Atlas of Genetics and Cytogenetics in Oncology and Haematology

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Gene Section

Mini Review

MARK4 (MAP/microtubule affinity-regulating kinase 4)

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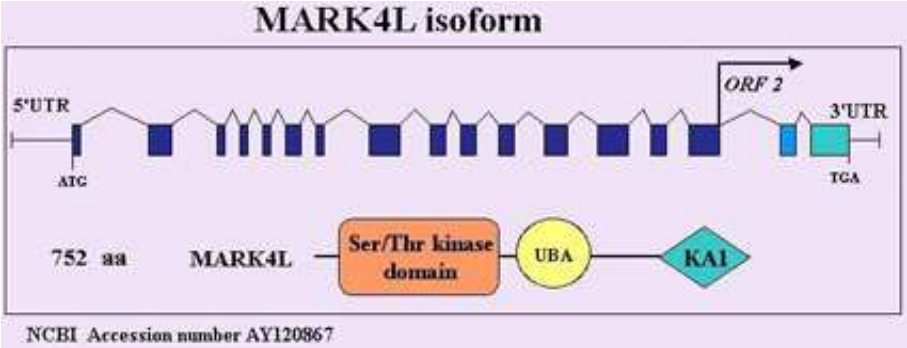
Identity

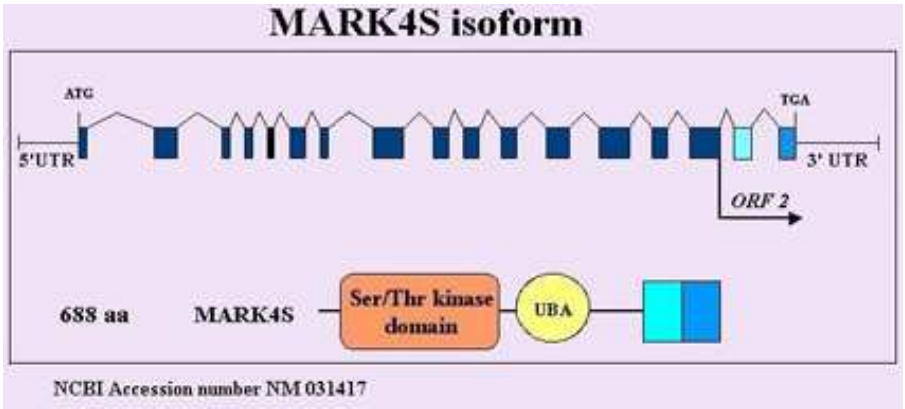
Other names: MARKL1; KIAA1860

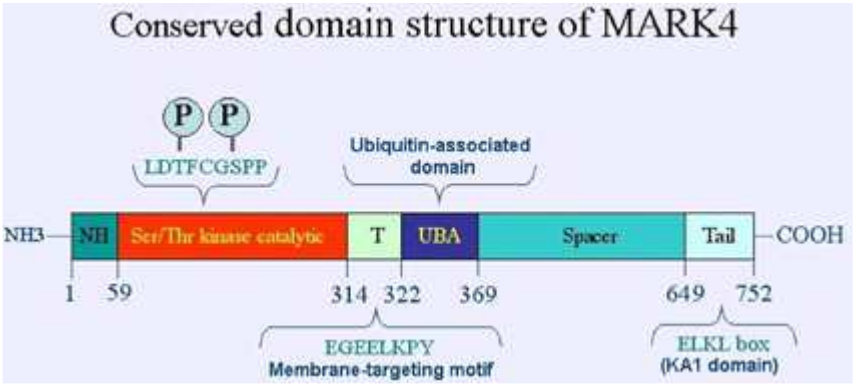
HGNC (Hugo): MARK4

Location: 19q13.2

DNA/RNA







Description

Spans 55,6 kb; 18 exons

Transcription

3,6 kb mRNA of MARK4S isoform, 3,22 kb of MARK4L isoform (alternative splicing-skipping of exon 16, which leads to a change in the reading frame).

Protein

Description

688 amino acids (aa) for MARK4S isoform and 752 aa for MARK4L isoform; belongs to the MARK family of protein kinases and contains from aa 59 to 314 a Serine-Threonine kinase catalytic domain with two activating phosphorylation sites. A short sequence (T region) contains a putative membrane-targeting motif. This region is followed by a ubiquitin-associated (UBA) domain. The spacer is the least-conserved region among MARKs proteins. This region is followed by a strikingly conserved C-terminal domain. In MARK4 the C-terminal domain differs between MARK4S and MARK4L isoforms.

Expression

The MARK4S isoform is predominantly expressed in the brain and at low levels in the heart. The MARK4L isoform is expressed ubiquitously in all tissues, with a highly abundant expression in testis, neural progenitors and glial tumors. MARK4L is downregulated during glial differentiation.

Localisation

Protein was detected homogeneously in cytoplasm.

Function

MARK4 is considered to play a role as a messenger of the Wnt-signaling pathway. MARK4L represents a mitogenic-associated isoform.

Homology

MARK1, MARK2 (Emk1), MARK3 (p78/C-TAK1), par1, kin1

Mutations

Note

Mutations have not been detected.

Implicated in

Hepatocellular carcinogenesis

Oncogenesis

RT-PCR anaysis detected upregulated expression in nearly all clinical hepatocellular carcinoma cells in which nuclear accumulation of b-catenin was observed.

Up-regulation and overexpression of MARK4 has been described in glial tumors and glioblastoma cell lines

Oncogenesis

MARK4 gene activation (enhanced expression and/or amplification) may result from intrachromo-somal duplication upon 19q rearrangements.

References

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