Recombinant Human Noggin Fc Chimera

Catalog Number: 3344-NG

DESCRIPTION

Source

Mouse myeloma cell line, NS0-derived human Noggin protein

Human Noggin (Gln28-Cys232) Accession # Q13253	IEGRMD	Human IgG_1 (Pro100-Lys330)

N-terminus C-terminus

N-terminal Sequence Analysis	No results obtained: Gln28 predicted
Structure / Form	Disulfide-linked homodimer
Predicted Molecular Mass	49.6 kDa (monomer)

SPECIFICATIONS

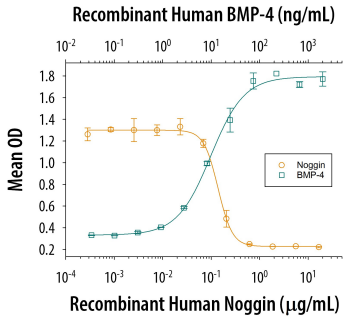
SDS-PAGE	58-62 kDa, reducing conditions
Activity	Measured by its ability to inhibit BMP-4-induced alkaline phosphatase production by ATDC5 mouse chondrogenic cells. The ED_{50} for this effect is 0.100-0.400 µg/mL in the presence of 30 ng/mL of Recombinant Human BMP-4 (Catalog # 314-BP).
Endotoxin Level	<0.10 EU per 1 µg of the protein by the LAL method.
Purity	>90%, by SDS-PAGE under reducing conditions and visualized by silver stain.
Formulation	Lyophilized from a 0.2 µm filtered solution in PBS. See Certificate of Analysis for details.

PREPARATION AND STORAGE

Reconstitution	Reconstitute at 100 µg/mL in sterile PBS.
Shipping	The product is shipped at ambient temperature. Upon receipt, store it immediately at the temperature recommended below.
Stability & Storage	**Use a manual defrost freezer and avoid repeated freeze-thaw cycles.** • 12 months from date of receipt, -20 to -70 °C as supplied. • 1 month, 2 to 8 °C under sterile conditions after reconstitution. • 3 months, -20 to -70 °C under sterile conditions after reconstitution.

DATA

Bioactivity



Bioactivity of Human Noggin
Recombinant human Noggin Fc chimera (Catalog # 3344-NG) inhibits recombinant human BMP-4-induced alkaline phosphatase production in the ATDC5 mouse chondrogenic cell line. The ED_{50} for this effect is 0.100-0.400 µg/mL in the presence of 30 ng/mL of recombinant human BMP-4 (Catalog # 314-BP).

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BACKGROUND

Noggin is a secreted homodimeric glycoprotein that is an antagonist of bone morphogenetic proteins (BMPs) (1, 2). Human Noggin cDNA encodes a 232 amino acid (aa) precursor protein; cleavage of a 19 aa signal peptide generates the 213 aa mature protein which contains an N-terminal acidic region, a central basic heparin-binding segment and a C-terminal cysteine-knot structure (2). Secreted Noggin probably remains close to the cell surface due to its binding of heparin-containing proteoglycans (3). Noggin is very highly conserved among vertebrates, such that mature human Noggin shares 99%, 99%, 98%, 97% and 89% aa sequence identity with mouse, rat, bovine, equine and chicken Noggin, respectively. Noggin binds some BMPs such as BMP-4 with high affinity and others such as BMP-7 with lower affinity, antagonizing BMP bioactivities by blocking epitopes on BMPs that are needed for binding to both type I and type II receptors (2, 4).

During embryogenesis, Noggin antagonizes specific BMPs at defined times during neural tube, somite and cardiomyocyte growth and patterning (5-7). During skeletal development, Noggin prevents chondrocyte hyperplasia, thus allowing proper formation of joints (4). Mutations within the cysteine-knot region of human Noggin are linked to multiple types of skeletal dysplasias that result in apical joint fusions (8). Noggin is expressed in defined areas of the adult central nervous system and peripheral tissues such as lung, skeletal muscle and skin (1). During culture of human embryonic stem cells (hESC) without feeder layers or conditioned medium, but with addition of FGF basic, addition of Noggin to antagonize BMP activity allows hESC to maintain their undifferentiated, pluripotent state (9, 10). In differentiation protocols, Noggin has been used to create neural crest stem cells from induced pluripotent stem cells (11).

Because of its importance in the development of tissues, regenerative medicine utilizes Noggin to generate cells for intestinal tissues or organoids in vitro (12). Noggin is also an important factor for stimulating bone development and has neuroprotective effects in early stages of spinal cord injury (13, 14). Expression of Noggin can help contain or reduce metastatic lesions by limiting BMP signaling, making it a therapeutic option for cancer treatment (15). Noggin has been used to create bladder cancer organoids that can serve as a tissue model in preclinical testing of chimeric antigen receptor (CAR)-T-cell immunotherapy (16).

References:

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