

## Product Information

### ANTI-ACTIVIN RECEPTOR IB Developed in Goat, Affinity Isolated Antibody

Product Number **A 2455**

#### Product Description

Anti-Activin Receptor IB is developed in goat using a purified recombinant human activin receptor IB extracellular domain expressed in mouse NSO cells as immunogen. Affinity isolated antigen specific antibody is obtained from goat anti-activin receptor IB antiserum by immuno-specific purification which removes essentially all goat serum proteins, including immunoglobulins, which do not specifically bind to the peptide.

Anti-Activin Receptor IB recognizes recombinant human activin receptor IB by various immunochemical techniques including immunoblotting, immunohistochemistry, and ELISA. Based on immunoblotting, this antibody exhibits approximately 2 % cross-reactivity with recombinant human activin receptor IIA and recombinant human activin receptor IA and less than 1 % cross-reactivity with recombinant human activin receptor IIA and recombinant human activin receptor IIB.

Activin, a disulfide-linked homodimeric protein is secreted by Sertoli<sup>1</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>2,3</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>3</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>4</sup> Five  $\beta$  subunits have been cloned (mammalian  $\beta_A$ ,  $\beta_B$ ,  $\beta_C$ ,  $\beta_E$ , and *Xenopus*  $\beta_D$ ).<sup>3</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>5,6</sup>, neural cell differentiation, bone remodeling, hematopoiesis, and reproductive physiology. Activins are also involved in growth and differentiation of several tissues from different species.<sup>1,2,6,7</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>2</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>8</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 are highly conserved and do not bind directly to activin but will associate with the type II receptor-activin complex and initiate signal transduction.<sup>10</sup> Type I activin receptors will also bind with the BMP-2/7-bound BMPR-II and form signaling complexes. Human, mouse, and bovine type IB activin receptors share greater than 98 % homology.

#### Reagent

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

#### Preparation Instructions

To one vial of lyophilized powder, add 1 ml of phosphate-buffered saline (PBS) to produce 0.1 mg/ml stock solution of antibody.

#### Storage/Stability

Prior to reconstitution, store at  $-20$  °C. Reconstituted product may be stored at  $2$  °C to  $8$  °C for at least one month. For prolonged storage, freeze in working aliquots at  $-20$  °C. Avoid repeated freezing and thawing.

#### Product Profile

For immunoblotting, a working concentration of

0.1 µg/ml to 0.2 µg/ml detects human activin receptor IB at approximately 5 ng/lane under reducing and non-reducing conditions.

For ELISAs, a working concentration of 0.5 µg/ml to 1.0 µg/ml detects human activin receptor IB.

For immunohistochemistry, a working concentration of 5 µg/ml to 15 µg/ml will detect activin receptor IB.

Note: In order to obtain best results in different techniques and preparations we recommend determining optimal working dilutions by titration test.

Endotoxin: <10 ng/mg antibody determined by the LAL method.

### References

1. 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).
2. Sporn, M.B., and Roberts, A.B., eds. *Peptide Growth Factors and Their Receptors*, Springer-Verlag Heidelberg, Vol. II, pp 217-235 (1991).
3. 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).
4. 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).
5. 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).
6. Ying, S.Y., et al., Activins and activin receptors in cell growth. *Proc. Soc. Exp. Biol. Med.*, **214**, 114-122 (1997).
7. Woodruff, T.K., Regulation of cellular and system function by activin. *Biochem. Pharmacol.*, **55**, 953-963 (1998).
8. 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).
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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