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Gene Section
Short Communication

RREB1 (Ras Responsive Element Binding Protein 1)

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Abstract

Review on RREB1, with data on DNA/RNA, on the protein encoded and where the gene is implicated.

Identity

Other names: FINB, HNT, LZ321, RREB-1, Zep-1

HGNC (Hugo): RREB1

Location: 6p24.3

DNA/RNA

Description

The RREB1 gene is 144384 bp. The mRNA is 8568 bp and codes a protein of 1742 amino acids. Nine splice variants of RREB1 are predicted. Variant 1 contains 13 coding exons.

Transcription

Five isoforms of RREB1 designated RREB1 alpha, RREB1 beta, RREB1 delta, RREB1 gamma and RREB1 epsilon are expressed through alternative splicing.

Pseudogene

None reported.

Protein

Description

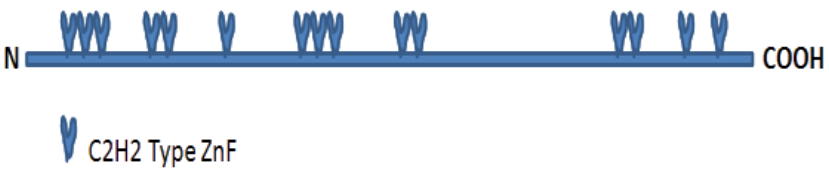
RREB1 is a zinc finger nuclear protein of 1742 amino acids that contains 15 zinc fingers of the C2H2 type and belongs to the Krueppel zinc-finger protein family. RREB1 protein-protein interactions include NEUROD1 (Ray et al., 2003) and AR (Mukhopadhyay et al., 2007).

Expression

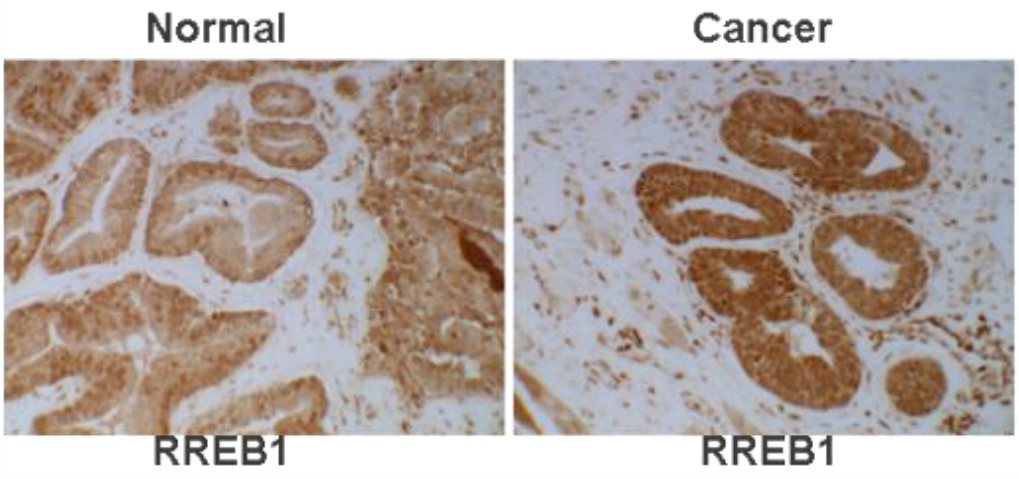
RREB1 is ubiquitously expressed in most tissues; however, it may not be expressed in brain.

Localisation

RREB1 expression is localized to nucleus speckle (Date et al., 2004; Fujimoto-Nishiyama et al., 1997).



Schematic diagram of Homo sapiens RREB1 protein showing clusters of conserved zinc figures (ZnF).



RREB1 expression in normal and prostate cancer tissue sections.

Function

RREB1 binds specifically to the ras-responsive element (RRE) of genes to activate promoter activity and gene transcription. It is involved in regulation of calcitonin expression (Thiagalingam et al., 1996). RREB1 is reported to both activate and repress transcription (Chen et al., 2010). RREB1 reportedly negatively regulates the transcriptional activity of the androgen receptor (Mukhopadhyay et al., 2007). RREB1 is reported to play a role in cell to cell adhesion and regulation of cell movement (Melani et al., 2008). The specific roles of the individual spliced forms are not well defined. RREB1 alpha is not required for proliferation of bladder cancer lines; however, RREB1 beta may be required (Nitz et al., 2011).

Homology

With members of the Krueppel family of zinc finger proteins.

Mutations

Note

No disease related mutations are reported.

Implicated in

Colorectal cancer

Note

RREB1 is implicated in Ras signaling pathways.

RREB1 is activated through phosphorylation by the MAPK pathway in colorectal cancer (Kent et al., 2013). RREB may play an important role in the development of the primitive gut tube (Lee et al., 2012).

Prostate adenocarcinoma.

Note

RREB1 represses the expression of ZIP1 zinc transporter in prostate epithelial cells. Up-regulation of RREB1 in prostate cancer may lead to loss of ZIP1 expression, zinc accumulation and progression of prostate cancer (Milon et al., 2010; Zou et al., 2011).

Pancreatic cancer

Note

The zinc levels are markedly decreased in pancreatic cancer.

The loss of zinc removes its cytotoxic effects on malignant cells. The change in zinc level is associated with decreased expression of the ZIP3 zinc transporter.

Recent studies demonstrate that ZIP3 and RREB1 are markedly down regulated with cellular zinc levels.

In addition, these changes in zinc, ZIP3 and RREB1 are apparent in PanIn lesions, which are thought to be precancerous lesions leading to ductal adenocarcinoma.

Results suggest that down regulation of RREB1 causes down regulation of ZIP3, which results in loss of zinc accumulation in premalignant pancreatic ductal cells (Costello et al., 2012).

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