Recombinant Human SCF/c-kit Ligand

Catalog Number: 11010-SC

DESCRIPTION

Source	Human embryonic kidney cell, HEK293-derived human SCF/c-kit Ligand protein Glu26-Ala189 Accession # P21583.1
N-terminal Sequence Analysis	Glu26
Predicted Molecular Mass	18 kDa

SPECIFICATIONS

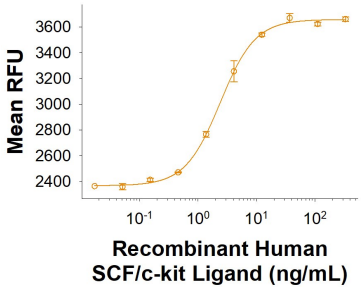
SDS-PAGE	22-31 kDa, under reducing conditions.
Activity	Measured in a cell proliferation assay using TF-1 human erythroleukemic cells. Kitamura, T. *et al.* (1989) J. Cell Physiol. **140**:323. The ED_{50} for this effect is 1.00-5.00 ng/mL.
Endotoxin Level	<0.10 EU per 1 µg of the protein by the LAL method.
Purity	>95%, by SDS-PAGE visualized with Silver Staining and quantitative densitometry by Coomassie® Blue Staining.
Formulation	Lyophilized from a 0.2 µm filtered solution in PBS. See Certificate of Analysis for details.

PREPARATION AND STORAGE

Reconstitution	Reconstitute at 100-500 µg/mL in PBS.
Shipping	The product is shipped at ambient temperature. Upon receipt, store it immediately at the temperature recommended below.
Stability & Storage	**Use a manual defrost freezer and avoid repeated freeze-thaw cycles.** • 12 months from date of receipt, -20 to -70 °C as supplied. • 1 month, 2 to 8 °C under sterile conditions after reconstitution. • 3 months, -20 to -70 °C under sterile conditions after reconstitution.

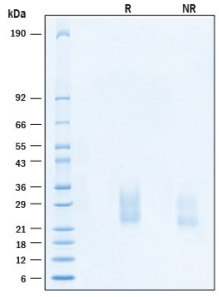
DATA

Bioactivity



Recombinant Human SCF/c-kit Ligand Protein Bioactivity. Recombinant Human SCF/c-kit Ligand Protein (Catalog # 11010-SC) induces proliferation of TF-1 human erythroleukemic cells. The ED_{50} for this effect is 1.00-5.00 ng/mL.

SDS-PAGE



Recombinant Human SCF/c-kit Ligand Protein SDS-PAGE. 2 µg/lane of Recombinant Human SCF/c-kit Ligand Protein (Catalog # 11010-SC) was resolved with SDS-PAGE under reducing (R) and non-reducing (NR) conditions and visualized by Coomassie® Blue staining, showing bands at 22-32 kDa.

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BACKGROUND

Stem cell factor (SCF) is a potent hematopoietic growth factor required in regulating both embryonic and adult hematopoiesis. SCF protein promotes the survival, differentiation, and mobilization of multiple cell types including myeloid, erythroid, megakaryocytic, lymphoid, germ cell, and melanocyte progenitors (1 7). SCF is a primary growth and activation factor for mast cells and eosinophils (8). And SCF assists in the recovery of cardiac function following myocardial infarction by increasing the number of cardiomyocytes and vascular channels (9). Stem cell factor is an important cytokine for ex vivo clinical applications. Along with other cytokines, SCF is used in the culture and expansion of hematopoietic stem cells (HSCs) as well as for proliferation and differentiation of both myeloid and erythroid progenitor cells.

