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Gene Section
Mini Review

TRIAP1 (TP53 regulated inhibitor of apoptosis 1)

Veruska Alves, Roberta Felix, Andre Vettore, Gisele Colleoni

Universidade Federal de Sao Paulo - UNIFESP, Laboratory of Cancer Molecular Biology, Sao Paulo, Brazil (VA, RF, AV, GC)

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Identity

Other names: HSPC132; p53CSV; P53CSV; WF-1

HGNC (Hugo): TRIAP1

Location: 12q24.31

DNA/RNA

Description

2452 bases, starts at 119366147 and ends at 119368598 bp from promoter with minus strand orientation.

Transcription

This gene contains 2 introns which transcription gives 3 different mRNAs, 2 alternatively spliced variants and 1 unspliced form that encodes good proteins (see figure 1).

Protein

Note

The P53CSV protein is involved in programmed cell death. It contains a p53-binding site and it is induced when cells are at low genotoxic stress. It is probably involved in cell survival by interaction between Apaf-1 (apoptosis protease activating factor 1) and heat shock protein 70 (Hsp70) with subsequent inhibition of caspase-9 activation.

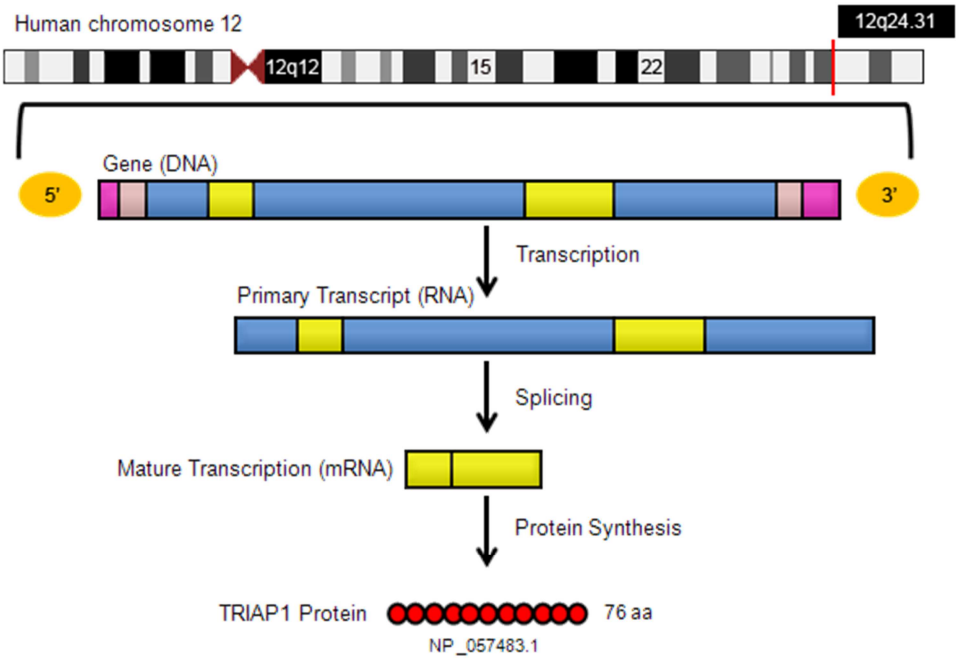

Figure 1.

Description

This protein contains 76 amino acids and has 8786 (Da) of weight.

MNSVGEACTD[10] MKREYDQCFN[20] RWFAEKFLKG[30] DSSGDPCTDL[40]
FKRYQQCVQK[50] AIKEKEIPIE[60] GLEFMGHGKE[70] KPENSS

Figure 2.

Localisation

The protein is localized in cytoplasm and perinuclear region.

Function

P53CSV is a novel p53-target gene. This gene can modulate apoptotic pathways by interaction with heat shock protein 70 (HSP70), preventing the induction of apoptosis. When cells are submitted to low levels of genotoxic stress, it is an important player in P53-mediated cell survivor pathway (Park and Nakamura, 2005; Felix et al., 2009).
P53CSV can inhibit apoptosis through interaction with APAF1 and HSP70 complex.

Mutations

Note

There are two identified alterations until now. One of them is located at position 270 of mRNA and the allele G (guanine) is switched to the allele C (cytosine) at position 77 of the amino acid sequence protein. The other one is a synonymous alteration localized at position 160 of mRNA involving the protein residue Leucine. The allele C (cytosine) is switched to the allele T (thymine) at position 40 of the amino acid sequence protein (NCBI).

Implicated in

Multiple myeloma

Note

Felix et al. (2009), described that P53CSV gene was upregulated in multiple myeloma SAGE (serial analysis of gene expression) library when compared to normal/reactive plasma cells.

