

## Product Information

### ACTIVIN RECEPTOR IB/Fc CHIMERA Human, Recombinant Expressed in mouse NSO cells

Product Number **A 9454**

#### Product Description

Recombinant human Activin Receptor IB is a chimeric protein expressed in mouse NSO myeloma cells. A DNA sequence encoding the extracellular domain of the human activin receptor IB protein<sup>1</sup>, is fused to the carboxy-terminal Fc region of human IgG1 via a polypeptide linker. Recombinant human activin receptor IB/Fc chimera is a disulfide-linked homodimeric protein with Leu 32 at the amino-terminus. This protein contains 338 amino acid residues with a calculated molecular mass of approximately 37.5 kDa. Due to glycosylation, this monomer migrates as a 45 kDa to 50 kDa protein in SDS-PAGE under reducing conditions. Human, mouse, and bovine type IB activin receptors share greater than 98 % homology.

Activin is secreted by Sertoli<sup>2</sup> cells in the testis and granulosa cells in the ovary. In early studies, this peptide was thought to be an inhibin and not recognized as a unique compound.<sup>3,4</sup> Activins and inhibins are members of the TGF- $\beta$  superfamily due to amino acid homology with respect to the conservation of 7 of the 9 cysteine residues common to all TGF- $\beta$  forms.<sup>4</sup> Activins are homodimers or heterodimers of the various  $\beta$  subunit isoforms, while inhibins are heterodimers of a unique  $\alpha$  subunit and one of the various  $\beta$  subunits.<sup>5</sup> Five  $\beta$  subunits have been cloned (mammalian  $\beta_A$ ,  $\beta_B$ ,  $\beta_C$ ,  $\beta_E$ , and *Xenopus*  $\beta_D$ ).<sup>4</sup> The activin/inhibin nomenclature reflects the subunit composition of the proteins: activin A ( $\beta_A$ - $\beta_A$ ), activin B ( $\beta_B$ - $\beta_B$ ), activin AB ( $\beta_B$ - $\beta_A$ ), inhibin A ( $\alpha$ - $\beta_A$ ), and inhibin B ( $\alpha$ - $\beta_B$ ).

Activins have a wide range of biological activities including mesoderm induction<sup>6,7</sup>, neural cell differentiation, bone remodeling, hematopoiesis, and reproductive physiology. Activins are involved in growth and differentiation of several tissues from different species.<sup>2,3,7,8</sup> This protein also plays a key role in the production and regulation of hormones such as FSH, LH, GnRH, and ACTH. Activin influences erythropoiesis and the potentiation of erythroid colony formation, oxytocin secretion, paracrine, and autocrine regulation.<sup>3</sup>

Similar to other TGF- $\beta$  family members, activins exert their biological activities through the effects of the heterodimeric complex composed of two membrane spanning serine-threonine kinases designated type I and type II receptors.<sup>1</sup> Activin type I and type II receptors are distinguished by the level of sequence homology of their kinase domains and other structural and functional features. To date, seven type I and five type II activin receptors have been cloned from mammals, including activin receptor IA, activin receptor IIA, activin receptor IB, and activin receptor IIB. In addition, two splice variants of activin receptor IIA and five splice variants of activin receptor IIB have been reported.<sup>9</sup>

Type I activin receptors do not bind directly to activin but will associate with the type II receptor-activin complex and initiate signal transduction.<sup>10</sup> Activin receptor IB is highly conserved and will also bind to form signaling complexes with the BMP-2/7-bound BMPR-II.

#### Reagent

Activin Receptor IB is supplied as approximately 100  $\mu$ g of protein lyophilized from a 0.2  $\mu$ m filtered solution in phosphate buffered saline (PBS).

#### Preparation Instructions

Reconstitute the contents of the vial using sterile phosphate-buffered saline (PBS) containing 0.1 % human serum albumin or bovine serum albumin. Prepare a stock solution of no less than 100  $\mu$ g/ml.

#### Storage/Stability

Store at  $-20$  °C. Upon reconstitution, store at 2 °C to 8 °C for one month. For extended storage, freeze in working aliquots at. Repeated freezing and thawing is not recommended.

#### Product Profile

Activin Receptor IB does not bind directly to activin or inhibin.

Purity: >90 % as determined by SDS-PAGE, visualized by silver stain.

Endotoxin: <0.1 ng/ $\mu$ g determined by the LAL method.

## References

1. ten Dijke, P., et al., Activin receptor-like kinases: a novel subclass of cell-surface receptors with predicted serine/threonine kinase activity. *Oncogene*, **8**, 2879-2887 (1993).
2. de Winter, J., et al., Activin is produced by rat Sertoli cells in vitro and can act as an autocrine regulator of Sertoli cell function. *Endocrinology*, **132**, 975-982 (1993).
3. Sporn, M.B., and Roberts, A.B., eds. *Peptide Growth Factors and Their Receptors*, Springer-Verlag Heidelberg, Vol. II, pp 217-235 (1991).
4. De Jong, F., et al., Effects of factors from ovarian follicular fluid and Sertoli cell culture medium on *in-vivo* and *in-vitro* release of pituitary gonadotrophins in the rat: an evaluation of systems for the assay of inhibin. *J. Reprod. Fertil.*, **26**, 47-59 (1979).
5. Vale, W. et al., The Inhibin/Activin Family of Hormones and Growth Factors." In: *Peptide Growth factors and their Receptors*. Sporn, M., Roberts, A., eds., Berlin, Springer-Verlag. pp. 211-248 (1990).
6. Smith, J., et al., Expression of a *Xenopus* homolog of Brachyury (T) is an immediate-early response to mesoderm induction. *Cell*. **67**, 79-87 (1991).
7. Ying, S.Y., et al., Activins and activin receptors in cell growth. *Proc. Soc. Exp. Biol. Med.*, **214**, 114-122 (1997).
8. Woodruff, T.K., Regulation of cellular and system function by activin. *Biochem. Pharmacol.*, **55**, 953-963 (1998).
9. Shoji, H., et al., Identification and Characterization of a PDZ Protein That Interacts with Activin Type II Receptors. *J. Biol. Chem.*, **275**, 5485-5492 (2000).
10. Attisano, L., et al., Identification of human activin and TGF beta type I receptors that form heteromeric kinase complexes with type II receptors. *Cell*, **75**, 671-680 (1993).

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