ALK-1 Protein, Human (HEK293, His)

Cat. No.:	HY-P72818
Synonyms:	Serine/threonine-protein kinase receptor R3; SKR3; ALK-1; TSR-I; ACVRL1
Species:	Human
Source:	HEK293
Accession:	P37023 (D22-Q118)
Gene ID:	94
Molecular Weight:	Approximately 27 kDa

PROPERTIES

AA Sequence	M T L G S P R K G L L M L L M A L V T Q G D P V K P S R G P L V T C T C E S P H C K G P T C R G A W C T V V L V R E E G R H P Q E H R G C G N L H R E L C R G R P T E F V N H Y C C D S H L C N H N V S L V L E A T Q P P S E Q P G T D G Q
Biological Activity	The enzyme activity of this recombinant protein is testing in progress, we cannot offer a guarantee yet.
Appearance	Lyophilized powder.
Formulation	Lyophilized from a 0.2 μm filtered solution of PBS, pH 7.4. Normally 5 % - 8 % trehalose, mannitol and 0.01% Tween 80 are added as protectants before lyophilization.
Endotoxin Level	<1 EU/μg, determined by LAL method.
Reconsititution	It is not recommended to reconstitute to a concentration less than 100 μg/mL in ddH_2O.
Storage & Stability	Stored at -20°C for 2 years. After reconstitution, it is stable at 4°C for 1 week or -20°C for longer (with carrier protein). It is recommended to freeze aliquots at -20°C or -80°C for extended storage.
Shipping	Room temperature in continental US; may vary elsewhere.

DESCRIPTION

Background	ALK-1, also known as ACVRL1, is a type I receptor for TGF-β superfamily with 2 ligands, BMP9 and BMP10. ALK-1 is predominantly expressed in endothelial cells and plays a critical role in regulating angiogenesis[1][2]. Mature human ALK-1 shares 89% amino acid sequence identity with mouse and rat ALK-1. While, mouse ALK-1 shares 96% aa sequence identity with rat ALK-1 protein. ALK-1 is able to bind to TGF-β1 or activins in the presence of either TβR-II or activin type II receptors, respectively. However, ALK-1 does not elicit a specific transcriptional response. Thus, ALK-1 has been considered an “orphan” receptor. ALK-1 is a type I receptor that mediates signaling of BMP9 (bone morphogenetic protein) and BMP10, proteins in the TGF-β

superfamily. Signaling through ALK-1 results in phosphorylation of the intracellular Smad 1/5/8 cascade which activates proangiogenic transcription factors such as ID1 and ID3. ALK-1 binds to TGF-β1 and phosphorylates Smad1 and Smad5. Overexpression of ALK-1 in HepG2 cells inhibits the ALK5-mediated TGF-β1 response. The balance between ALK-1 and ALK5 may be crucial for controlling the properties of endothelium during angiogenesis[1]. BMP9/BMP10/ALK-1 signaling controlled the specific gene expression program and survival of Kupffer cells (KCs) through a Smad4-dependent pathway. Functionally, the loss of ALK-1 resulted in impaired capture of L. monocytogenes and overwhelming disseminated infections [2].

ALK-1 is expressed in blood vessels during embryogenesis and adult stages. In addition, mutations of the ALK-1 gene have been linked to the type II hereditary hemorrhagic telangiectasia[1]. ALK-1 inhibits BMP9-mediated Id-1 expression in human umbilical vein endothelial cells. In a chick chorioallantoic membrane assay, ALK-1 reduces VEGF-, FGF-, and BMP10-mediated vessel formation. In addition, ALK1 reduces tumor burden in mice receiving orthotopic grafts of MCF7 mammary adenocarcinoma cells[3].

REFERENCES

[1]. S P Oh, et al. Activin receptor-like kinase 1 modulates transforming growth factor-beta 1 signaling in the regulation of angiogenesis. Proc Natl Acad Sci U S A. 2000 Mar 14;97(6):2626-31.

[2]. Dianyuan Zhao, et al. ALK1 signaling is required for the homeostasis of Kupffer cells and prevention of bacterial infection. J Clin Invest. 2022 Feb 1;132(3):e150489.

[3]. Dianne Mitchell, et al. ALK1-Fc inhibits multiple mediators of angiogenesis and suppresses tumor growth. Mol Cancer Ther. 2010 Feb;9(2):379-88.

[4]. Kerstin Wöltje, et al. Serum induces transcription of Hey1 and Hey2 genes by Alk1 but not Notch signaling in endothelial cells. PLoS One. 2015 Mar 23;10(3):e0120547.

Tel: 609-228-6898 Fax: 609-228-5909 E-mail: tech@MedChemExpress.com

Address: 1 Deer Park Dr, Suite Q, Monmouth Junction, NJ 08852, USA