

BMP 4 Human

Bone Morphogenetic Protein-4 Human Recombinant
CYK0082

Product Overview

Name BMP 4 Human

Description

Bone Morphogenetic Protein-4 Human Recombinant

Accession (Primary) [P12644](#)

Synonyms

Bone morphogenetic protein 5, BMP-5, BMP5, MGC34244.

Introduction

BMP5 belongs to the bone morphogenetic protein family which is part of the transforming growth factor-beta superfamily. This superfamily is comprised of large families of growth and differentiation factors. Bone morphogenetic proteins were initially identified by their ability of demineralizing bone extract to induce endochondral osteogenesis in vivo in an extraskeletal site. BMP5 is an essential signaling molecule within the trabecular meshwork and optic nerve head, and may play a potential role in glaucoma pathogenesis. It was shown that BMP-5 increases the levels of osteopontin, BMP-2, alkaline phosphatase and core binding factor alpha 1 mRNAs in human periodontal (HPL) ligament cells. The BMP5 protein is expressed in normal synovial tissue and reduced in osteoarthritis and rheumatoid arthritis. BMP5 may have a role in certain cancers given that it is differentially regulated during the formation of different tumors.

Source

Escherichia Coli.

Physical Appearance

Sterile Filtered colorless solution.

Formulation

The BMP-5 solution contains 10mM Sodium Citrate buffer (pH3.5) and 10% Glycerol.

Stability

Store at 4°C if entire vial will be used within 2-4 weeks. Store, frozen at -20°C for longer periods of time. For long term storage it is recommended to add a carrier protein (0.1% HSA or BSA). Avoid multiple freeze-thaw cycles.

Purity

Greater than 95.0% as determined by SDS-PAGE.

Amino acid sequence

MAANKRKNQN RNKSSSHQDS SRMSSVGDYN TSEQKQACKK HELYVSFRDL GWQDWIIAPE GYAAFYCDGE
CSFPLNAHMN ATNHAIQTL VHLMPDHVP KPCCAPTKLN AISVLYFDDS SNVILKKYRN MVVRSCGCH.

Background

Bone Morphogenetic Protein-5 Human Recombinant: Unleashing the Potential for Tissue Engineering and Regenerative Medicine

Abstract: Bone Morphogenetic Protein-5 (BMP-5) human recombinant is a pivotal member of the bone morphogenetic protein family, known for its crucial role in tissue development, repair, and regeneration. This research paper provides an in-depth analysis of BMP-5, including its characteristics, signaling pathways, and potential therapeutic applications. Additionally, innovative methodologies for the production and optimization of BMP-5 human recombinant are proposed, shedding light on its future implications in the field of tissue engineering and regenerative medicine.

Introduction: Tissue engineering and regenerative medicine hold great promise for addressing the challenges of tissue repair and regeneration. BMP-5, a prominent member of the BMP family, plays a vital role in orchestrating cellular responses during tissue development and healing. This paper explores the unique features of BMP-5 and presents novel approaches for the production and optimization of BMP-5 human recombinant, aiming to unlock its therapeutic potential in various regenerative contexts.

Characteristics and Signaling Pathways: BMP-5 is a secreted growth factor that belongs to the transforming growth factor-beta (TGF- β) superfamily. It exerts its biological effects by binding to specific cell surface receptors, initiating intracellular signaling cascades. BMP-5 signaling pathways, including Smad-dependent and Smad-independent pathways, regulate crucial processes such as cell differentiation, proliferation, and extracellular matrix synthesis, thereby influencing tissue development and repair.

Production of BMP-5 Human Recombinant: Efficient production methodologies are crucial for harnessing the therapeutic potential of BMP-5 human recombinant. Recombinant protein expression systems, including mammalian cells or baculovirus-insect cell systems, have been utilized for the production of functional BMP-5. Optimization strategies, such as codon optimization, signal peptide engineering, and protein folding enhancement, have been employed to improve the yield and bioactivity of BMP-5 recombinant protein.

Potential Therapeutic Applications: BMP-5 human recombinant holds tremendous potential in the field of tissue engineering and regenerative medicine. It plays a crucial role in bone formation, cartilage regeneration, and wound healing, making it a promising candidate for the treatment of skeletal disorders, osteochondral defects, and tissue injuries. Furthermore, the ability of BMP-5 to modulate cell behavior and tissue remodeling highlights its broader therapeutic applications in diverse regenerative processes.

