

**DESCRIPTION**

<b>Source</b>	Chinese Hamster Ovary cell line, CHO-derived Activin A protein Gly311-Ser426 Accession # P08476
<b>N-terminal Sequence Analysis</b>	Gly311
<b>Structure / Form</b>	Disulfide-linked homodimer
<b>Predicted Molecular Mass</b>	13 kDa (monomer)

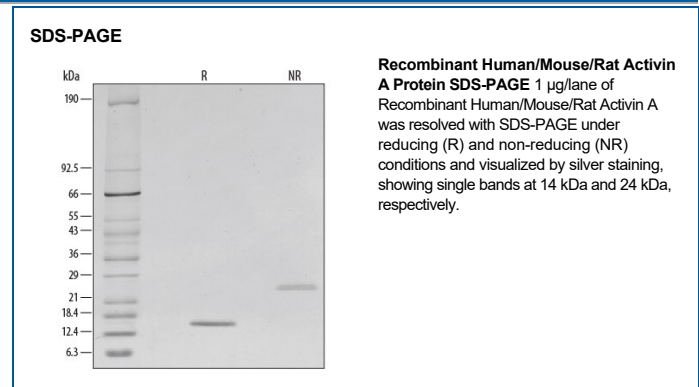
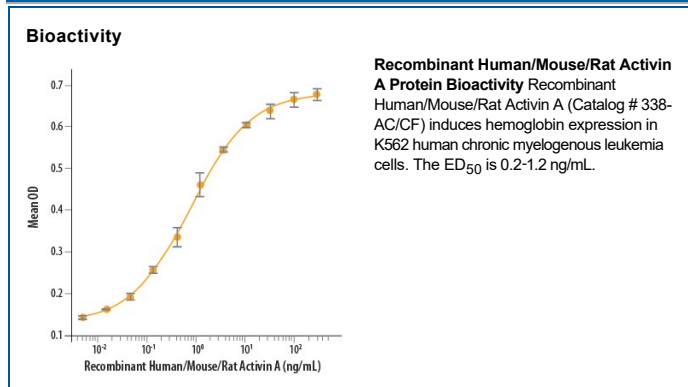
**SPECIFICATIONS**

<b>SDS-PAGE</b>	14 kDa, reducing conditions 24 kDa, non-reducing conditions
<b>Activity</b>	Measured by its ability to induce hemoglobin expression in K562 human chronic myelogenous leukemia cells. Schwall, R.H. <i>et al.</i> (1991) <i>Method Enzymol.</i> <b>198</b> :340. The ED <sub>50</sub> for this effect is 0.2-1.2 ng/mL.  The specific activity of Recombinant Human/Mouse/Rat Activin A is approximately 2.5 x 10 <sup>3</sup> units/mg, which is calibrated against human Activin A WHO International Standard (NIBSC code: 91/626). Specific activity is for reference purposes only and is not routinely tested.
<b>Endotoxin Level</b>	<0.01 EU per 1 µg of the protein by the LAL method.
<b>Purity</b>	>95%, by SDS-PAGE with silver staining.
<b>Formulation</b>	Lyophilized from a 0.2 µm filtered solution in Acetonitrile and TFA. See Certificate of Analysis for details.

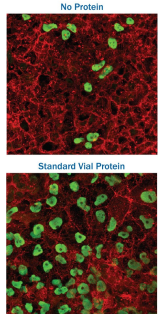
**PREPARATION AND STORAGE**

<b>Reconstitution</b>	Reconstitute at 100-500 µg/mL in sterile 4 mM HCl.
<b>Shipping</b>	The product is shipped at ambient temperature. Upon receipt, store it immediately at the temperature recommended below.
<b>Stability &amp; Storage</b>	<b>Use a manual defrost freezer and avoid repeated freeze-thaw cycles.</b> <ul style="list-style-type: none"> <li>• 12 months from date of receipt, -20 to -70 °C as supplied.</li> <li>• 1 month, 2 to 8 °C under sterile conditions after reconstitution.</li> <li>• 3 months, -20 to -70 °C under sterile conditions after reconstitution.</li> </ul>

