

## Activin RIB/ALK-4 Protein, Human (HEK293, Fc)

Cat. No.:	HY-P75571
Synonyms:	Activin Receptor IB, His; ALK-4; Activin RIB; ACVR1B
Species:	Human
Source:	HEK293
Accession:	P36896 (S24-E126)
Gene ID:	91
Molecular Weight:	Approximately 38.1 kDa

### PROPERTIES

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.
Reconstitution	It is not recommended to reconstitute to a concentration less than 100 µg/mL in ddH <sub>2</sub> O.
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

ALK4, also termed activin A receptor type 1b (ACVR1B), is a transmembrane serine/threonine kinase activin type-I receptor and is highly expressed in the mammal heart. ALK4 is an important regulator of vertebrate development, with roles in mesoderm induction, primitive streak formation, gastrulation, dorsoanterior patterning, and left-right axis determination<sup>[1]</sup> [2].

The sequence of amino acids in ALK4 (ACVR1B) proteins from different species is very stable, which leads to the conclusion that in the process of evolution, ALK4 has been only slightly altered, and that both in humans and in animals, its function is similar.

Activin binds to a type II activin receptor (Acvr2 or Acvr2b) and then recruits ACVR1B. ALK4 (ACVR1B) forms an activin receptor complex with activin type-II receptor to transduce activin signal from the cell surface to the cytoplasm, thus regulating physiological and pathological processes including embryogenesis, tissue homeostasis, wound healing, extracellular matrix production, immunosuppression, and carcinogenesis. Receptor heterodimerization activates the type II receptor kinase to phosphorylate the type I receptor, which recruits and phosphorylates regulated Smads2 and 3. Phosphorylated regulated Smads are released and form a heteromeric complex with the Co-Smad, Smad4. The regulated

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Smad and Co-Smad complex then translocates to the nucleus where it regulates the expression of many genes. In mammals, Acvr1b is expressed by various types of epithelial cells, including interfollicular epidermis, and the outer root sheath (ORS) and the inner root sheath (IRS) of the hair follicles. Activin signaling through Acvr1b acts on skin epithelial cells in a paracrine manner<sup>[1][2][3]</sup>.

ALK4 (ACVR1B), is an important regulator of vertebrate development, with roles in mesoderm induction, primitive streak formation, gastrulation, dorsoanterior patterning, and left-right axis determination. ALK4 also regulates physiological and pathological processes including embryogenesis, tissue homeostasis, wound healing, extracellular matrix production, immunosuppression, and carcinogenesis. ALK4 functions as a tumor-suppressor gene in pancreatic tumorigenesis<sup>[1][2][3][4]</sup>.

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## REFERENCES

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- [1]. Dev Dyn, et al. Developmental analysis of activin-like kinase receptor-4 (ALK4) expression in *Xenopus laevis*. . 2005 Feb;232(2):393-8.
  - [2]. Qian Wang, et al. Activin Receptor-Like Kinase 4 Haplodeficiency Mitigates Arrhythmogenic Atrial Remodeling and Vulnerability to Atrial Fibrillation in Cardiac Pathological Hypertrophy. *J Am Heart Assoc*. 2018 Aug 21;7(16):e008842.
  - [3]. Wanglong Qiu, et al. Conditional activin receptor type 1B (Acvr1b) knockout mice reveal hair loss abnormality. *J Invest Dermatol*. 2011 May;131(5):1067-76.
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**Caution: Product has not been fully validated for medical applications. For research use only.**

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