HS-binding peptides to selectively modulate BMP and other signaling pathways

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Technology description

Heparan Sulfate (HS) Binding Peptides as An Alternative to Bone Morphogenetic Protein (BMP) in Bone Disease Treatment

Market Need

Recombinant bone morphogenetic protein (BMP) is used in orthopedic surgeries such as spinal fusion, long bone fracture sinus elevation, and localized alveolar/extraction socket defect repair. However, BMP is used in extremely high doses and has a short half-life. Adverse effects have been documented such as local edema, erythema, pain, surgical site infection, graft failure, and pseudoarthrosis. Problems are more common after off-label uses including graft failure, local inflammation, osseous formations/ ectopic bone formation. Therefore, there is need for decreased dose of BMP with increased specificity.

Technology Overview

Heparan sulfate (HS) specifically interact with signaling proteins, including BMPs. These interactions regulate protein distribution and function. The Billngs laboratory has developed HS-binding peptides that can selectively bind to BMPs at high affinity and tests of possible peptide biological activities showed that the HS-binding N-terminal BMP2/4 and C-terminal BMP5/6/7
peptides stimulated chondrogenesis in vitro. These peptides can also be used for fast tissue staining for diagnosis, as well as modulating cytokin and growth factor signaling and action to treat disease. Specifically, they have identified short HS peptides that can be administered systemically to stimulate bone mass/volume/growth and cartilage mass/volume/growth in vitro.

Application area

- Systemically administration to stimulate bone or cartilage mass/volume/growth
- Tissue staining for diagnostics and prognostics

Advantages

- High affinity binding
- Selective activation of signaling pathway allows for low dosage use of peptides

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