Recombinant Human Noggin
Catalog Number: 6057-NG

DESCRIPTION
Source Mouse myeloma cell line, NS0-derived
Gln28-Cys232
Accession # Q13253

N-terminal Sequence Analysis
No results obtained: Gln28 predicted

Structure / Form Disulfide-linked homodimer

Predicted Molecular Mass 23 kDa (monomer)

SPECIFICATIONS
SDS-PAGE 30-33 kDa, reducing conditions

Activity Measured by its ability to inhibit BMP-4-induced alkaline phosphatase production by ATDC5 mouse chondrogenic cells. The ED50 for this effect is 0.04-0.2 μg/mL in the presence of 50 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 >95%, by SDS-PAGE visualized with Silver Staining and quantitative densitometry by Coomassie® Blue Staining.

Formulation Lyophilized from a 0.2 μm filtered solution in PBS with BSA as a carrier protein. See Certificate of Analysis for details.

PREPARATION AND STORAGE
Reconstitution Reconstitute at 250 μg/mL in PBS containing at least 0.1% human or bovine serum albumin.

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

Recombinant Human Noggin. BG01V human embryonic stem cells were cultured in Mouse Embryonic Fibroblast Conditioned Media supplemented with FGF basic (5 ng/mL). Stem cells were driven into early cells of the neuroectoderm using a 3 day incubation in recombinant human Noggin (25 μg/mL) from either R&D Systems (Lot 1, Lot 2; Catalog # 6057-NG) or from two separate competitors (Competitor 1, Competitor 2). Control cells were not incubated in Noggin (No Noggin). The cells were stained for the early ectoderm marker, Otx2, and the neuroectoderm marker, SOX1. (A) Representative images of SOX1 (green), Otx2 (red), and DAPI (blue) staining in embryonic stem cells differentiated with Noggin from R&D Systems or Noggin from Competitor 2. (B) SOX1+ clusters were quantified under each of the indicated culture conditions. Cells treated with R&D Systems Noggin showed an increase in SOX1+ cells compared to both untreated and competitor-treated cells. R&D Systems Noggin showed consistent differentiation across the lots tested. BG01V human embryonic stem cells are licensed from ViaCyte, Inc.
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. It antagonizes 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, for example, 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) or neural stem cells under certain conditions, addition of Noggin to antagonize BMP activity may allow stem cells to proliferate while maintaining their undifferentiated state, or alternatively, to differentiate into dopaminergic neurons (6, 9 - 13). Noggin also appears to maintain adult stem cell populations in-vivo, for example, maintaining neural stem cells within the hippocampus (13).

References: