

DESCRIPTION

Source *E. coli*-derived Noggin protein
Accession # P97466.1

Predicted Molecular Mass 46 kDa (dimer)

SPECIFICATIONS

SDS-PAGE Oligomeric mouse Noggin protein only

Activity No significant difference between EC₅₀ of reference and test lots

Endotoxin Level <0.10 EU per 1 µg of the protein by the LAL method.

Mass Spectrometry Single species with expected mass

Formulation Lyophilized from acetonitrile/TFA See Certificate of Analysis for details.

PREPARATION AND STORAGE

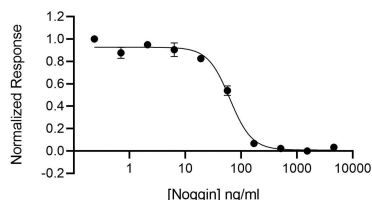
Reconstitution Resuspend in 10mM HCl at >100 µg/ml, prepare single use aliquots, add carrier protein if desired.

Shipping The product is shipped lyophilized at ambient temperature, on ice blocks or dry ice. Shipping at ambient temperature does not affect the bioactivity or stability of the protein. Upon receipt, store immediately at the conditions stated below.

Stability & Storage BulkLotPrefix assignment required for Storage Info

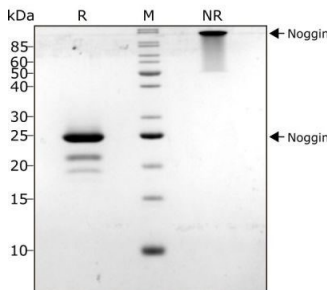
DATA

Binding Activity



Recombinant Mouse/Rat Noggin, Animal-Free Protein Bioactivity Noggin is a BMP inhibitor and its activity is determined by inhibition of BMP2 (Qk007) activity in a BMP-2 responsive firefly luciferase reporter assay. HEK293T cells are treated (in triplicate) with a serial dilution of Noggin and standard concentration of BMP2 for 6 hours. Firefly luciferase activity is measured and normalized to the control Renilla luciferase activity. EC₅₀ = 62.7 ng/ml (1.4 nM).

SDS-PAGE



Recombinant Mouse/Rat Noggin, Animal-Free Protein SDS-PAGE Noggin protein (Qk033) has an unusual migration in non-reduced (NR) SDS-PAGE due to the non-covalent dimer which is the active protein. Similar migration in SDS-PAGE is seen for Gremlin-1, a related BMP antagonist. The identity of the purified dimeric protein was confirmed using mass spectrometry. Upon reduction, the protein monomer migrates at 23 kDa. Purified recombinant mouse Noggin protein (3 µg) was resolved using 15% w/v SDS-PAGE in reduced (+β-mercaptoethanol, R) and non-reduced conditions (NR) and stained with Coomassie Brilliant Blue R250.

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 mouse Noggin shares 99%, 100%, 98%, 97% and 87% aa sequence identity with human, 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:

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2. Groppe, J. *et al.* (2002) *Nature* **420**:636.
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11. Chaturvedi, G. *et al.* (2009) *Cell Prolif.* **42**:425.
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13. Bonaguidi, M.A. *et al.* (2008) *J. Neurosci.* **28**:9194.

PRODUCT SPECIFIC NOTICES

The above product was manufactured, tested and released by R&D System's contract manufacturer, Qkine Ltd, at 1 Murdoch House, Cambridge, UK, CB5 8HW. The product is for research use only and not for the diagnostic or therapeutic use.