of Tris-based buffer, 50% Glycerol.

<b>Endotoxin Level</b>	<1 EU/μg, determined by LAL method.
<b>Reconstitution</b>	It is not recommended to reconstitute to a concentration less than 100 μg/mL in ddH <sub>2</sub> O.
<b>Storage &amp; Stability</b>	Stored at -20°C for 2 years. After reconstitution, it is stable at 4°C for 1 week or -20°C for longer (with carrier protein). It is recommended to freeze aliquots at -20°C or -80°C for extended storage.
<b>Shipping</b>	Room temperature in continental US; may vary elsewhere.

## DESCRIPTION

### Background

Bone morphogenetic protein 1 (BMP-1) also known as metalloprotease, belonging to the BMP-1/tolloidlike proteinases (BTP) family<sup>[1][2]</sup>. BTPs are known to be involved in the control of muscle growth and homeostasis and in wound healing and tissue repair, and BMP-1 is a signature extracellular matrix (ECM) proteins associated with the high metastatic potential of breast tumors<sup>[3]</sup>. BMP-1 regulates morphogenesis by processing precursors to mature functional extracellular matrix (ECM) proteins and several growth factors including TGFβ, BMP2, BMP4 and GFD8<sup>[4]</sup>.

BMP1 is the dominant C-proteinase in postnatal lung fibroblasts and mediates cleavage of COOH-terminal propeptide of type I procollagen (C1CP) with the main action site of extracellular space<sup>[1]</sup>.

BMP1 maintains appropriate levels of procollagen I and its activated products, acts as an essential part for maintaining periodontal homeostasis and normal cementum formation<sup>[2]</sup>.

The cleavage of thrombospondin-1 (TSP-1), an ECM protein classified as “matricellular” for its ability to regulate cell-matrix interactions, results BMP-1 overexpression. However BMP-1 can both trigger the disruption of cell adhesion and stimulate TGF-β signaling in TSP-1-rich microenvironments, which promote the differentiation of primary human keratocytes into myofibroblasts<sup>[3]</sup>.

Thereby, BMP1 participates in several developmental and physiological processes such as cartilage and bone formation, muscle growth and homeostasis<sup>[2][3]</sup>.

Mutations of BMP1 gene cause osteogenesis imperfecta in human, a bone disorder characterized by brittle bones that are prone to fracture, or phenotypes of periodontal disease and skin fragility in mice<sup>[3]</sup>.

BMP1-3 is a novel systemic regulator of bone repair. BMP1-3 isoform of the BMP-1 gene circulates in the human plasma and enhances bone healing. In vitro BMP1-3 increases the expression of collagen type I and osteocalcin in MC3T3-E(1) osteoblast like cells, and enhances the formation of mineralized bone nodules from bone marrow mesenchymal stem cells<sup>[4]</sup>.

BMP-1 is widely found in different animals, while the sequence in human is highly similar with rat (96.54%), and mouse (96.34%).

## REFERENCES

- [1]. N'Diaye EN, et al. Extracellular BMP-1 is the major proteinase for COOH-terminal proteolysis of type I procollagen in lung fibroblasts. *Am J Physiol Cell Physiol*. 2021 Feb 1;320(2):C162-C174.
- [2]. Wang J, et al. Proteinase bone morphogenetic protein 1, but not tolloid-like 1, plays a dominant role in maintaining periodontal homeostasis. *J Periodontol*. 2021 Jul;92(7):1018-1029.
- [3]. Anastasi C, et al. BMP-1 disrupts cell adhesion and enhances TGF-β activation through cleavage of the matricellular protein thrombospondin-1. *Sci Signal*. 2020 Jul 7;13(639):eaba3880.
- [4]. Grgurevic L, et al. Bone morphogenetic protein (BMP)1-3 enhances bone repair. *Biochem Biophys Res Commun*. 2011 Apr 29;408(1):25-31.
- [5]. Grgurevic L, et al. Bone morphogenetic protein (BMP)1-3 enhances bone repair. *Biochem Biophys Res Commun*. 2011 Apr 29;408(1):25-31.

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**Caution: Product has not been fully validated for medical applications. For research use only.**

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