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

Cat. No.:	HY-P700043AF
Synonyms:	Stromal Cell-Derived Factor 1; SDF-1; IRH; hIRH; PBSF; CXCL12; SDF1
Species:	Human
Source:	E. coli
Accession:	P48061-1 (V24-N88)
Gene ID:	6387
Molecular Weight:	Approximately 8.55 kDa

PROPERTIES

AA Sequence	M 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
Biological Activity	Measure by its ability to chemoattract BaF3 cells transfected with human CXCR4. The ED_{50} for this effect is <0.5 ng/mL.
Appearance	Lyophilized powder.
Formulation	Lyophilized from a solution containing 20 mM sodium citrate, 0.1 MNaCl, pH 4.5.
Endotoxin Level	<0.1 EU per 1 μg of the protein by the 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	SDF-1 alpha/CXCL12 protein functions as a chemoattractant with specific activity on T-lymphocytes and monocytes, excluding neutrophils. Upon activation of the C-X-C chemokine receptor CXCR4, it induces a rapid and transient rise in intracellular calcium ions, facilitating chemotaxis. SDF-1-beta(3-72) and SDF-1-alpha(3-67) exhibit reduced chemotactic activity, and binding to cell surface proteoglycans appears to inhibit the formation of SDF-1-alpha(3-67), preserving activity at local sites. Additionally, it binds to the atypical chemokine receptor ACKR3, activating the beta-arrestin pathway and serving as a scavenger receptor for SDF-1. Through binding to the allosteric site (site 2) of integrins, it activates ITGAV:ITGB3, ITGA4:ITGB1, and ITGA5:ITGB1 independently of CXCR4. Acting as a positive regulator of monocyte migration and a negative regulator of monocyte adhesion via the LYN kinase, SDF-1 alpha/CXCL12 stimulates migration of monocytes and T-lymphocytes through CXCR4 and ACKR3, decreasing monocyte adherence to ICAM-1-coated surfaces, a ligand for beta-2

integrins. The SDF1A/CXCR4 signaling axis inhibits beta-2 integrin LFA-1-mediated adhesion of monocytes to ICAM-1 through LYN kinase. It inhibits CXCR4-mediated infection by T-cell line-adapted HIV-1, plays a protective role after myocardial infarction, and induces down-regulation and internalization of ACKR3 in various cells. Essential during embryonic development, it is required for B-cell lymphopoiesis, myelopoiesis in bone marrow, and heart ventricular septum formation. Furthermore, SDF-1 alpha/CXCL12 stimulates the proliferation of bone marrow-derived B-cell progenitors in the presence of IL7, as well as the growth of stromal cell-dependent pre-B-cells (By similarity). Existing in monomeric or homodimeric forms, the equilibrium is influenced by non-acidic pH, multivalent anions, and binding to CXCR4 or heparin. The monomeric form is vital for full chemotactic activity and resistance to ischemia/reperfusion injury, while the dimeric form acts as a partial agonist of CXCR4, stimulating Ca2+ mobilization without chemotactic activity, serving instead as a selective antagonist that blocks chemotaxis induced by the monomeric form. SDF-1 alpha/CXCL12 interacts with the N-terminus of ACKR3, integrin subunit ITGB3 (via the allosteric site (site 2)), and TNFAIP6 via the Link domain.

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