

# Gene Section

## Mini Review

### RPL10 (ribosomal protein L10)

Mohit Goel, Ranjan Tamuli

Department of Biotechnology, Indian Institute of Technology Guwahati, Guwahati-781 039, Assam, India (MG, RT)

Published in Atlas Database: August 2010

Online updated version : <http://AtlasGeneticsOncology.org/Genes/RPL10ID42148chXq28.html>

DOI: 10.4267/2042/45018

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#### Identity

**Other names:** DKFZp686J1851, DXS648, DXS648E, FLJ23544, FLJ27072, NOV, QM

**HGNC (Hugo):** RPL10

**Location:** Xq28

#### DNA/RNA

##### Description

DNA size 3.96 kb, mRNA size 2172 bp, 7 exons. The RPL10 gene is co-transcribed with the small nucleolar RNA gene U70 that is located in its fifth intron. Multiple processed pseudogenes of the gene RPL10 are

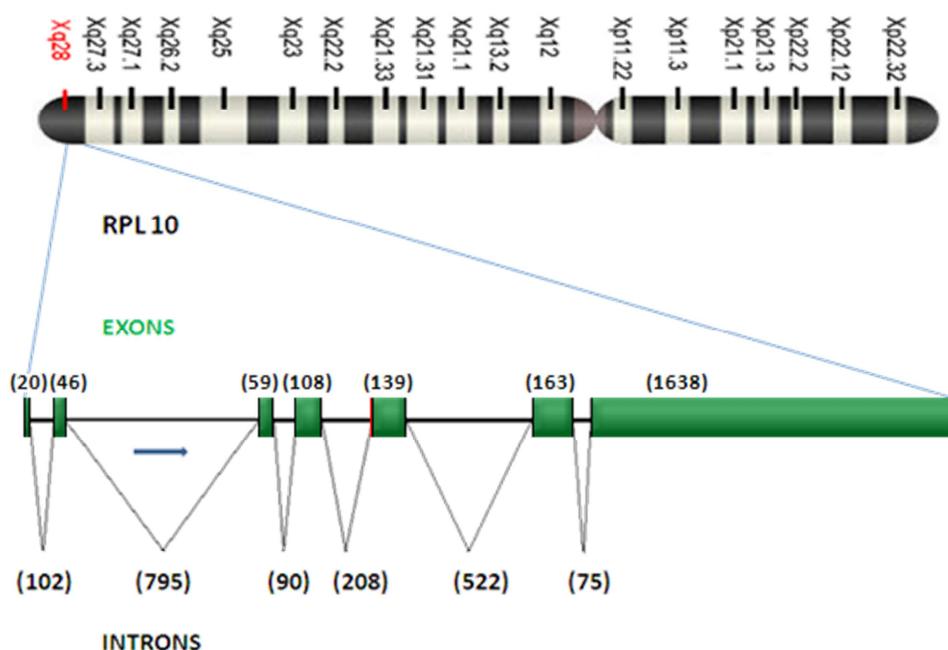
dispersed in the genome. Moreover, transcript variants utilizing alternative polyA

signals exist; the variant with the longest 3' UTR overlaps the deoxyribonuclease I-like 1 gene on the opposite strand.

#### Protein

##### Description

214 amino acids; 24604 Da. The protein is a component of the large ribosomal (60S) subunit and belongs to the L10E family of ribosomal proteins. Three natural variants of the RPL10 protein, VAR\_006922 (N202S, dbSNP rs4909 and dbSNP rs12012747), VAR\_027795 (L206M), and VAR\_027796 (H213Q) have been reported.



## Expression

Ubiquitous. RPL10 is expressed in a wide variety of embryonic and adult tissues, down-regulated during adipocyte, kidney, and heart differentiation.

## Localisation

Cytoplasm.

## Function

The ribosomal protein L10 (RPL10), a member of the L10E family of ribosomal proteins, is a key protein in assembling 60S ribosomal subunit and organizes the architecture of the aminoacyl-tRNA binding site. RPL10 was originally identified as QM, a candidate for a Wilms' tumor suppressor; however, later studies did not support the original hypothesis. In vitro studies have shown the interaction of RPL10 with the transcript regulator the c-Jun, as well as with the proto-oncogene c-Yes; however, these interactions yet to demonstrate in vivo.

## Homology

The percent identity below represents identity of RPL10 over an aligned region in UniGene.

- Mus musculus: 100 (percent identity)
- Xenopus tropicalis: 99.5
- Monodelphis domestica: 99.5
- Pan troglodytes: 99.5
- Xenopus laevis: 99.1
- Danio rerio: 97.7
- Drosophila melanogaster: 88.9
- Caenorhabditis elegans: 85.5
- Neurospora crassa: 84.7
- Saccharomyces cerevisiae: 78.3

## Mutations

### Note

Two missense mutations L206M and H213Q at the C-terminal end of RPL10 were identified in two independent families with autism, a disorder of neural development.

## Implicated in

### Prostatic adenocarcinoma

#### Note

RPL10 gene showed up-regulation in androgen-independent C81 passage cells, derived from the LNCaP cell model that recapitulates prostate cancer progression. In a study using immunohistochemical technique, human prostatic tissues showed expression of RPL10 protein in all normal prostate glands adjacent to prostate cancer and in various intraepithelial neoplasia (PIN). However, in prostate cancer, the staining intensity and stained areas were decreased, compared to the normal glands and PIN lesions. There was an inverse correlation from normal to low-grade tumors and then to high-grade tumors. In high-grade

tumors, the positive areas were mostly confined to peripheral aspects of tumors and were particularly strong in foci of perineural invasion. These results suggested that decreased RPL10 expression may be associated with early development of prostate cancer, but later a high level of RPL10 may facilitate progression of the tumors to a more aggressive phenotype.

### Ovarian cancer

#### Note

Both adenine (A)/guanine (G) replacement was detected at the 605th nucleotide which changes the coding from serine to asparagines in 17 (58.6%) of the 29 ovarian tumors studied. The frequencies of A/A, G/G and A/G homo- or hetero-zygosity were 3.5%, 37.9% and 58.6%, respectively in cancer tissues but they were 26.1%, 52.2% and 21.7%, respectively in the adjacent normal tissues, indicating a higher heterozygous rate in cancer (58.6% vs 21.7%,  $p < 0.01$ ). These results suggest that high frequencies of loss of the A/G heterozygosity at the 605th nt of the RPL10 gene may be associated with ovarian cancer.

### Wilms' tumor

#### Note

RPL10 was originally isolated by subtractive hybridization between a tumorigenic cell line (deleted for part of 11p) and a non-tumorigenic cell line (the tumorigenic cell line carrying an extra t(X;11) translocation chromosome). The RPL10 mRNA level was found modulated between the tumorigenic and nontumorigenic cell lines and suspected to be involved in the maintenance of the nontumorigenic phenotype. However, later study had shown that the RPL10 gene is X-linked and therefore not involved in suppression of tumorigenesis in Wilms' tumor.

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*This article should be referenced as such:*

Goel M, Tamuli R. RPL10 (ribosomal protein L10). *Atlas Genet Cytogenet Oncol Haematol*. 2011; 15(5):425-427.

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