ALPHA DIAGNOSTIC INTERNATIONAL

LIFE TECH Life Technologies™ Your Molecular & Cell Technology Partner

Product Specification Sheet

**Noggin Recombinant Protein**

□ **Cat.** NOGN15-R-20 **Human** (E.Coli) Recombinant Noggin purified protein **SIZE**: 20 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 and controls**

Human recombinant noggin protein was expressed in *E.coli* and purified to >98% by SDS-PAGE. This protein is secreted as a disulphide-linked homodimer, however the non-disulphide-linked also assume dimeric structure and displays similar biological activity. The purified protein is of ~23.1 KDa non-disulphide-linked homodimer consisting of 206 amino acid residues.

**Purified recombinant human** (cat # NOGN15-R-5/ 20) **noggin** has very low endotoxin level (<0.1 ng/1 ug). The biological activity of noggin was determined by its ability to inhibit 5.0ng/ml of BMP-4 induced alkaline Phosphatase production by ATDC-5 chodrogenic cells. The expected ED50 for this effect is 0.05-0.08 ug/ml of Noggin.

**Reconstitution**: The human noggin is available in lyophilized, carrier free form; we recommend a quick spin followed by reconstitution in water to a concentration of .01-1.0 mg/ml. Due to solubility reasons the protein should be kept at low pH. Further dilutions should be done in water and stored at 4oC for 1 week or –20oC for future use.

**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; Zimmerman LB et al (1996) Cell 86, 599; Smith WC et al (1993) Nature 361, 547; Bachiller, D et al (2000) Nature 403, 658; Valenzuela, DM (1995) J Neurosci 15, 6077.

*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.

NOGN15-R-5-20-100 140609P

**India Contact**:
**Life Technologies (India) Pvt. Ltd.**
306, Aggarwal City Mall, Opposite M2K Pitampura, Delhi – 110034 (INDIA). Ph: +91-11-42208000, 42208111, 42208222, Mobile: +91-9810521400, Fax: +91-11-42208444
Email: customerservice@lifetechindia.com Website: www.lifetechindia.com