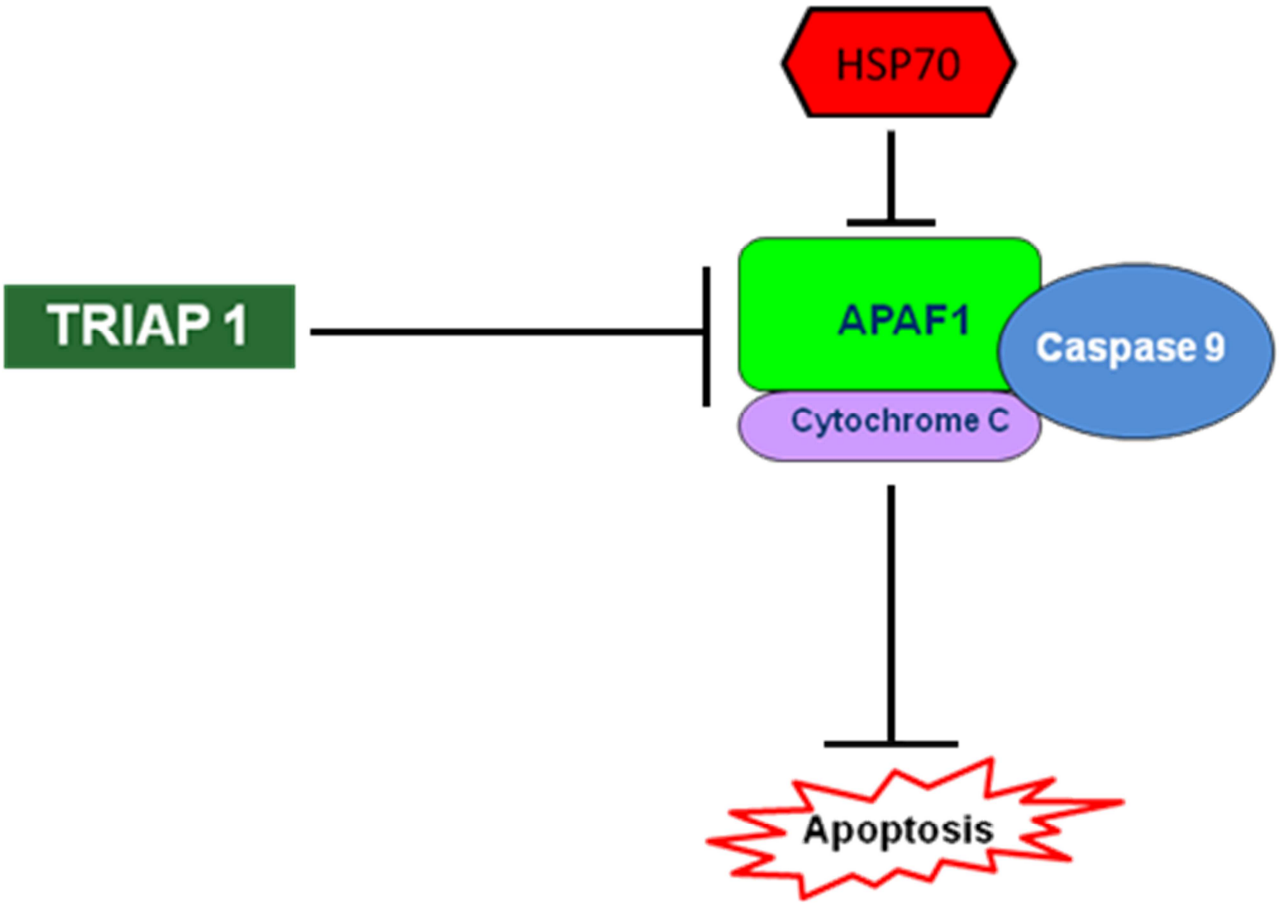

Figure 3. Hypothetical illustration about TRIAP1 (P53CSV) involvement in the p53-dependent cell survival pathway. The TRIAP1 mediates cell survival at low level of genotoxic stress by inhibiting activation of the complex APAF-1/caspase-9/cytochrome C preventing the apoptosis induction.

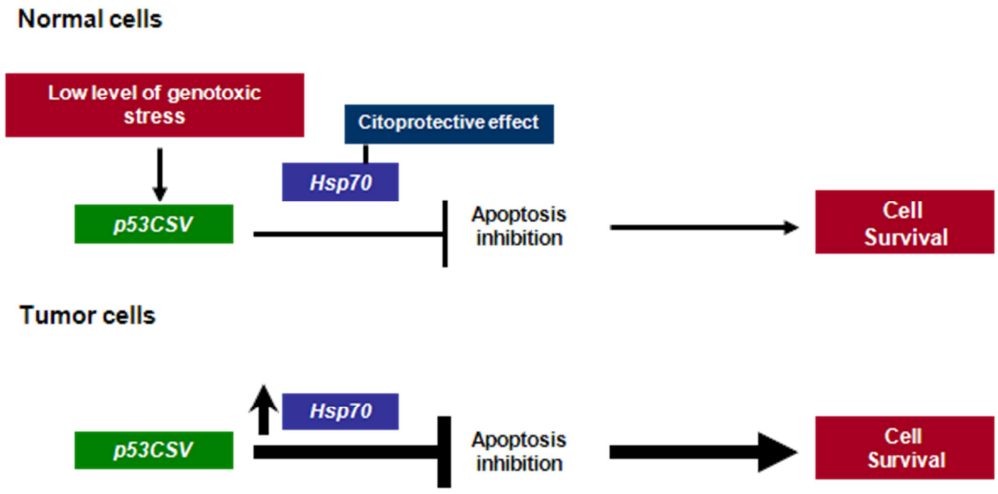

Figure 4. Hypothetical P53CSV mechanism of action in interaction with heat shock protein 70 in normal and tumor cells (Felix et al., 2009)

They suggested that the interaction between P53CSV/Hsp70 should be evaluated as a potential target for multiple myeloma patients. Real time quantitative PCR analyses confirmed upregulation of P53CSV in 90% of multiple myeloma plasma samples cells.

Inflammatory stress

Note

Staib et al. (2005) reported P53CSV expression in colon carcinoma cells in the course of inflammatory responses associated with four microenvironmental components: nitric oxide, hydrogen peroxide, DNA replication arrest, and hypoxia.

Solid cancers

Note

Yu Kun et al. (2008), using a genome-wide computational strategy identified genes exhibiting precise transcriptional control in solid tumors and evaluated if they linked to multiple cancer-related pathways such as metastatic and invasive potential. siRNA knockdown of five genes supports the existence of precisely controlled genes in solid tumors, including P53CSV.

References

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