

Gene Section

Mini Review

FAM107A (family with sequence similarity 107, member A)

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Identity

Other names: DRR1; FLJ30158; FLJ45473; TU3A

HGNC (Hugo): FAM107A

Location: 3p14.3

Note: The FAM107A protein is encoded by FAM107A gene.

DNA/RNA

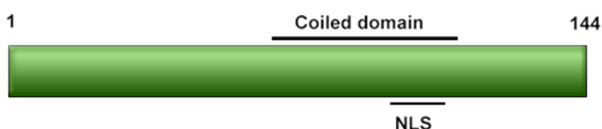
Description

FAM107A DNA contains 17742 bps (genomic size), on negative strand.

Transcription

FAM107A has two transcript variants. FAM107A transcript variant 1 mRNA contains 3465 bps and 5 exons. FAM107A transcript variant 2 mRNA contains 3367 bps and 4 exons. These two transcript variants encode for the same protein.

Protein



Description

144 amino acids, 17,5 kDa.
FAM107A protein includes a nuclear localization signal (NLS) and a coiled domain (Yamato et al., 1999; Wang et al., 2000).

Expression

FAM107A protein is expressed in a wide variety of normal tissues. High expression is found in the brain and heart (Wang et al., 2000; Zhao et al., 2007).

Localisation

Nucleus and cytoplasm (Wang et al., 2000; Zhao et al., 2007; Le et al., 2010).

Function

FAM107A is a candidate tumor suppressor gene. FAM107A protein is downregulated in several tumor cell lines and primary tumors. Overexpression of FAM107A can suppress tumor cell growth (Yamato et al., 1999; Wang et al., 2000; Kholodnyuk et al., 2006; van den Boom et al., 2006; Liu et al., 2009; Asano et al., 2010; Le et al., 2010).

FAM107A protein is also involved in neuronal cell survival. Downregulation of FAM107A protein in primary cultured cortical neurons decrease cell number (Asano et al., 2010).

FAM107A protein probably plays important roles in embryo development (Zhao et al., 2007).

FAM107A protein is a cytoskeletal crosslinker that regulates FA dynamics and cell movement. FAM107A protein is an important molecular in cell invasion (Le et al., 2010).

Homology

No proteins with significant homology with FAM107A protein were found (Wang et al., 2000).

Mutations

Note

Up to now, no point mutations were identified.

Implicated in

Renal cell carcinoma

Disease

Loss of FAM107A gene was found on 3p21.1 in renal cell carcinoma. Reduced expression was found in renal cell carcinoma cell lines and primary renal cell carcinomas. Overexpression of FAM107A in renal cell carcinoma cell line resulted in growth suppression of these cells (Yamato et al., 1999; Wang et al., 2000). Also, FAM107A hypermethylation was detected in renal cell carcinomas and significantly associated with advanced tumor stage (Awakura et al., 2008).

Astrocytomas

Disease

FAM107A was expressed at significantly lower levels in secondary glioblastomas as compared to diffuse astrocytomas (Van den Boom et al., 2006).

Lung cancer

Disease

Loss of expression of FAM107A was found in non-small cell lung cancer and primary lung cancers. Overexpression of FAM107A in non-small cell lung cancer cell line reduced cell proliferation activity and induced apoptosis (Liu et al., 2009).

Neuroblastoma

Disease

FAM107A protein was detected in the normal ganglions and the ganglions exhibiting neuroblast hyperplasia from 2 weeks hemizygote MYCN transgenic mice. However, the expression of FAM107A completely disappeared in the tumors from 8 weeks hemizygote MYCN transgenic mice (Asano et al., 2010).

Brain tumor

Disease

FAM107A is not expressed in normal glial cells, it is highly expressed in the invasive component of gliomas. It was found that FAM107A associates with and organizes the actin and microtubular cytoskeletons. FAM107A regulates focal adhesion disassembly and cell invasion (Le et al., 2010).

Embryo development

Note

The expression level of FAM107A gene increases gradually with embryo development in the early stages (Zhao et al., 2007).

Schizophrenia and bipolar disorder

Note

High expression level of FAM107A was found in the dorsolateral prefrontal cortex from schizophrenia and bipolar disorder patient (Shao et al., 2007).

Neuronal cell survival

Note

FAM107A protein was mainly localized in the neurites of the primary culture of cerebral cortical neurons. Downregulation of FAM107A expression with siRNA decreased neuron cell number. These data suggest that FAM107A plays a critical role in neuronal cell survival (Asano et al., 2010).

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