Pacific Biomarkers
The Value of Expertise

CXCL-12 SDF-1 (Stromal Cell Derived Factor-1)

Analyte: Stromal Cell Derived Factor-1
Specimen Type: PlatletPoor EDTA Plasma
Optimum Volume: 0.5 mL
Stability:

2-8 Degrees C	-20 Degrees C	-70 Degrees C
6 days	1 month	2.8 years

Reporting Units: pg/mL
Method: ELISA

Biological or Clinical Significance:
SDF-1 alpha or stromal derived factor 1 alpha (also known as CXCL12) has weak sequence homology with other CXC chemokines and with members of the CC (β) chemokines sub-family In contrast to other chemokines genes, which are on chromosomes 4 or 17, the SDF-1 gene is on chromosome 10. SDF-1 also has a higher degree of interspecies conservation than other chemokines, with 99% identity between the human and the mouse sequences.

There are two alternatively spliced variants of SDF-1. SDF-1 alpha is an 89 amino acid polypeptide, while SDF-1 beta has the identical sequence with a 4 residue C-terminal extension. Both SDF-1 variants are highly basic, heparin-binding proteins. There is no glycosylation site in the sequence of either SDF-1 variant. SDF-1 alpha binds to and activates the CXCR4 and CXCR7 receptors. The binding of SDF-1 alpha to CXCR4 initiates divergent signaling pathways downstream of ligand binding, which can result in a variety of responses such as chemotaxis, cell survival and/or proliferation, increase in intracellular calcium, and gene transcription. The precise nature of these pathways may be tissue-dependent and thus may differ between cell types.

SDF-1 alpha knockout studies show that bone marrow colonization during the third trimester of gestation is controlled by SDF-1 alpha /CXCR4 pathway function. The SDF-1 alpha /CXCR4 pathway function in adults is integral to the retention and homing of HSC in the bone marrow microenvironment and lymphocyte trafficking. SDF-1 alpha is constitutively expressed in several organs including lung, liver, skeletal muscle, brain, kidney, heart, skin, and bone marrow.

CXCR4, is widely expressed on hematopoietic cells. Functional CXCR4 is expressed on embryonic pluripotent stem cells and several types of tissue-committed stem cells, for example, neural tissue, skeletal muscles, heart, liver, endothelium, and renal tubular- and retina pigment-epithelium.

The SDF-1 alpha/CXCR4 axis has significant roles in diverse diseases. Therefore, it is a therapeutic target as well as a biomarker of disease.

SDF-1 alpha has a significant role in metastasis to lung, liver, lymph nodes, and bone. SDF-1 alpha mediated activation of CXCR4 expressed on cancer cells stimulates a number of cellular processes involved in metastasis. The SDF-1 alpha /CXCR4 pathway also contributes to the vicious cycle of bone marrow destruction and tumor growth which occurs during cancer metastasis to the bone. Multiple myeloma (MM) cells were shown to secrete SDF-1 alpha, which contributed to an increase in

CXCL-12 SDF-1 (Stromal Cell Derived Factor-1)

circulating SDF-1 alpha levels. The SDF-1 alpha /CXCR4 axis contributes to neoangiogenesis through the mobilization and recruitment of immature and mature hematopoietic cells, endothelial precursor cells, and smooth muscle cell progenitors.

SDF-1 alpha secretion may be induced by events causing hypoxia and HIF-1a upregulation. In patients with chronic heart failure. SDF-1alpha levels peak between 3 and 7 days post stroke. SDF-1 alpha was upregulated in patients with fibrotic interstitial lung diseases, and can be associated with several inflammatory diseases, including RA, SLE, MS, IBD and uveitis.

Principle of Test Method:

The SDF-1 alpha immunoassay is a solid-phase ELISA designed to measure human SDF-1 alpha in cell culture supernates and platelet poor plasma. This assay employs the quantitative sandwich enzyme immunoassay technique.