Gene Section

Review

CD82 (CD82 molecule)
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Identity

Other names: 4F9; C33; GR15; IA4; KAI1; R2; SAR2; ST6; TSPAN27; Tetraspanin-27; Tspan-27
HGNC (Hugo): CD82
Location: 11p11.2
Local order: LOC729793---LOC729798---ALX4---LOC646535---CD82---TSPAN18---TP53I11---LOC100131432---PRDM11---CHST1.

DNA/RNA

Note
We do notice that, in literature, there is one more splicing variant with functional importance (Lee et al., 2003). In this variant, the 84 bp exon that encodes the amino acids 215-242 of CD82/kAI1 protein is selectively deleted. However, the chromosome location and exon numbers of this splicing variant described in the publication are not consistent with those for the other two splicing variants herein. There is no gene accession number be assigned to this slicing variant. Thus, this variant is not presented in the following diagram.

Description
Gene type: protein coding.
Gene size: 54.2 kb.
Two splicing variants in addition to wild type (NM_002231 or CD82 wild type consists of 10 exons; NM_001024844 or the splicing variant lacking exon 6 and the splicing variant likely lacking exon 8 consist of 9 exons).

NM_002231 encodes the longer isoform, i.e., CD82 wild type; NM_001024844 encodes a shorter isoform, which lacks exon 6.
CD82 is a 4-transmembrane glycoprotein and belongs to the tetraspanin superfamily. This family of proteins is characterized by the conservation of several motifs located within the extracellular and transmembrane domains. CD82 undergoes two types of post-translational modifications: glycosylation at its large extracellular loop and palmitoylation at the cysteine residues in or near cytoplasmic domains.

**Transcription**

Transcript length: NM_002231 is 1715 bp; NM_001024844 is 1640 bp; and the splicing variant likely lacking exon 8 is 1631 bp.

**Protein**

*Description*

Size: 267 amino acids. Because of the glycosylation, the molecular weight of CD82 proteins ranges between 30-90 kDa depending on tissue and cell types.

*Expression*

CD82 is ubiquitously expressed in various human tissues such as epithelium and endothelium. CD82 expression is frequently diminished or lost in invasive and metastatic solid-tumor tissues.

*Localisation*

CD82 is found in the plasma membrane, endosomes, lysosomes, and exosomes.

*Function*

In relation to cancer, CD82 function is to inhibit tumor invasion and suppresses tumor metastasis. Palmitoylation is essential for CD82 function as well as the presence of three polar residues, NQE, located within its transmembrane domains. CD82 associates with other transmembrane proteins such as tetraspanins, integrins, Ig superfamily members, and growth factor receptors and intracellular signaling proteins to regulate membrane microdomain.
organization, vesicular trafficking, and transmembrane signaling.

Homology

Mouse and other human tetraspanins.

Mutations

Note

Currently there is no report for the disease-related or biologically significant mutation for CD82 gene (See HGMD).

Implicated in

Prostate cancer, breast cancer, pancreatic cancer, gastric cancer, bladder cancer, ovarian cancers, non-small-cell lung carcinoma, hepatocellular carcinoma, oral squamous cell carcinoma, and other solid tumors

Note

Invasion and metastasis suppression. CD82 is expressed in many normal tissues such as epithelia. In invasive or metastatic cancers, CD82 expression is typically reduced or lost. In most of the solid tumors studied so far, CD82 expression is inversely correlated with the invasive and metastatic abilities of malignant tumors.

The metastasis-suppressive effect of CD82 can be observed in the animal studies of cancer metastasis by re-introducing CD82 expression in various metastatic cancer cell lines such as prostate cancer AT6.1, prostate cancer LNCaP, fibroblastoma HT1080, melanoma MDA-MB-435, breast cancer LCC6, liver cancer MHCC97-H, and lung cancer LLC lines. The observations of CD82-mediated suppression of cancer metastasis in animal models are supported by a variety of clinical studies on the human cancers from prostate, breast, ovary, colon, lung, stomach, liver, and other organs.

CD82 attenuates the signaling from integrins and growth factor receptors such as epidermal growth factor receptor and c-Met. CD82 also reorganizes the membrane micordomains including tetraspanin webs and lipid rafts. The interaction of CD82 and its counter-receptor DARC inhibits tumor cell proliferation and induces senescence.

Prognosis

The lower or no expression of CD82 in the tumors from prostate, breast, colon, stomach, bladder, lung, liver, pancreas, ovary, and other organs predicts the poor clinical outcome. Conversely, the expression of CD82 wild type proteins in solid tumors reflects the less invasiveness and low metastatic potential of the tumors.

References


Tagawa K, Arihiro K, Takeshima Y, Hiyama E, Yamasaki M, Inai K. Down-regulation of KAI1 messenger RNA expression is not associated with loss of heterozygosity of the KAI1 gene region in lung adenocarcinoma. Jpn J Cancer Res. 1999 Sep;90(9):970-6


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