

## KITLG (KIT ligand) (updated: old version not available)

### Identity

Other names **MGF (Mast Cell Growth Factor)**

**SCF (Stem Cell factor)**

Hugo [KITLG](#)

Location 12q22

### DNA/RNA

Description Genomic sequence not known; 9 exons ([see diagram](#)).

Transcription 1,4 Kb mRNA; alternative splicing gives rise to different transcripts, mainly represented by those for a membrane and a soluble form.

### Protein

Description the membrane bound form is a surface molecule of 248 aa, that includes 23 aa of the highly hydrophobic transmembrane domain; the second form corresponds to a soluble protein constituted by the first 165 aa of the extracellular domain released by a posttranslational processing, consisting in a proteolytic cleavage of the mature SCF in the extracellular juxtamembrane region; the full length transcripts encode for a transmembrane precursor of the soluble protein; an alternative splicing that involves the region corresponding to exon 6 of the SCF cDNA, which contains the proteolytic cleavage site, encodes for a surface molecule.

Expression SCF transcripts have been found in the cells surrounding kit-positive cells, such as granulosa and Sertoli cells, bone marrow stromal cells and in fibroblasts, keratinocytes and mature granulocytes; SCF expression of peripheral lymphocytes and monocytes is still controversial.

Localisation plasma membrane or interstitial space

Function SCF/MGF binding of receptor [KIT](#), with tyrosine kinase activity, induces receptor dimerization, autophosphorylation and signal transduction via molecules containing SH2-domains; the soluble and the transmembrane protein have a different biological activity; the soluble form mainly stimulates cellular proliferation; the membrane-bound isoform induces an activation of the receptor more prolonged than the soluble one

Homology with [PDGFRb](#), PDGFRa, and CSF-1.

### Mutations

Germinal human mutations are yet unknown in human MGF/SCF gene; mouse mutations at the murine steel (Sl) locus that encodes MGF are known

and give rise to deficiencies in pigment cells, germ cells, and blood cells; in particular the steel-Dickie (Sld) mouse has a 4.0-kb intragenic deletion that truncates the Sl coding sequence; Sld mice are only capable of encoding a soluble truncated growth factor that lacks both transmembrane and cytoplasmic domains.

## Implicated in

**Entity** [Mastocytosis](#)

**Disease** In skin from patients with mastocytosis, MGF was found prevalently free in the dermis and in extracellular spaces between keratinocytes suggesting the presence of a soluble form of the protein; altered distribution of mast cell growth factor in the skin of patients with cutaneous mastocytosis is consistent with abnormal production of the soluble form of the factor, resulting by an increased cleavage of SCF with excessive release of a soluble form from the normally membrane bound form; no sequence abnormalities were detected in MGF mRNA.

**Entity** Gynecological tumors

**Disease** findings obtained on three cervical carcinomas (ovarian serous adenocarcinoma, small cell carcinoma and ovarian immature teratoma) and two gynecological cancer cell lines (ME180 and HGCM) demonstrate coexpression of c-Kit receptor and SCF; these observations are consistent with the possibility that an autocrine activation of SCF/KIT system might be involved in gynecological malignancies.

**Entity** [Small-cell lung cancer](#)

**Disease** SCF is expressed in small-cell lung cancer (SCLC); abundant expression of SCF and c-Kit mRNA was seen in 32% of SCLC cell lines and 66% of SCLC tumors; an autocrine mechanism in the pathogenesis of SCLC is strongly suggested.

## External links

### Nomenclature

[Hugo](#) [KITLG](#)  
[GDB](#) [KITLG](#)  
[Entrez\\_Gene](#) [KITLG 4254](#) KIT ligand

### Cards

[Atlas](#) [MGFID142](#)  
[GeneCards](#) [KITLG](#)  
[Ensembl](#) [KITLG](#)  
[Genatlas](#) [KITLG](#)  
[GeneLynx](#) [KITLG](#)

