Atlas of Genetics and Cytogenetics in Oncology and Haematology

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Gene Section
Mini Review

DUSP10 (dual specificity phosphatase 10)

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Identity

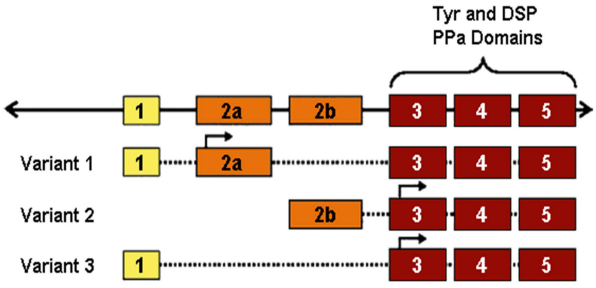
Other names: MKP-5, MKP5

HGNC (Hugo): DUSP10

Location: 1q41

Note: DUSP10 is also known as MAP Kinase Phosphatase 5.

DNA/RNA



DUSP10 mRNA transcript variants.

Description

The DUSP10 gene consists of 5 exons and 4 introns spanning 40 kb.

Transcription

There are three mRNA transcript variants for DUSP10 and two protein isoforms. Variant 1 is the full length protein, isoform a. Variants 2 and 3 have different 5' mRNA transcripts, but the same start site in exon 3 and are missing the N-terminus. Variants 2 and 3 only contain the C-terminal catalytic domain and code for isoform b.
The ATG site is on Exon 2.
DUSP10 Variant 1 (isoform a), NM_007207.3.
DUSP10 Variant 2 (isoform b), NM_144728.1.
DUSP10 Variant 3 (isoform b), NM_144729.1.

Protein

Note
Dual specificity protein phosphatases inactivate their target kinases by dephosphorylating both the phosphoserine/threonine and phosphotyrosine residues. They negatively regulate members of the MAPK superfamily (MAPK/ERK, SAPK/JNK, p38), which is associated with cellular proliferation and differentiation. Different members of this family of dual specificity phosphatases show distinct substrate specificities for MAPKs, different tissue distribution and subcellular localization, and different modes of inducibility of their expression by extracellular stimuli.
DUSP10 gene product binds to and inactivates p38 and SAPK/JNK, but not MAPK/ERK.

Description

DUSP10 gene is translated into two different protein products. Transcript variant 1 codes for the full-length DUSP10 isoform a (NP_009138.1) of 482 amino acids and a molecular weight of 52 kDa. Transcript variants 2 and 3 encode for a shorter protein, DUSP10 isoform b (NP_653329.1), that is 140 amino acids in length.

Expression

DUSP10 mRNA is widely expressed in liver, skeletal muscle, retina, macrophages, colon, fetal heart, spleen, infant brain, pregnant uterus, prostate epithelium and ovarian tumors.
DUSP10 mRNA is inducible by oxidative stress via JNK and ATF activation.

Localisation

DUSP10 is present in both the cytoplasm and nucleus of the cell.

Function

DUSP10 is a MAP kinase phosphatase with substrate specificy for jun N-terminal kinase (JNK) and p38.

Homology

The DUSP10 gene is conserved in chimpanzee, dog, cow, mouse, rat, chicken and zebrafish.

Mutations

Note

There are no characterized mutations in DUSP10.

Implicated in

Prostate cancer

Note

To date, DUSP10 levels or mutation have not been associated with any disease. However, DUSP10 mRNA levels were lower in prostate cell lines derived from malignant tumor than from cells derived from normal prostate tissue (Nonn et al., 2006). Additionally, DUSP10 mRNA levels are inducible in prostate cells by treatment with 1,25-dihydoxyvitamin D, curcumin, reseveratrol and gingerol (Nonn et al., 2006; Nonn et al., 2007).

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