Gene Section
Mini Review

OLFM4 (olfactomedin 4)

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Published in Atlas Database: January 2010
DOI: 10.4267/2042/44885

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Identity

Other names: hA209I19.1; GC1; GW112; hGC-1; hOlfD; KIAA4294; OlfD; OLM4; UNQ362
HGNC (Hugo): OLFM4
Location: 13q14.3
Note: OLFM4 is a member of olfactomedin-related protein family. This gene was originally cloned from human myeloblasts and constitutively expressed in normal bone marrow, stomach, small intestine, colon, prostate and pancreas.

DNA/RNA

Description

OLFM4 gene locus was mapped to chromosome 13q14.3 with five exons spanning 23220 bp.

Transcription

OLFM4 is transcribed to 2861 bp mRNA with an open reading frame of 1530 nucleotides. There is no alternative mRNA splicing.
mRNA expression: highly in bone marrow and small intestine; lowly expressed in stomach, colon, pancreas and prostate; no expression is detected in other tissues determined by Northern blot. OLFM4 transcription is regulated by transcription factors, PU1 and NF-kB.

Protein

Description

OLFM4 encodes a 510 amino acid protein with a molecular weight of 55 kD. OLFM4 has a signal peptide and six N-linked glycosylation motifs and forms disulfide-bonded multimers. It has an N-terminal coil-coil domain and C-terminal olfactomedin domain.

Expression

OLFM4 protein is endogenously expressed in mature neutrophils and gastric and intestinal epithelial cells.
Its expression in bone marrow neutrophils is significantly higher than peripheral blood neutrophils. OLFM4 is more abundantly expressed in intestinal crypts than in surface epithelial cells.

**Localisation**
OLFM4 is localized in multiple subcellular compartments including cytoplasm, mitochondria and membrane. It is also secreted extracellularly.

**Function**
OLFM4 binds to cadherins and lectins and mediates cell adhesion. OLFM4 is a robust marker for stem cells in human intestine.

**Homology**
Human OLFM4 is highly homologous to its mouse homologue (pDP4) with 93% amino acid identity. OLFM4 C-terminal olfactomedin domain has significant homology with other olfactomedin-related proteins including olfactomedin, TIGR, Noelin-1, Noeline-2 and latrophilin-1, etc.

**Mutations**
No known genetic mutation in normal or cancer tissues.

**Implicated in**

**Stomach cancer**
Note
OLF4 mRNA expression is upregulated in gastric cancer patients. OLFM4 protein staining by immunohistochemistry was observed more frequently in well-differentiated cancer tissues and more frequently in stage I/II cases than in stage III/IV cases. Serum OLFM4 is a useful marker for gastric cancer patients.

**Colon cancer**
Note
OLF4 mRNA is upregulated in colon cancer patients. OLFM4 protein expression is correlated with prognosis for colon cancer patients. Lower or lost OLFM4 protein expression is correlated with more malignancy and poor survival.

**Prostate cancer**
Note
OLF4 mRNA expression is upregulated in prostate cancer patients. OLFM4 interacts with GRIM-19, a mitochondria pro-apoptosis protein and has an anti-apoptotic function in prostate cancer cells when it is overexpressed.

**Pancreatic cancer**
Note
OLF4 mRNA is upregulated in pancreatic cancer patients. OLFM4 promotes S-phase transition in proliferation of pancreatic cancer cells.

**Breast cancer**
Note
OLF4 mRNA is upregulated in breast cancer patients.

**Chronic bowel disease (Crohn’s disease and ulcerative colitis)**
Note
OLF4 mRNA expression is upregulated in the intestines of chronic bowel disease patients including Crohn’s disease and ulcerative colitis.

**H. pylori gastritis**
Note
OLF4 mRNA expression is upregulated in the gastric mucosa of H. pylori infected patients than normal individuals.

**References**


This article should be referenced as such: