MAPK4 (mitogen-activated protein kinase 4)

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Identity

Other names: extracellular signal-regulated kinase 4; ERK4; PRKM4; pP63mapk; ERK3-related
HGNC (Hugo): MAPK4
Location: 18q21.1
Local order: The MAPK4 gene is located between the genes C18orf24 and MRO on chromosome 18.

Figure 1. Genomic organization of the MAPK4 gene on chromosome 18.

DNA/RNA

Description
The MAPK4 gene spans 171.7 kb on the long arm of chromosome 18 and is transcribed in the centromere-to-telomere orientation. The gene is composed of 6 exons with the translation initiation codon located in exon 2. The first two exons are separated by a long intron of 102.8 kb.

Transcription
The MAPK4 transcribed mRNA has 4,736 bp. No splice variants have been reported.

Pseudogene
None.

Protein

Description
Extracellular signal-regulated kinase 4 (ERK4) is an atypical member of the mitogen-activated protein (MAP) kinase family of serine/threonine kinases. The human ERK4 protein is made of 587 amino acids and contains a typical kinase domain located at the N-terminal extremity. Another region with homology to the MAP kinase ERK3 (C34 domain) has been identified after the kinase domain. The function of the C34 domain is unknown.

Expression
MAPK4 mRNA is expressed to the highest level in the brain. Other sites of expression include the heart, lung, kidney, intestine, pancreas, parathyroid gland, prostate, thymus, ovary, eye and ear.

Localisation
ERK4 localizes to the cytoplasm and nucleus of a variety of cultured cells.

Function
Little is known about the regulation and functions of ERK4. The only known substrate of ERK4 is the protein kinase MK5.
**Homology**

ERK4 display 73% amino acid identity with ERK3 in the kinase domain. ERK4 and ERK3 define a distinct subfamily of MAP kinases that is found exclusively in vertebrates.

**Mutations**

Note

No mutation reported yet.

**Cancer**

Note

The expression of MAPK4 mRNA is down-regulated in bladder and squamous cell carcinomas (Oncomine 3.0). A chromosomal subregion containing the MAPK4 gene show recurrent copy number loss in pancreatic adenocarcinoma cell lines.

**References**


Turgeon B, Lang BF, Meloche S. The protein kinase ERK3 is encoded by a single functional gene; genomic analysis of the ERK3 gene family. Genomics. 2002 Dec;80(6):673-80


This article should be referenced as such: