Recombinant Human Sonic Hedgehog, amino terminal peptide

Catalog Number: 1314-SH

Specifications and Use

Source
- A DNA sequence encoding amino acid residues Cys 24 - Gly 197 of human SHH (Accession number NP_000184; Riddle, R.D. *et al*., 1993, Cell **75**:1401 - 1416) was fused to a 6X histidine tag at the carboxy-terminus. The fusion protein was expressed in *E. coli*.

Molecular Mass
- The 180 amino acid residue N-terminal peptide of recombinant human SHH-N has a predicted molecular mass of approximately 20 kDa.

Purity
- > 97%, as determined by SDS-PAGE and visualized by silver stain.

Endotoxin Level
- < 1.0 EU per 1 μg of the cytokine as determined by the LAL method.

Activity
- Measured by its ability to induce alkaline phosphatase production by C3H10T1/2 fibroblasts (Nakamura, T. *et al*., 1997, Biochem. Biophys. Res. Commun. **237**:465).
- The ED_{50} for this effect is typically 2 - 8 μg/mL.

Formulation
- Lyophilized from a 0.2 μm filtered solution in PBS containing 50 μg of bovine serum albumin per 1 μg of cytokine.

Reconstitution
- It is recommended 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 50 μg/mL.

Storage
- Lyophilized samples are stable for up to twelve months from date of receipt at -20° C to -70° C.
- Upon reconstitution, this cytokine can be stored under sterile conditions at -20° C to -70° C **in a manual defrost freezer** for three months without detectable loss of activity.
- **Avoid repeated freeze-thaw cycles.**

Human Sonic Hedgehog, amino terminal peptide

The *hedgehog* (*hh*) gene encoding a secreted protein was originally identified in *Drosophila* as a segment polarity gene. The vertebrate homologues of Hh comprise several proteins including sonic hedgehog (Shh), Indian hedgehog (Ihh), and Desert hedgehog (Dhh). Hedgehog proteins are important signaling molecules during embryonic development. Shh genes are highly conserved and have been identified in a variety of species including human, mouse, frog, fish, and chicken. Mouse and human Shh are 92% identical at the amino acid sequence level. Shh is expressed in key embryonic tissues such as the Hensen's node, the zone of polarizing activity in the posterior limb bud, the notochord, and the floor plate of the neural tube. Shh is involved in regulating the patterning of the developing central nervous system, somite, and limb. Shh plays an important role in the development of particular tissues such as whisker, hair, foregut, tooth and bone. Recent evidence also suggests that Shh is involved in regulating stem cell fates of neural and hematopoeitic lineages, and that aberrant Shh signaling is implicated in basal cell carcinomas and other diseases.

Human Shh cDNA encodes a 45kDa precursor protein. An autocatalytic reaction yields a 19 kDa amino-terminal domain Shh-N protein containing cholesterol and palmitate, and a 25 kDa carboxy-terminal domain Shh-C protein. The N-terminal domain retains all known signaling capabilities, while the C-terminal domain is responsible for the intramolecular processing, acting as a cholesterol transferase. Shh can act as both a short-range contact dependent factor and as a long-range, diffusible morphogen. At the cell surface, Shh activity is mediated by a multicomponent receptor complex involving the 12-pass transmembrane protein Patched (Ptc) which binds Shh with high affinity and Smoothened (Smo), a signaling seven transmembrane G-protein coupled receptor. In the absence of Shh, Ptc represses Smo activity. The binding of Shh to Ptc, releases the basal repression of Smo by Ptc.[1-5]

References

1. Carpenter, D. *et al*., 1998, Proc. Natl. Acad. Sci. USA **95**:13630.
2. Perrimon, N., 1995, Cell **80**:517.
3. Weed, M. *et al*., 1997, Matrix Biol. **16**:53.
4. Mullor, J. *et al*., 2002, Trends Cell Biol. **12**:562.
5. Ingham, P. and A. McMahon, 2001, Genes & Dev. **15**:3059.

R&D Systems, Inc.
1-800-343-7475

3/7/03