

Gene Section

Mini Review

KRAS (Kirsten rat sarcoma 2 viral oncogene homolog)

Franz Watzinger, Thomas Lion

Children's Cancer Research Institute, Kinderspitalgasse 6, A-1090 Vienna, Austria (FW, TL)

Published in Atlas Database: February 1999

Online updated version : <http://AtlasGeneticsOncology.org/Genes/KRASID91.html>
DOI: 10.4267/2042/37505

This work is licensed under a Creative Commons Attribution-Noncommercial-No Derivative Works 2.0 France Licence.
© 1999 Atlas of Genetics and Cytogenetics in Oncology and Haematology

Identity

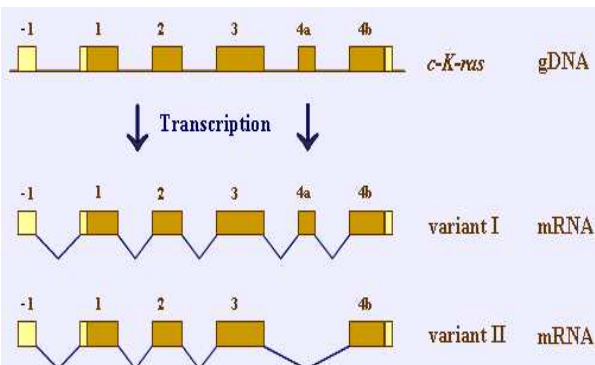
Other names: K-RAS (Kirsten rat sarcoma 2 viral oncogene homolog); c-Ki-ras 2

HGNC (Hugo): KRAS

Location: 12p12

Note: More on the RAS family is available as a deep insight.

DNA/RNA



K-ras splicing variants/alternative splicing of K-ras precursor mRNA leads to the two transcripts which differ by the ex- or inclusion of Exon 4a; Exons that encode protein are shown as black boxes, untranslated exons as white boxes; the upstream untranslated exon is indicated as Exon -1.

Description

Consists of six exons, spread over 35 kb of genomic DNA.

Transcription

Alternative RNA splicing reveals two different

transcripts of 5.5 and 3.8 kb (see Fig); if exon 4a is skipped exon 4b is directly joined to exon 3; in 98% of the transcripts exon 4a is spliced out and only exon 4b is available for translation into protein.

Pseudogene

c-Ki-ras 1, inactivated, processed pseudogene which is located on chromosome 6.

Protein

Description

Regular RAS protein - characterized in the RAS family page.

Expression

Ubiquitously expressed.

Localisation

Anchored to the inner surface of the plasma membrane.

Function

Analogously to other GTP-binding proteins (such as Translation Elongation Factor EFTu or signal transducing G-Proteins) RAS proteins are involved in signal transduction pathways.

Homology

Ras gene family is part of the ras superfamily including the mammalian RAS, RAL, RAC, RHO, RAP, and RAB gene families and the yeast homologs like SEC4 and YPT1 genes; genes encode small monomeric proteins of low molecular mass (20-30 kDa) which share at least 30% homology to RAS proteins.

Implicated in

**Tumor (frequency of K-RAS mutations);
references in Full Bibliography**

Pancreas (80-90%)

Colon and rectum (25-60%)

Lung (25-60%)

Prostate (0-25%)

Skin (0-25%)

Thyroid (0-60%)

Liver (10-25%)

Ovary (0-50%)

Endometrium (10-40%)

Kidney (0-50%)

Brain (0-15%)

Testis (seminoma) (10-45%)

**Acute non lymphocytic leukemia and
myelodysplasia (5-15%)**

Urinary bladder (5%)

Head and neck (10%)

Breast (10%)

References

Nishimura S, Sekiya T. Human cancer and cellular oncogenes. *Biochem J.* 1987 Apr 15;243(2):313-27

Bos JL. ras oncogenes in human cancer: a review. *Cancer Res.* 1989 Sep 1;49(17):4682-9

Barbacid M. ras oncogenes: their role in neoplasia. *Eur J Clin Invest.* 1990 Jun;20(3):225-35

Manges R, Pellicer A. ras activation in experimental carcinogenesis. *Semin Cancer Biol.* 1992 Aug;3(4):229-39

This article should be referenced as such:

Watzinger F, Lion T. KRAS (*Kirsten rat sarcoma 2 viral oncogene homolog*). *Atlas Genet Cytogenet Oncol Haematol.* 1999; 3(2):66-67.
