

Gene Section

Short Communication

SOCS3 (suppressor of cytokine signaling 3)

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Published in Atlas Database: February 2012

Online updated version : <http://AtlasGeneticsOncology.org/Genes/SOCS3ID44124ch17q25.html>
DOI: 10.4267/2042/47423

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Identity

Other names: ATOD4, CIS3, Cish3, MGC71791, SOCS-3, SSI-3, SSI3

HGNC (Hugo): SOCS3

Location: 17q25.3

DNA/RNA

Description

Size: 3300 bases.

Transcription

2 introns.

Transcription generates 3 different mRNAs, 2 spliced variants and 1 unspliced form.

Protein

Description

225 amino acids, 24770 Da.

Expression

Widely expressed in normal and tumor tissues.
Expression in tumors is variable due to its different

functions.

Localisation

Cytoplasm.

Function

SOCS is a negative regulator of cytokines that signal through the JAK/STAT pathway. It binds to tyrosine kinase receptors such as gp130 subunit of receptors.

It interacts with cytokine receptors or JAK kinases and interaction with growth factor receptors (insulin-like growth factor-I, insulin, fibroblast growth factor). It inhibits JAK2 kinase activity.

Part of the ubiquitin-protein ligase complex which contains elongin, RNF7, and CUL5.

Binding to leptin.

Tumor promoting or tumor suppressive functions. Antagonizing cAMP-antiproliferative effects. SOCS3 suppresses erythropoietin in fetal liver and IL-6 signaling in vivo.

Mutations

Note

Mutations not detected.



KIR = kinase inhibitory region.

Implicated in

Lung cancer

Note

SOCS-3 acts as a tumor suppressor and is frequently lost in the disease. Its transient transfection in lung cancer cell lines leads to a decrease in proliferation.

Liver cancer

Note

SOCS-3 is silenced by methylation. SOCS-3 is a tumor suppressor in this malignancy. It is implicated in regulation of migration of cancer cells. SOCS-3 deletion enhances JAK/STAT and FAK signaling.

Barret's adenocarcinoma

Note

SOCS-3 is methylated. It is considered as a tumor suppressor.

Glioblastoma multiforme

Note

SOCS-3 expression is lost through promoter methylation.

Head and neck squamous cell cancer

Note

SOCS-3 is frequently down-regulated as a result of promoter methylation. It causes a growth inhibition.

Hematological malignancies

Note

SOCS-3 inhibits megakaryocytic growth, overexpression of SOCS-3 is associated with a decreased survival of patients with follicular lymphoma.

Melanoma

Note

SOCS-3 is a tumor promoter in melanoma and is constitutively expressed in several cell lines.

Prostate cancer

Note

SOCS-3 stimulates proliferation and inhibits apoptosis in prostate cancer cells which do not express the androgen receptor.

It may also antagonize the effects of fibroblasts growth factor and mitogen-activated protein kinases.

In androgen-sensitive prostate cancer cells, SOCS-3 is induced by androgen and may inhibit androgen-stimulated proliferation and secretion.

Diabetes

Note

SOCS-3 may antagonize function of insulin-like growth factors.

Various cancers

Prognosis

Loss of protein expression and promoter hypermethylation occur in lung, liver cancer, head and neck squamous cell cancer. Overexpression occurs in melanoma and prostate cancer.

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This article should be referenced as such:

Culig Z. SOCS3 (suppressor of cytokine signaling 3). *Atlas Genet Cytogenet Oncol Haematol*. 2012; 16(7):496-497.
