## bio-techne® RD SYSTEMS

Catalog Number: 1066-AB

| DESCRIPTION                     |   |              |  |
|---------------------------------|---|--------------|--|
| Source                          | Chinese Hamster Ovary cell line, CHO-derived human Activin AB protein |              |  |
|                                 | Human Activin βA<br>(Gly311 - Ser426)<br>Accession # NP_002183.       | .1           |  |
|                                 | Human Activin βB<br>(Gly293 - Ala407)<br>Accession # NP_002184.       | 2            |  |
|                                 | N-terminus C  | C-terminus   |  |
| N-terminal Sequence<br>Analysis | Gly311(βA subunit) & Gly293 (βB subunit)                              |              |  |
| Structure / Form                | Disulfide-linked heterodimer  |              |  |
| Predicted Molecular<br>Mass     | 12.8 kDa (βA subunit) and 13 kDa                                      | (βB 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. <i>et al.</i> (1991)<br>Method Enzymol. <b>198</b> :340.<br>The ED <sub>50</sub> for this effect is 0.2-1.2 ng/mL. |  |
| Endotoxin Level | <0.10 EU per 1 µg 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 µm filtered solution in Acetonitrile and TFA with BSA as a carrier protein. See Certificate of Analysis for details.  |  |

| PREPARATION AND STORAGE |  |  |  |
|-------------------------|--|--|--|
| Reconstitution          | Reconstitute at 100 μg/mL in 4 mM HCI.   |  |  |
| Shipping                | The product is shipped at ambient temperature. Upon receipt, store it immediately at the temperature recommended below.  |  |  |
| Stability & Storage     | <ul> <li>Use a manual defrost freezer and avoid repeated freeze-thaw cycles.</li> <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> |  |  |

## 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  $\beta_A$ ,  $\beta_B$ ,  $\beta_C$ ,  $\beta_E$  and *Xenopus*  $\beta_D$ ) have been cloned. The nomenclature reflects the subunit composition of the proteins: Activin A ( $\beta_A - \beta_A$ ), Activin B ( $\beta_B - \beta_B$ ), and Activin AB ( $\beta_A - \beta_B$ ). 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  $\beta_C$  and  $\beta_E$  in mice do not exhibit a phenotype.

At the amino acid sequence level, the mature human  $\beta_A$  subunit is 100% identical to mouse  $\beta_A$ , while the mature human and mouse  $\beta_B$  subunits share 98% identity. The mature  $\beta_A$  and  $\beta_B$  subunits share less than 80% amino acid identity. Mice with targeted mutations of  $\beta_A$ ,  $\beta_B$ , 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  $\beta_A$  and  $\beta_B$  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.

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