Mature stem cell factor consists of a 189 amino acid (aa) extracellular domain (ECD), a 23 aa transmembrane domain, and a 36 aa cytoplasmic tail (10). The ECD shows both N linked and O-linked glycosylation (11). SCF protein exists in two forms, a membrane-bound form and a proteolytically processed soluble form that lacks the transmembrane domain and cytoplasmic tail. The soluble form is created by proteolytic cleavage at two alternate sites in the extracellular juxtamembrane region releasing a 25 kDa soluble SCF protein which is comparable to the only form produced by Steel-dickie mutant mice (12, 13). There is also an alternately spliced isoform of human SCF that lacks 28 amino acids that encompasses the primary proteolytic recognition site (14). This form cannot be cleaved and is only membrane bound. SCF binds to C-kit (CD117). C-kit is expressed on many different cell types including HSCs, mast cells, germ cells, and melanocytes. Binding of SCF to C-kit induces receptor dimerization and autophosphorylation of tyrosine residues in the cytoplasmic domain (15). Tyrosine phosphorylation initiates multiple signaling pathways including RAS, PI3 kinase, Src, and JAK/STAT. Stem cell factor is highly conserved among mammals. Human SCF protein shares 79% 87% aa sequence identity with dog, cat, mouse, and rat SCF. Rat SCF is active on mouse and human cells, but human SCF is only weakly active on mouse cells (10).

SCF is a versatile factor in the differentiation of many specific cell types like spermatogonial stem cells (16) and megakaryocyte progenitors (17). Apart from differentiation, SCF also can maintain stemness in cells. This is the case for human bone marrow mesenchymal cells, which require SCF and hepatocyte growth factor for maintenance (18). Hematopoietic stem cells similarly require SCF from surrounding cells in their niche to maintain their stemness and their progenitors (19). SCF has also improved protocols for continuous generation of cells in culture systems, like granulocytes and macrophages (20).

For treatment of graft versus host disease, SCF is used in combination with other cytokines to generate myeloid-derived suppressor cells from human umbilical cord blood (21). SCF is also used to generate T cells for cell-based therapies, drug screening and disease modeling (22). In regenerative studies, SCF is applied in wound healing hydrogel as a means of increasing its adhesion strength and tissue regeneration (23).

References:

1. Ashman, L.K. (1999) Int. J. Biochem. Cell Biol. **31**:1037.
2. Sette, C. *et al.* (2000) Int. J. Dev. Biol. **44**:599.
3. Yoshida, H. *et al.* (2001) J. Invest. Dermatol. Symp. Proc. **6**:1.
4. Erlandsson, A. *et al.* (2004) Exp. Cell Res. **301**:201.
5. Kapur, R. *et al.* (2002) Blood **100**:1287.
6. Wang, C.H. *et al.* (2007) Arterioscler. Thromb. Vasc. Biol. **27**:540.
7. Bashamboo, A. *et al.* (2006) J. Cell Sci. **119**:3039.
8. Reber, L. *et al.* (2006) Eur. J. Pharmacol. **533**:327.
9. Kanellakis, P. *et al.* (2006) Cardiovasc. Res. **70**:117.
10. Martin, F.H. *et al.* (1990) Cell **63**:203.
11. Arakawa, T. *et al.* (1991) J. Biol. Chem. **266**:18942.
12. Majumdar, M.K. *et al.* (1994) J. Biol. Chem. **269**:1237.
13. Brannan, C.I. *et al.* (1991) Proc. Natl. Acad. Sci. **88**:4671.
14. Anderson, D.M. *et al.* (1991) Cell Growth Differ. **2**:373.
15. Lemmon, M.A. *et al.* (1997) J. Biol. Chem. **272**:6311.
16. Nasimi, M. *et al.* (2021) Reprod Sci. **28**:963.
17. Krisch, L. *et al.* (2021) Int. J. Mol. Sci. **22**:8224.
18. Cao, Z. *et al.* (2020) Stem Cell Res Ther. **11**:1.
19. Comazzetto, S. *et al.* (2019) Cell Stem Cell. **24**:477.
20. Bernecker, C. *et al.* (2019) Stem Cells Dev. **28**:1540.
21. Park, M.Y. *et al.* (2019) Front Immunol. **10**:1.
22. Netsrithong, R. *et al.* (2020) Stem Cell Res Ther. **11**:1.
23. Zhang, Li. *et al.* (2021) Journal Mater Chem B. **29**:5887.

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