

DESCRIPTION

Source *E. coli*-derived human Activin A protein
Gly311-Ser426
Accession # P08476.2

N-terminal Sequence Analysis Gly311

Structure / Form Disulfide-linked homodimer

Predicted Molecular Mass 13 kDa (monomer)

SPECIFICATIONS

SDS-PAGE 13 kDa, under reducing conditions.
23 kDa, under non-reducing conditions.

Activity Measured by its ability to induce cytotoxicity using MPC-11 mouse B lymphocyte cells.
The ED₅₀ for this effect is <10.0 ng/mL.

Endotoxin Level <0.10 EU per 1 µg of the protein by the LAL method.

Purity >97%, by SDS-PAGE with quantitative densitometry by Coomassie® Blue Staining.

Formulation Lyophilized from a 0.2 µm filtered solution in Acetonitrile and TFA with Trehalose. See Certificate of Analysis for details.

PREPARATION AND STORAGE

Reconstitution Reconstitute 10 µg size at 100 µg/mL and all the other sizes at 500 µg/mL in water.

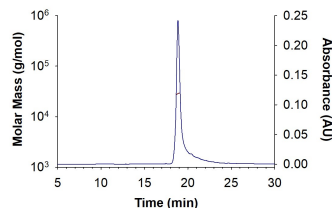
Shipping The product is shipped with polar packs. Upon receipt, store it immediately at the temperature recommended below.

Stability & Storage Use a manual defrost freezer and avoid repeated freeze-thaw cycles.

- 12 months from date of receipt, -20 to -70 °C as supplied.
- 1 month, 2 to 8 °C under sterile conditions after reconstitution.
- 3 months, -20 to -70 °C under sterile conditions after reconstitution.

DATA

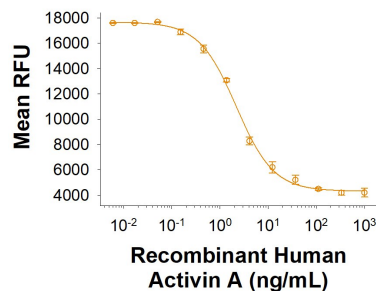
SEC-MALS



SEC-MALS Data	Result
Retention Time	18.6 - 18.1
MW - Predicted (Monomer)	13.1 kDa
MW - MALS	28.6 kDa
Polydispersity	1.00
System Suitability:	Pass
SSA Monomer 66.4 ± 3.32 kDa	

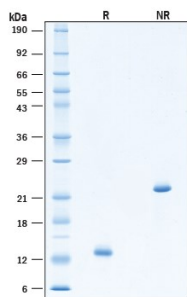
Recombinant Human Activin A Protein SEC-MALS. Recombinant Human Activin A (Catalog # BT-ACTA) has a molecular weight (MW) of 27-30 kDa as analyzed by SEC-MALS, suggesting that this protein is a homodimer.

Bioactivity



Recombinant Human Activin A Protein Bioactivity. Recombinant Human Activin A Protein induces cytotoxicity in the MPC-11 mouse B-lymphocyte cell line.

SDS-PAGE



Recombinant Human Activin A Protein SDS-PAGE. 2 µg/lane of Recombinant Human Activin A Protein (Catalog # BT-ACTA) was resolved with SDS-PAGE under reducing (R) and non-reducing (NR) conditions and visualized by Coomassie® Blue staining, showing bands at 13 kDa under reducing conditions and 23 kDa under non-reducing conditions.

BACKGROUND

Activin and Inhibin are members of the TGF- β 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 β subunits (β A, β B, β C, and β E in mammals), while Inhibins are heterodimers of a unique α subunit and one of the β subunits. Activin A is a widely expressed homodimer of two β A chains. The β A subunit can also heterodimerize with a β B or β C subunit to form Activin AB and Activin AC, respectively (10). The 14 kDa mature human β A chain shares 100% amino acid sequence identity with bovine, feline, mouse, porcine, and rat β 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). BAMBI, 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 β 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 α 2-Macroglobulin, Follistatin, and FLRG (15, 16).

Activin A is involved in the differentiation of various cell and tissue types. The induction of definitive endoderm by Activin A is required in differentiation protocols of induced pluripotent stem cells (iPSCs) (17, 18). In vitro models of human gametogenesis use prolonged Activin A supplementation to human embryonic stem cells for differentiation into human primordial germ cell-like cells (19). Activin A can also be used to maintain cells in vitro, as is the case for iPSC-derived nephron cells that can then be used in disease modeling, drug screening and in regenerative medicine (20).

Activin A is an important factor for tumor cells to evade the immune system as Activin A can act on surrounding immune cells to decrease their antitumor activity (21). Activin A also promotes migration and growth of tumors, making it a target for cancer therapies (22). Specifically, research has shown that interfering with Activin A activity can assist in overcoming CD8 T-cell exclusion and immunotherapy resistance (23). In bone marrow-derived stem cell transplants for treatment of diabetes, Activin A enhances migration and homing of stem cells towards pancreatic lineage (24).

References:

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