

Gene Section

Mini Review

ADIPOR1 (adiponectin receptor 1)

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Identity

Other names: ACDCR1; CGI-45; CGI45; FLJ25385
FLJ42464; PAQR1; TESBP1A

HGNC (Hugo): ADIPOR1

Location: 1q32.1

DNA/RNA

Description

Eight exons spanning 17.5 kb. Transcription is from telomere to centromere.

Transcription

Transcription produces 11 different mRNAs, 10 alternatively spliced variants and 1 unspliced form. There are 6 probable alternative promoters, 2 non overlapping alternative last exons and 8 validated alternative polyadenylation sites. The mRNAs appear to differ by truncation of the 5' end, truncation of the 3' end, presence or absence of 6 cassette exons, overlapping exons with different boundaries. 9 spliced and the unspliced mRNAs putatively encode good proteins, altogether 9 different isoforms (3 complete, 6 partial), some containing Hly-III related proteins domain (Pfam) some transmembrane domains (Psort2); 1 of the 3 complete proteins appears to be secreted. The remaining mRNA variant (spliced) appears not to encode a good protein.

Protein

Description

Receptor for globular and full-length adiponectin (APM1), an essential hormone secreted by adipocytes that counteracts the effects of insulin.

Expression

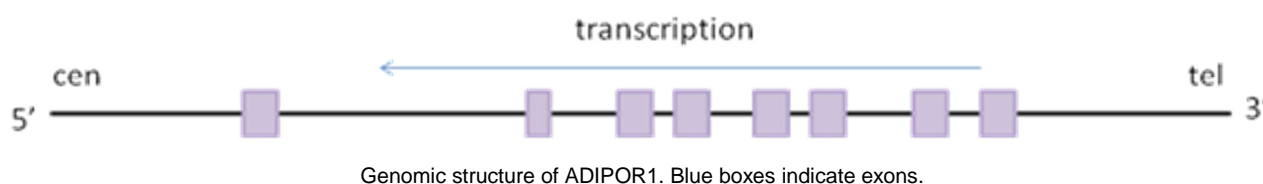
Widely expressed. Highly expressed in adipose tissue and skeletal muscle. Expressed at intermediate level in brain, heart, spleen, kidney, liver, placenta, lung and peripheral blood leukocytes. Weakly expressed in colon, thymus and small intestine. We have also shown expression in normal and cancerous breast tissue as well as in other cancers such as prostate, colon, endometrial. It is also present in several cell lines.

Localisation

ADIPOR1 localizes to the plasma membrane.

Function

Receptor for globular and full-length adiponectin (APM1), an essential hormone secreted by adipocytes that acts as an antidiabetic. Probably involved in metabolic pathways that regulate lipid metabolism such as fatty acid oxidation. Mediates increased AMPK, PPAR α ligand activity, fatty acid oxidation and glucose uptake by adiponectin. Has some high-affinity for globular adiponectin but low-affinity for full-length adiponectin.



Homology

The mouse, human, and rat Adipor1 protein (ADIPOR1) contains 375 amino acids. Human and mouse ADIPOR1 share 96.8% identity.

Mutations

Note

One functional polymorphism has been described. Rs7539542 has been found to modulate expression of ADIPOR1 mRNA (Soccio et al., 2006).

Implicated in

Breast Cancer

Note

Adiponectin has been implicated in breast cancer. The breast cancer cell lines MCF-7, MDB-MB-231 and T47D were found to express both adiponectin receptors ADIPOR1/ADIPOR2 (Dieudonne et al., 2006; Korner et al., 2007) and exposure of T47D cells to adiponectin, significantly inhibited their proliferation (Korner et al., 2007). rs2232853 CT genotype (OR=1.67; 95% CI 1.23-2.26) and the combination of rs7539542 GC (OR=0.59; 95% CI 0.36-0.98) and CC genotypes (OR=0.57; 95% CI 0.35-0.94) were significantly associated with breast cancer risk. The high expressing rs2241766 G allele (GG and GT genotypes) was associated with decreased breast cancer risk (OR=0.64; 95% CI 0.49-0.83). The low expressing rs1501299 G allele was associated with increased breast cancer risk: for TG: OR=1.59; 95% CI 1.03-2.48, for GG: OR=1.80; 95% CI 1.14-2.85.

Colon Cancer

Note

Adiponectin has also been implicated in colon cancer risk. rs266729 polymorphism was significantly associated with colon cancer risk: the RR for the GG/CG genotypes was rs266729 was associated with a reduced colorectal cancer risk: O.R. 0.73, 95% CI (0.53-0.99) (Kaklamani et al., 2008).

Endometrial Cancer

Note

Adiponectin levels have been shown to correlate with endometrial cancer risk (Petridou et al., 2003; Dal et al., 2004).

Prostate Cancer

Note

Adiponectin levels have been shown to correlate with prostate cancer risk (Barb et al., 2007; Arisan et al., 2009).

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