Conclusion: BMP-5 human recombinant emerges as a key regulator in tissue engineering and regenerative medicine, with significant implications for tissue repair and regeneration. Optimizing production methodologies and further elucidating its signaling mechanisms will enhance its therapeutic applications. With its involvement in bone and cartilage formation, as well as wound healing, BMP-5 human recombinant represents a promising tool for promoting tissue regeneration and addressing the challenges of tissue repair in various clinical contexts.

References

Bibliography: Celeste AJ, Iannazzi JA, Taylor RC, et al. Identification of transforming growth factor beta family members present in bone-inductive protein purified from bovine bone. *Proc Natl Acad Sci U S A*. 1990;87(24):9843-9847. Luyten FP, Cunningham NS, Ma S, et al. Purification and partial amino acid sequence of

osteogenin, a protein initiating bone differentiation. J Biol Chem. 1989;264(23):13377-13380. Lyons KM, Pelton RW, Hogan BL. Organogenesis and pattern formation in the mouse: RNA distribution patterns suggest a role for bone morphogenetic protein-2A (BMP-2A). Development. 1990;109(4):833-844. Reddi AH, Cunningham NS. Initiation and promotion of bone differentiation by bone morphogenetic proteins. J Bone Miner Res. 1993;8 Suppl 2:S499-502. Solloway MJ, Robertson EJ. Early embryonic lethality in Bmp5;Bmp7 double mutant mice suggests functional redundancy within the 60A subgroup. Development. 1999;126(8):1753-1768.

Precautions

BMP 4 Human is for research use only and not for use in diagnostic or therapeutic procedures.

Target Information: ([P12644](#))

Background

What You Should Know About Bone Morphogenetic Protein-4 (BMP-4) Human Recombinant As part of the transforming growth factor-beta (TGF- β) superfamily, Bone morphogenetic protein-4 (BMP-4) participates in multiple developmental processes, from embryogenesis to bone and cartilage formation. Since this signaling protein is involved in many physiological processes, its laboratory-produced version has been studied for different medical applications. Additionally, a reduction in BMP-4 expression has been associated with multiple diseases, leading to further research into its potential therapeutic benefits. Are you interested in learning more about Bone Morphogenetic Protein-4 (BMP-4) human recombinant? Read on to find more information! How Does Bone Morphogenetic Protein-4 (BMP-4) Work? Bone Morphogenetic Protein-4 (BMP-4) regulates microRNAs miR-494 and miR-126-5p expression, controlling endothelial cells' involvement and function in angiogenesis. As such, it has diverse effects on cell growth, differentiation, and survival. The Role of BMP-4 This protein emits signals that promote the formation of different tissues and organs, including the bones and cartilage, kidneys, teeth, and the neural tube. In other words, it's essential for the development of the heart, skeleton, and central nervous system. However, the role of BMP-4 goes beyond these processes. It participates in different physiological activities, such as: Embryonic development Wound healing Bone remodeling Immune response modulation Tissue repair Cardiac development and function What Is Bone Morphogenetic Protein-4 (BMP-4) Human Recombinant? To replicate the effects of the BMP4 found in humans and explore its possible therapeutic applications, many laboratories have started producing this protein in Chinese hamster ovary (CHO) cells. As mentioned, decreased BMP-4 expression has been associated with different diseases, including bone disorders, fibrosis, and cancer, which can cause other conditions, such as organ dysfunction. More research is needed, but BMP-4 human recombinant (rhBMP4) produced in CHO has the potential to address these diseases and

could be used for other medical applications. These are some examples: Cancer therapy Development of engineered tissues and organs Bone regeneration for the treatment of osteoporosis and nonunion fractures Bone growth and fusion in spinal fusion surgeries (the U.S. Food and Drug Administration approved some bone morphogenetic proteins for these procedures) Promotion of tissue repair and regeneration Final Thoughts BMP-4 Although BMP-4 human recombinant produced in CHO offers potential benefits, several challenges remain, including possible side effects, as high doses can cause inflammation, bone overgrowth, and other issues. However, the long-term effects of rhBMP4 are still under investigation. Further research will provide solutions to address these challenges and allow experts to explore this laboratory-produced protein's power in different medical fields.