SDF-1 alpha/CXCL12 Protein, Human (His)

Cat. No.:	HY-P73661
Synonyms:	Stromal Cell-Derived Factor 1; SDF-1; IRH; hIRH; PBSF; CXCL12; SDF1
Species:	Human
Source:	E. coli
Accession:	P48061-2 (K22-K89)
Gene ID:	6387
Molecular Weight:	Approximately 10 kDa

PROPERTIES

AA Sequence	K P V S L S Y R C P C R F F E S H V A R A N V K H L K I L N T P N C A L Q I V A R L K N N N R Q V C I D P K L K W I Q E Y L E K A L N K
Biological Activity	Measured by its ability to chemoattract IL-2-activated human T cells. The ED_{50} for this effect is approximately 23.37 ng/mL, corresponding to a specific activity is 4.279×10^4 U/mg.
Appearance	Lyophilized powder
Formulation	Lyophilized from a 0.2 μm filtered solution of PBS, pH 7.4.
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. For long term storage it is recommended to add a carrier protein (0.1% BSA, 5% HSA, 10% FBS or 5% Trehalose).
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	Stromal cell-derived factor-1 (SDF-1), an important member of the chemokine family, is expressed in two subtypes, SDF-1α and SDF-1β, with SDF-1α being the main subtype. SDF-1α is widely present in many tissues and organs of the human body, such as the lymph nodes, bone marrow, liver, lung, muscle, small intestine, kidney, and brain, and can sustainably exist in these organs and tissues. Studies have shown that SDF-1α plays an important role in the physiological mfunctions of migration, distribution, development, differentiation, and apoptosis of various cells. Moreover, SDF-1α plays a key role in the pathological process of some diseases, such as inflammation, tumor formation and metastasis, pathogen infection, and wound repair[1][3].

SDF-1 has three isoforms, α, β, and γ, which are different at the splicing level, not at the transcriptional level. The analysis of the genomic structure of SDF-1 in human and mouse revealed two isoforms, SDF-1α and SDF-1β, which are encoded by a single gene and result from alternative splicing. SDF-1α comprises 3 exons and encodes a protein of 89 amino acids whereas SDF-1β consists of 4 exons and encodes a protein of 93 amino acids. Both isoforms are highly similar regarding their sequences with the only difference of 4 additional amino acids at the C-terminus of SDF1β. In adult rat brain, SDF-1α is the predominant one, present in astrocytes, microglia, as well as in neurons. SDF-1α is found positive in normal cholinergic neurons, such as in the medial septum and substantia innominata, and in dopaminergic neurons, such as in the substantia nigra (SN) pars compacta and the ventral tegmental area. SDF-1α is the only known ligand for CXCR4. CXCR4 is also a target for human immunodeficiency virus (HIV) binding[1][2].

In vitro and in vivo studies using ischemic reperfusion models and a pretreatment with SDF-1α results in decreased infarct size and increases resistance to hypoxic damage and apoptotic cell death via activation of ERK-1/2 and AKT phosphorylation [1]. The SDF-1α/CXCR4 signaling maintains central nervous system homeostasis through the interaction with the neurotransmitter and neuropeptide systems, the neuroendocrine systems[2]. An increasing number of animal experiments have shown that SDF-1α can enhance the migration of BMSCs, mobilize BMSCs to diseased areas, and promote their proliferation and differentiation[3].

REFERENCES

[1]. Santhosh K Ghadge, et al. SDF-1α as a therapeutic stem cell homing factor in myocardial infarction. Pharmacol Ther. 2011 Jan;129(1):97-108.

[2]. Zheng Jiang, et al. Contribution of SDF-1α/CXCR4 signaling to brain development and glioma progression. Neurosignals. 2013;21(3-4):240-58.

[3]. Zhiqiang Meng, et al. SDF Factor-1α Promotes the Migration, Proliferation, and Osteogenic Differentiation of Mouse Bone Marrow Mesenchymal Stem Cells Through the Wnt/β-Catenin Pathway. Stem Cells Dev. 2021 Jan 15;30(2):106-117.

[4]. Andrew C W Zannettino, et al. Elevated serum levels of stromal-derived factor-1alpha are associated with increased osteoclast activity and osteolytic bone disease in multiple myeloma patients. Cancer Res. 2005 Mar 1;65(5):1700-9.

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