BMP-7 Protein, Human

Cat. No.:	HY-P7008
Synonyms:	rHuBMP-7; OP-1
Species:	Human
Source:	E. coli
Accession:	P18075 (S293-H431)
Gene ID:	655
Molecular Weight:	Approximately 15.7 kDa

PROPERTIES

AA Sequence	S T G S K Q R S Q N R S K T P K N Q E A L R M A N V A E N S S S D Q R Q A C K K H E L Y V S F R D L G W Q D W I I A P E G Y A A Y Y C E G E C A F P L N S Y M N A T N H A I V Q T L V H F I N P E T V P K P C C A P T Q L N A I S V L Y F D D S S N V I L K K Y R N M V V R A C G C H
Appearance	Lyophilized powder
Formulation	Lyophilized after extensive dialysis against solution in 30% acetonitrile, 0.1% TFA.
Endotoxin Level	<1.0 EU/μg, determined by LAL method.
Reconsititution	It is not recommended to reconstitute to a concentration less than 100 μg/mL in 10mM HAc. For long term storage it is recommended to add a carrier protein (0.1% BSA, 5% HSA, 10% FBS or 5% Trehalose).
Storage & Stability	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.
Shipping	Room temperature in continental US; may vary elsewhere.

DESCRIPTION

Background	Bone Morphogenetic Protein 7 (BMP-7) is a ligand protein with pleiotropic, belongs to TGFβ family. BMP-7 is involved in regulating the proliferation, invasion and migration of cancer cells, associated with a variety of human tumors[1]. BMP-7 also appears to exhibit anti-inflammatory effects on the vasculature, and may function to maintain vascular integrity [3]. BMP-7 attenuates vascular calcification, but also corrects hyperphosphatemia associated with uremia, and stimulates orthotopic skeletal phosphate deposition while simultaneously preventing vascular calcification by direct action on vascular smooth muscle cells[4]. BMP/TGFβ signaling to involve in vascular and valvular homeostasis, which is a critical process of embryonic development[5]

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BMP-7 inhibits primary human aortic smooth muscle cells (SMCs) proliferation due to stimulation with serum, platelet-derived growth factor subunit BB (PDGF-BB) or TGFβ1, and maintains the expression of the vascular SMC phenotype[3].

And BMP/TGFβ signaling can be terminated by inhibitory SMADs including SMAD6 and SMAD7, which are activated and induced by BMP signaling and switch off BMP signaling via multiple mechanisms[2].

However, BMP-7 knockdown results the expression of p-Smad1/5/9 significantly decreased, accompanied with BMP-7-Smad1/5/9 signaling pathway inactive and epithelial-mesenchymal transition (EMT) process reverse[1].

In lung cancer, BMP-7 inhibits bone metastasis, and induces apoptosis and cell cycle arrest. In malignant melanoma, BMP-7 can induce mesenchymal-epithelial transformation and inhibit the metastasis of cancer cells. BMP-7 inhibit epithelial-mesenchymal transition (EMT)-related genes and cell invasion, inhibit telomerase, shorten telomeres, and induce the aging and apoptosis of breast cancer cells. BMP-7 has also been found to increase the cell proliferation and migration potential in a model of metastatic breast cancer in the bone and prostate cancer[1].

BMP-7 is widely found in different animals, while the sequence in mouse is highly similar to rat (100.00%), and human (97.67%).

REFERENCES

[1]. Sun R, et al. Expression of BMP-7 in cervical cancer and inhibition of epithelial‐mesenchymal transition by BMP-7 knockdown in HeLa cells. Int J Mol Med. 2020 May;45(5):1417-1424.

[2]. Miyazawa K, et al. Regulation of TGF-β Family Signaling by Inhibitory Smads. Cold Spring Harb Perspect Biol. 2017 Mar 1;9(3):a022095.

[3]. Dorai H, et al. Bone morphogenetic protein-7 (osteogenic protein-1) inhibits smooth muscle cell proliferation and stimulates the expression of markers that are characteristic of SMC phenotype in vitro. J Cell Physiol. 2000 Jul;184(1):37-45.

[4]. Mathew S, et al. Function and effect of bone morphogenetic protein-7 in kidney bone and the bone-vascular links in chronic kidney disease. Eur J Clin Invest. 2006 Aug;36 Suppl 2:43-50.

[5]. Yang P, et al. The role of bone morphogenetic protein signaling in vascular calcification. Bone. 2020 Dec;141:115542.

[6]. Xu RH, et al. BMP4 initiates human embryonic stem cell differentiation to trophoblast. Nat Biotechnol. 2002 Dec;20(12):1261-4.

[7]. Beck HN, et al. Bone morphogenetic protein-5 (BMP-5) promotes dendritic growth in cultured sympathetic neurons. BMC Neurosci. 2001;2:12.

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

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