

**DESCRIPTION**

**Source** Chinese Hamster Ovary cell line, CHO-derived

Human Activin  $\beta$ A  
(Gly311 - Ser426)  
Accession # NP\_002183.1

Human Activin  $\beta$ B  
(Gly293 - Ala407)  
Accession # NP\_002184.2

N-terminus

C-terminus

**N-terminal Sequence Analysis** Gly311 ( $\beta$ A subunit) & Gly293 ( $\beta$ B subunit)

**Structure / Form** Disulfide-linked heterodimer

**Predicted Molecular Mass** 12.8 kDa ( $\beta$ A subunit) and 13 kDa ( $\beta$ B subunit)

**SPECIFICATIONS**

**SDS-PAGE** 14 kDa, reducing conditions

**Activity** Measured by its ability to induce hemoglobin expression in K562 human chronic myelogenous leukemia cells. Schwall, R.H. *et al.* (1991) *Method Enzymol.* **198**:340.  
The ED<sub>50</sub> for this effect is 0.2-1.2 ng/mL.

**Endotoxin Level** <0.10 EU per 1  $\mu$ g of the protein by the LAL method.

**Purity** >90%, by SDS-PAGE under reducing conditions and visualized by silver stain.

**Formulation** Lyophilized from a 0.2  $\mu$ m filtered solution in Acetonitrile and TFA with Trehalose. See Certificate of Analysis for details.

**PREPARATION AND STORAGE**

**Reconstitution** Reconstitute at 50  $\mu$ g/mL in sterile PBS.

**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.

**BACKGROUND**

Activins, members of the TGF- $\beta$  superfamily, are disulfide-linked dimeric proteins that were originally purified from gonadal fluids as proteins that stimulated pituitary follicle stimulating hormone (FSH) release. Activin proteins have since been shown to have a wide range of biological activities including: mesoderm induction, neural cell differentiation, bone remodeling, hematopoiesis and roles in reproductive physiology. Activins are produced as precursor proteins with an amino-terminal propeptide that is cleaved to release the carboxy-terminal bioactive ligands. Activins are homodimers or heterodimers of the various  $\beta$  subunit isoforms. Five  $\beta$  subunits (mammalian  $\beta$ <sub>A</sub>,  $\beta$ <sub>B</sub>,  $\beta$ <sub>C</sub>,  $\beta$ <sub>E</sub> and *Xenopus*  $\beta$ <sub>D</sub>) have been cloned. The nomenclature reflects the subunit composition of the proteins: Activin A ( $\beta$ <sub>A</sub> -  $\beta$ <sub>A</sub>), Activin B ( $\beta$ <sub>B</sub> -  $\beta$ <sub>B</sub>), and Activin AB ( $\beta$ <sub>A</sub> -  $\beta$ <sub>B</sub>). Activin A, Activin B, and Activin AB are present in gonadal tissues and are biologically active proteins. However, little is known about the contribution of the other  $\beta$  subunits to Activin formation and function since knock-outs of  $\beta$ <sub>C</sub> and  $\beta$ <sub>E</sub> in mice do not exhibit a phenotype.

At the amino acid sequence level, the mature human  $\beta$ <sub>A</sub> subunit is 100% identical to mouse  $\beta$ <sub>A</sub>, while the mature human and mouse  $\beta$ <sub>B</sub> subunits share 98% identity. The mature  $\beta$ <sub>A</sub> and  $\beta$ <sub>B</sub> subunits share less than 80% amino acid identity. Mice with targeted mutations of  $\beta$ <sub>A</sub>,  $\beta$ <sub>B</sub>, or both genes do not show mesodermal defects, indicating Activin is not involved in mesoderm formation in mammals as it is in *Xenopus*. Also, the double homozygous mutants have the whole spectrum of defects associated with either mutation alone, suggesting that Activin  $\beta$ <sub>A</sub> and  $\beta$ <sub>B</sub> do not compensate for one another, nor do they have overlapping functions. Similar to other TGF- $\beta$  family members, Activins exert their biological activities through binding to the heterodimeric complex composed of two membrane spanning serine-threonine kinases designated type I and type II. Activin binds directly to ACT RII, the complex then associates with ACT RI and initiates signaling through the SMADs.

**References:**

1. Woodruff, T.K. (1998) *Biochemical Pharmacology* **55**:953.
2. Ying, S.Y. *et al.* (1997) *Proc. Soc. Exp. Biol. Med.* **214**:114.
3. Chang, H. *et al.* (2001) *Mol. Cell. Endocrinology* **180**:39.