Atlas of Genetics and Cytogenetics
in Oncology and Haematology

OPEN ACCESS JOURNAL AT INIST-CNRS

Gene Section
Mini Review

ADAM23 (ADAM metallopeptidase domain 23)

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Published in Atlas Database: July 2007

Online updated version: http://AtlasGeneticsOncology.org/Genes/ADAM23ID44041ch2q33.html
DOI: 10.4267/2042/38466

Identity

Hugo: ADAM23
Other names: MDC3
Location: 2q33

DNA/RNA

Description

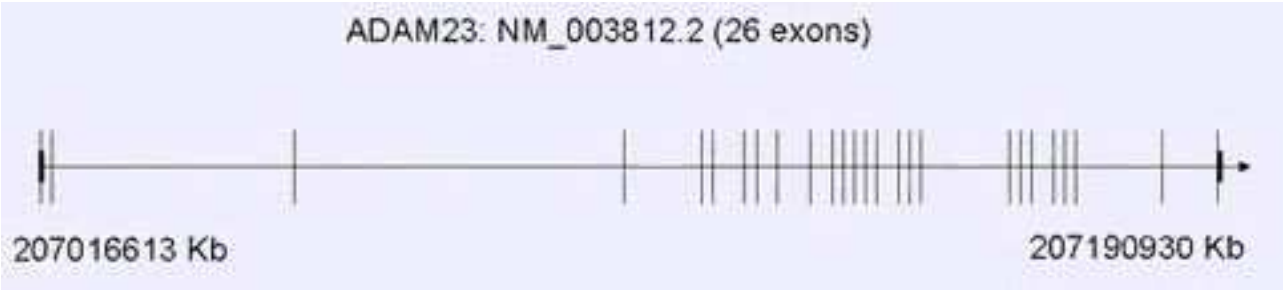
DNA contains 174312 bp composed of 26 coding exons.

Transcription

3059 bp mRNA transcribed in centromeric to telomeric orientation; 2499 bp open reading frame. There are two isoforms of human ADAM23 (ADAM23alpha), i.e. ADAM23beta and ADAM23gamma. ADAM23beta is consistent with ADAM23alpha in domain structure except for a different transmembrane domain. ADAM23gamma, without transmembrane domain, is predicted to be a secreted form of ADAM23. ADAM23gamma is formed by skipping both exons enconding transmembrane domain in RNA splicing.

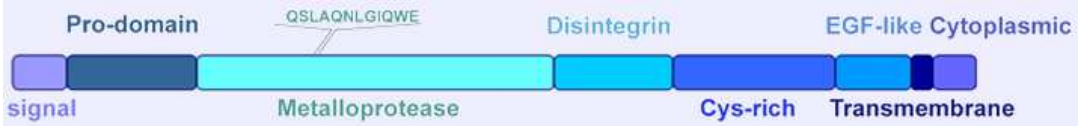
Pseudogene

No pseudogenes reported.



DNA of ADAM23 gene composed of 26 coding exons.

Protein



Domain structure of ADAM23. Its deduced amino acid sequence lacks essential residues conserved in metalloproteinases (Cal S. et al., 2000).

Description

832amino acid protein including a hydrophobic transmembrane domain and eight potential N-linked glycosylation sites. This protein has multiple domain structures including a pro-, a metalloproteinase-like, a desintegrin-like, a cysteine-rich, an epidermal growth factor-like, a transmembrane and a cytoplasmatic domain. Within the metalloproteinase-like domain, ADAM23 lacks HEXXHXXGXXH active-site amino acids for zinc-binding, which is critical for the proteinase activity. So, the metalloproteinase domain is inactive, suggesting that it is exclusively involved in cell adhesion processes rather than in protease-mediated events.

Expression

Highly expressed in the brain and weakly expressed in the heart. In the brain, expressed prominently in the amygdala, caudate nucleus, hypothalamus, thalamus, cerebral cortex and occipital pole.

Localisation

Cell membrane; single-pass type I membrane protein (Potential). Isoform Gamma: Secreted protein.

Function

May play a role in cell-cell and cell-matrix interactions. This is a non-catalytic metalloprotease-like protein.

Homology

H. sapiens: ADAM23;
P.troglodytes: ADAM23;
C.lupus: LOC607871;
M.musculus: ADAM23;
R.novergicus: ADAM23;
G.gallus: LOC424099.

Mutations

Note: There are one SNP on exon 1 in the amino acid position 1 with function start codon and two SNPs on exon 23 in the amino acid position 695 with functions synonymous and contig reference.

Implicated in

Gastric tumors

Note: Hypermethylation of the promoter region of ADAM 23 gene, along with decreased expression, occurs in primary gastric tumors compared with noncancerous gastric tissue.

Prognosis

Not determined.

Cytogenetics

Not determined.

Hybrid/Mutated Gene

Not determined.

Oncogenesis

Loss of ADAM23, which is likely to play an important role regard to cell-cell and cell- extracellular matrix interactions in gastric tissue as well, might be essential for the progression of gastric cancer.

Breast tumors

Note: Hypermethylation of the promoter region of ADAM23 gene, along with decreased expression, occurs in primary breast tumors and primary breast tumors with a more advanced grade have higher degree of methylation.

Cytogenetics

Not determined.

Hybrid/Mutated Gene

Not determined.

Oncogenesis

Primary breast tumors with a more advanced grade have a higher degree of methylation, suggesting that the adhesion molecule ADAM23 may be downregulated during the progression of breast cancer.

Head and neck cancer

Note: Hypermethylation of the promoter region of ADAM23 gene, along with decreased expression, occurs in Head and neck cancer and the frequency of hypermethylation of ADAM23 gene is higher in primary head and neck tumors with a more advanced grade.

Cytogenetics

Not determined.

Hybrid/Mutated Gene

Not determined.

Oncogenesis

Hypermethylation of the ADAM23 gene could lead to tumor progression, because the neoplastic cells would lose the contact inhibition. As a consequence, these cells would proliferate in an uncontrolled manner; once the proliferation of most cancer cells is no longer sensitive to density-dependent inhibition, a permissive environment for cell proliferation is created.

References

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This article should be referenced as such:

Calmon MF, Rahal P. ADAM23 (ADAM metallopeptidase domain 23). Atlas Genet Cytogenet Oncol Haematol.2008;12(1):17-19.