<a href="#">eGenome</a>	<a href="#">KITLG</a>
<a href="#">euGene</a>	<a href="#">4254</a>
<b>Genomic and cartography</b>	
<a href="#">GoldenPath</a>	<a href="#">KITLG - 12q22</a> <a href="#">chr12:87410700-87498369 - 12q21.32</a> (hg18-Mar_2006)
<a href="#">Ensembl</a>	<a href="#">KITLG - 12q21.32 [CytoView]</a>
<a href="#">NCBI</a>	<a href="#">Genes Cyto</a> <a href="#">Gene Seq</a> [Map View - NCBI]
<a href="#">OMIM</a>	<a href="#">Disease map [OMIM]</a>
<a href="#">HomoloGene</a>	<a href="#">KITLG</a>
<b>Gene and transcription</b>	
<a href="#">Genbank</a>	<a href="#">AF119835</a> [ENTREZ]
<a href="#">Genbank</a>	<a href="#">AF400436</a> [ENTREZ]
<a href="#">Genbank</a>	<a href="#">AF400437</a> [ENTREZ]
<a href="#">Genbank</a>	<a href="#">BC069733</a> [ENTREZ]
<a href="#">Genbank</a>	<a href="#">BC069783</a> [ENTREZ]
<a href="#">RefSeq</a>	<a href="#">NM_000899</a> [SRS] <a href="#">NM_000899</a> [ENTREZ]
<a href="#">RefSeq</a>	<a href="#">NM_003994</a> [SRS] <a href="#">NM_003994</a> [ENTREZ]
<a href="#">AceView</a>	<a href="#">KITLG</a> AceView - NCBI
<a href="#">TRASER</a>	<a href="#">KITLG</a> Traser - Stanford
<a href="#">Unigene</a>	<a href="#">Hs.1048</a> [SRS] <a href="#">Hs.1048</a> [NCBI] <a href="#">HS1048</a> [spliceNest]
<b>Protein : pattern, domain, 3D structure</b>	
<a href="#">SwissProt</a>	<a href="#">P21583</a> [SRS] <a href="#">P21583</a> [EXPASY] <a href="#">P21583</a> [INTERPRO]
<a href="#">Interpro</a>	<a href="#">IPR012351 Cytokine_4_hlx</a> [SRS] <a href="#">IPR012351 Cytokine_4_hlx</a> [EBI]
<a href="#">Interpro</a>	<a href="#">IPR003452 SCF</a> [SRS] <a href="#">IPR003452 SCF</a> [EBI]
<a href="#">CluSTr</a>	<a href="#">P21583</a>
<a href="#">Pfam</a>	<a href="#">PF02404 SCF</a> [SRS] <a href="#">PF02404 SCF</a> [Sanger] <a href="#">pfam02404</a> [NCBI-CDD]
<a href="#">Blocks</a>	<a href="#">P21583</a>
<a href="#">PDB</a>	<a href="#">1EXZ</a> [SRS] <a href="#">1EXZ</a> [PdbSum], <a href="#">1EXZ</a> [IMB]
<a href="#">PDB</a>	<a href="#">1SCF</a> [SRS] <a href="#">1SCF</a> [PdbSum], <a href="#">1SCF</a> [IMB]
<b>Protein Interaction databases</b>	
<a href="#">DIP</a>	<a href="#">P21583</a>
<a href="#">IntAct</a>	<a href="#">P21583</a>
<b>Polymorphism : SNP, mutations, diseases</b>	
<a href="#">OMIM</a>	<a href="#">184745</a> [map]
<a href="#">GENECLINICS</a>	<a href="#">184745</a>
<a href="#">SNP</a>	<a href="#">KITLG</a> [dbSNP-NCBI]
<a href="#">SNP</a>	<a href="#">NM_000899</a> [SNP-NCI]
<a href="#">SNP</a>	<a href="#">NM_003994</a> [SNP-NCI]

[SNP](#) [KITLG](#) [GeneSNPs - Utah] [KITLG](#) [HGBASE - SRS] [KITLG](#) [SNP - HAPMAP]

### General knowledge

[Family Browser](#)

[KITLG](#) [UCSC Family Browser]

[SOURCE](#)

[NM\\_000899](#)

[SOURCE](#)

[NM\\_003994](#)

[SMD](#)

[Hs.1048](#)

[SAGE](#)

[Hs.1048](#)

[Amigo](#)

[stem cell factor receptor binding](#)

[Amigo](#)

[stem cell factor receptor binding](#)

[Amigo](#)

[protein binding](#)

[Amigo](#)

[plasma membrane](#)

[Amigo](#)

[cell adhesion](#)

[Amigo](#)

[signal transduction](#)

[Amigo](#)

[growth factor activity](#)

[Amigo](#)

[cell proliferation](#)

[Amigo](#)

[organ morphogenesis](#)

[Amigo](#)

[membrane](#)

[Amigo](#)

[integral to membrane](#)

[Amigo](#)

[hemopoiesis](#)

