

## Product Information

### Activin A human, recombinant expressed in insect cells

Catalog Number **A4941**  
Storage Temperature  $-20\text{ }^{\circ}\text{C}$

#### Product Description

Recombinant human Activin A is a disulfide-linked homodimeric protein expressed in insect cells. The DNA sequence encodes the human Activin A protein.<sup>1</sup> Recombinant human mature activin A has two 116 amino acid residue  $\beta_A$  subunits.

Activin A ( $\beta_A$ - $\beta_A$ ), a disulfide-linked dimeric protein is secreted by Sertoli cells in the testis<sup>2</sup> 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*  $\beta_D$ ). 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 ( $\alpha$ - $\beta_B$ ). The mature human  $\beta_A$  subunit is 100% identical to mouse  $\beta_A$ . Cells known to express the  $\beta_A$  chain include fibroblasts, endothelial cells, hepatocytes, vascular smooth muscle cells, macrophages, keratinocytes, osteoclasts, bone marrow monocytes, prostatic epithelium, neurons, chondrocytes, osteoblasts, Leydig cells, Sertoli cells, and ovarian granulosa cells.

Activins have a wide range of biological activities including mesoderm induction,<sup>6,7</sup> neural cell differentiation, bone remodeling, hematopoiesis, and reproductive physiology. Activin A is 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>9</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>10</sup> Activin binds directly to activin receptor type II, this complex then associates with activin receptor type I and initiates signal transduction.<sup>11</sup>

Activin A is lyophilized from a 0.2  $\mu\text{m}$  filtered solution of 10 mM sodium citrate, pH 3.0.

The biological activity is determined by its ability to inhibit the proliferation of mouse MPC-11 cells.

Purity: >95% (SDS-PAGE, visualized by silver stain)

Endotoxin level: <0.1  $\mu\text{g}/\mu\text{g}$  (<1 EU/ $\mu\text{g}$ , LAL method)

#### Preparation Instructions

Do a quick spin followed by reconstitution in water to a concentration of 50  $\mu\text{g}/\text{mL}$  (e.g., 5  $\mu\text{g}/100\text{ }\mu\text{L}$ ) yielding a solution of 10 mM citric acid, pH 3.0. This solution can then be stored at room temperature or at  $2-8\text{ }^{\circ}\text{C}$  for up to one month. It is recommended that further dilutions be made in phosphate buffered saline containing 2 mg/mL albumin and stored at  $-20\text{ }^{\circ}\text{C}$ .

#### Storage/Stability

Prior to reconstitution, store the product at  $-20\text{ }^{\circ}\text{C}$ . The reconstituted product may be stored at  $2-8\text{ }^{\circ}\text{C}$  for up to one month. For prolonged storage, freeze in working aliquots at  $-20\text{ }^{\circ}\text{C}$ . Avoid repeated freezing and thawing.

## References

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