**DATA**



**Bioactivity**



**Recombinant Human/Mouse/Rat Activin A Promotes the Differentiation of Pluripotent Stem Cells into Endoderm.** BG01V human embryonic stem cells were differentiated into endoderm using media supplemented with Recombinant Human/Mouse/Rat Activin A (Catalog # 338-AC). Control cells were cultured in medium without recombinant Activin A. Differentiation into endoderm was confirmed by positive-staining for Claudin-6 (red) and Sox17 (green) using the Mouse Anti-Human Claudin-6 Monoclonal Antibody (Catalog # MAB3656) and the Goat Anti-Human Sox17 Polyclonal Antibody (Catalog # AF1924), respectively. BG01V human embryonic stem cells are licensed from ViaCyte, Inc.

**BACKGROUND**

Activin and Inhibin are members of the TGF- $\beta$  superfamily of cytokines and are involved in a wide range of biological processes including tissue morphogenesis and repair, fibrosis, inflammation, neural development, hematopoiesis, reproductive system function, and carcinogenesis (1-7). Activin and Inhibin are produced as precursor proteins. Their amino terminal propeptides are proteolytically cleaved and facilitate formation of disulfide-linked dimers of the bioactive proteins (8, 9). Activins are nonglycosylated homodimers or heterodimers of various  $\beta$  subunits ( $\beta$ A,  $\beta$ B,  $\beta$ C, and  $\beta$ E in mammals), while Inhibins are heterodimers of a unique  $\alpha$  subunit and one of the  $\beta$  subunits. Activin A is a widely expressed homodimer of two  $\beta$ A chains. The  $\beta$ A subunit can also heterodimerize with a  $\beta$ B or  $\beta$ C subunit to form Activin AB and Activin AC, respectively (10). The 14 kDa mature human  $\beta$ A chain shares 100% amino acid sequence identity with bovine, feline, mouse, porcine, and rat  $\beta$ A. Activin A exerts its biological activities by binding to the type 2 serine/threonine kinase Activin RIIA which then noncovalently associates with the type 1 serine/threonine kinase Activin RIB/ALK-4 (7, 11). Signaling through this receptor complex leads to Smad activation and regulation of activin-responsive gene transcription (7, 11). The bioactivity of Activin A is regulated by a variety of mechanisms (11). BAMB1, Betaglycan, and Cripto are cell-associated molecules that function as decoy receptors or limit the ability of Activin A to induce receptor complex assembly (12-14). The intracellular formation of Activin A can be prevented by the incorporation of the  $\beta$ A subunit into Activin AC or Inhibin A (3, 10). And the bioavailability of Activin A is restricted by its incorporation into inactive complexes with  $\alpha$ 2-Macroglobulin, Follistatin, and FLRG (15, 16).

**References:**

1. Kumanov, P. *et al.* (2005) *Reprod. Biomed. Online* **10**:786.
2. Maeshima, A. *et al.* (2008) *Endocr. J.* **55**:1.
3. Rodgarkia-Dara, C. *et al.* (2006) *Mutat. Res.* **613**:123.
4. Werner, S. and C. Alzheimer (2006) *Cytokine Growth Factor Rev.* **17**:157.
5. Xu, P. and A.K. Hall (2006) *Dev. Biol.* **299**:303.
6. Shav-Tal, Y. and D. Zipori (2002) *Stem Cells* **20**:493.
7. Chen, Y.G. *et al.* (2006) *Exp. Biol. Med.* **231**:534.
8. Gray, A.M. and A.J. Mason (1990) *Science* **247**:1328.
9. Mason, A.J. *et al.* (1996) *Mol. Endocrinol.* **10**:1055.
10. Thompson, T.B. *et al.* (2004) *Mol. Cell. Endocrinol.* **225**:9.
11. Harrison, C.A. *et al.* (2005) *Trends Endocrinol. Metab.* **16**:73.
12. Onichtchouk, D. *et al.* (1999) *Nature* **401**:480.
13. Gray, P.C. *et al.* (2002) *Mol. Cell. Endocrinol.* **188**:254.
14. Kelber, J.A. *et al.* (2008) *J. Biol. Chem.* **283**:4490.
15. Phillips, D.J. *et al.* (1997) *J. Endocrinol.* **155**:65.
16. Schneyer, A. *et al.* (2003) *Endocrinology* **144**:1671.