[BIOCARTA](#)

[Regulation of BAD phosphorylation](#) [Genes]

[BIOCARTA](#)

[Erythrocyte Differentiation Pathway](#) [Genes]

[BIOCARTA](#)

[IL 17 Signaling Pathway](#) [Genes]

[BIOCARTA](#)

[CDK Regulation of DNA Replication](#) [Genes]

[BIOCARTA](#)

[Melanocyte Development and Pigmentation](#) [Genes]

[PubGene](#)

[KITLG](#)

### Other databases

#### Probes

[Probe](#)

[KITLG Related clones \(RZPD - Berlin\)](#)

#### PubMed

[PubMed](#)

[68 Pubmed reference\(s\) in LocusLink](#)

## Bibliography

### **Stem cell factor is encoded at the Sl locus of the mouse and is the ligand for the c-kit tyrosine kinase receptor.**

Zsebo K.M., Williams D.A., Geissler E.N., Broudy V.C., Martin F.H., Atkins H.L., Hsu R.Y., Birkett N.C., Okino K.H., Murdock D.C., Jacobsen F.W., Langley K.E., Smith K.A., Takeishi T., Cattanach B.M., Galli S.J. and Suggs S.V.

Cell. 1990 Oct 5;63(1):213-24.

Medline [91004220](#)

### **Primary structure and functional expression of rat and human stem cell factor DNAs**

Martin FH, Suggs SV, Langley KE, Lu HS, Ting J, Okino KH, Morris CF, McNiece IK, Jacobsen FW, Mendiaz EA, et al

Cell 63 (1990): 203-211

Medline [91004219](#)

### **Steel-Dickie mutation encodes a c-Kit ligand lacking transmembrane and cytoplasmic domains**

Brannan C.I., Lyman S.D., Williams D.E., Eisenman J., Anderson D.M., Cosman D., Bedell M.A., Jenkins N.A. and Copeland N.G.

Proc. Natl. Acad. Sci. USA 88 (1991): 4671-4674

Medline [91271255](#)

### **Coexpression of the stem cell factor and the c-kit genes in small-cell lung cancer**

Hibi K., Takahashi T., Sekido Y., Ueda R., Hida T., Ariyoshi Y., Takagi H. and Takahashi T.

Oncogene 6 (1991): 2291-2296

Medline [92115331](#)

### **Altered metabolism of mast-cell growth factor (c-kit ligand) in cutaneous mastocytosis**

Longley B.J., Morganroth G.S., Tyrrell L., Ding T.G., Anderson D.M., Williams D.E. and Halaban R.

New England J Med 328 (1993): 1302-1307

Medline [93226002](#)

### **Expression of interleukins 1, 3, 6, stem cell factor and their receptors in acute leukemia blast cells and in normal peripheral lymphocytes and monocytes.**

Ferrari S., Grande A., Manfredini R., Tagliafico E., Zucchini P., Torelli G. and Torelli U.

Eur J Haematol 50 (1993): 141-148

Medline [93231292](#)

**Human peripheral blood granulocytes and myeloid leukemic cell lines express both transcripts encoding for stem cell factor**

Ramenghi U., Ruggieri L., Dianzani I., Rosso C., Brizzi M.F., Camaschella C., Pietsch T. and Saglio G.

Stem Cells 12 (1994): 521-526

Medline [95102503](#)

**Coexpression of the c-kit receptor and stem cell factor in gynecological tumors**

Inoue M., Kyo S., Fujita M., Enomoto T. and Kondoh G.

Canc Res 54 (1994): 3049-3053

Medline [94243829](#)

[REVIEW articles](#)      *automatic search in PubMed*

[Last year publications](#)      *automatic search in PubMed*

[BiblioGene - INIST](#)

**Contributor(s)**

<b>Written</b>	10-1998	Alessandro Beghini
<b>Updated</b>	06-2000	Lidia Larizza and Alessandro Beghini

**Citation**

*This paper should be referenced as such :*

**Beghini A** . KITLG (KIT ligand). Atlas Genet Cytogenet Oncol Haematol. October 1998 .

URL : <http://AtlasGeneticsOncology.org/Genes/MGFID142.html>

**Larizza L and Beghini A** . KITLG (KIT ligand). Atlas Genet Cytogenet Oncol Haematol. June 2000 .

URL : <http://AtlasGeneticsOncology.org/Genes/MGFID142.html>

© Atlas of Genetics and Cytogenetics in Oncology and Haematology

---