

## Product Specification Sheet

### Noggin Recombinant Proteins

<b>Cat. NOGN25-R-10</b>	Mouse Recombinant Noggin/ Fc Chimera	<b>SIZE:</b> 10 ug
<b>Cat. NOGN25-R-25</b>	Mouse Recombinant Noggin/ Fc Chimera	<b>SIZE:</b> 25 ug

The gene *noggin* encodes a member of one of at least four distinct gene families encoding secreted polypeptides that bind to members of the transforming growth factor-beta superfamily, such as BMP, and inhibit the function of these signaling proteins by preventing their interaction with receptors on the cell surface. Other antagonists with related functions include Chordin, Follistatin, Sclerostin and members of the DAN family. These BMP antagonists are assumed to be diffusible and therefore potentially important in the establishment of BMP activity gradients *in vivo*. Although structurally distinct, members of these gene families have in some cases similar ligand specificity and overlapping patterns of expression, and in the case of Chordin and Noggin these proteins apparently are capable of at least partial compensation for each other. In addition to these multiple secreted BMP antagonists, there are other secreted proteins whose primary function is to overcome this antagonism. Thus, there is a highly complex system to regulate the bioavailability and consequently the activities of BMPs in the extracellular space.

BMP activities are modulated through gene expression, protein processing and by interaction with antagonists. The interplay between BMPs and their antagonists governs developmental and cellular processes as diverse as establishment of the embryonic dorsal-ventral axis, induction of neuronal tissue, and formation of joints in the skeletal system and the neurogenesis in the adult brain. Noggin inhibits BMP signaling by blocking the molecular interfaces of the binding epitopes for both type-I and –II receptors of BMP.

BMPs are important regulators of key events in the processes of bone formation during embryogenesis, postnatal growth, remodeling and regeneration of the skeleton. The BMPs function by binding to a receptor complex that is found on all normal cells and is composed of type-I and –II receptors. The primary unit of bone formation is osteoblast, the bone-forming cell. These osteoblast cells respond to physical loading by transducing signals that alter gene expression patterns. Cbfa (core binding factor), the osteoblast specific transcription factor plays an important role in osteoblast differentiation and function.

**Noggin** is a homodimer (~32kDa) of two monomeric units linked together by a disulfide bond. The monomeric precursor (232aa, human and mouse) is encoded by NOG gene, mapped at human chromosome 17. The mature protein (28-232aa) is secreted as a glycosylated dimer, which binds to BMPs including BMP-2, -4 and -7. The structure of Noggin is very similar to BMP-7. Mutation in Noggin gene leads to skeletal dysplasias characterized by joint fusions.

#### Source of Protein

A DNA sequence encoding the signal peptide from human CD33 joined with amino acid residues 20-232 of mouse noggin was fused to the Fc region of human IgG, via a polypeptide linker. The chimeric protein was expressed in a mouse myeloma cell line, NSO. The recombinant mature mouse noggin/ Fc is a disulphide-linked homodimeric protein. Based on N-terminal sequencing, the reduced mouse noggin/Fc monomer has a calculated mol. mass of ~50kD. As a result of glycosylation, the recombinant protein migrates as an approximately 55-60kD protein in SDS-PAGE under reducing conditions.

**Recombinant mouse (cat # NOGN25-R-10, # NOGN25-R-25) noggin/ Fc Chimera** has low endotoxin level (<1.0 ng/1 ug of cytokine as determined by the LAL method).

**Biological activity:** Measured by its ability to inhibit rhBMP-4 induced alkaline Phosphatase production by ATDC5 cells. The ED50 for this effect is typically 0.3-1.0 ug/ml in the presence of 75 ng/ml of rhBMP-4.

**Reconstitution:** The mouse noggin/ Fc Chimera is available in lyophilized, carrier free form, we recommend that sterile PBS containing at least 0.1% human serum albumin or bovine serum albumin be added to the vial to prepare a stock solution of no less than 10ug/ml.

**Stability:** 6-12 months at –20oC or below.

**Shipping:** 4oC for solutions and room temp for powder.

**General References:** Groppe J et al (2002) Nature 420, 636; Wrana J (2002) Nature 420, 613; Smith, W. C et al (1992) Cell 70: 829-840, Valenzuela, D. M et al (1995), J. Neuroscience 15:6077-6084; Brunet, L. J et al (1998), Science 280: 1455-1457.

\*This product is for in vitro research use only.

#### Related material available from ADI

Antibodies to Core binding factor alpha (Cbfa) 1, 2 & 3, Sclerostin, Bone morphogenetic proteins (BMP), CDMP etc.

NOGN25-R-10-25

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