EEF1A2 (eukaryotic translation elongation factor 1 alpha 2)

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Identity

Other names: EEF1AL; EF-1-alpha-2; EF1A; HS1; STN; eEF1A-2
HGNC (Hugo): EEF1A2
Location: 20q13.3

DNA/RNA

Description
8 exons and 7 introns.

Transcription
5 alternatives for transcript splicing.

Protein

Description
50kDa; 463 amino acids contains tRNA binding sites, GTP binding and hydrolysis sites and putative actin binding sites (see figure below).

Expression

In mice and humans, eEF1A2 is expressed only in normal tissues of the brain, heart and skeletal muscle. Expression is found in tumours of the breast, lung and ovary.

Localisation

Diffusely cytoplasmic and nuclear.

Function

This protein is an isoform of the alpha subunit of the elongation factor-1 complex. There are two known isoforms of protein elongation factor eEF1A (eEF1A1 and eEF1A2). eEF1A proteins are GTP-binding proteins that interact with amino-acylated tRNA and recruit them to the ribosome during the elongation phase of protein translation. In addition, eEF1A2 binds to and stimulates the lipid kinase activity of phosphatidylinositol 4-kinase beta, the enzyme that catalyzes the generation of phosphatidylinositol 4-phosphate from phosphatidylinositol.

![Diagram of EEF1A2 proteins with tRNA Binding Sites, GTP Hydrolysis, GTP Binding, and Actin Binding sites.]
eEF1A2 also activates the Akt serine/threonine kinase and can stimulate actin remodeling and increase the rate of cell invasion and migration in vitro.

**Homology**

EEF1A2 is highly homologous to the EEF1A1. EEF1A2 and EEF1A1 share greater than 90% DNA sequence and amino acid identity. The GTP binding and hydrolysis domains also have homology to the Ras GTPase.

**Mutations**

**Note**

Inactivation of mouse EEF1A2 leads to immunodeficiency, neuromuscular abnormalities and death by 30 days of age.

**Implicated in**

**Tumorigenesis**

**Disease**

Breast, lung and ovarian cancer. EEF1A2 overexpression is found in approximatively 60% of breast, 30% of ovary and 40% of lung tumours.

**Prognosis**

High eEF1A2 protein expression is associated with good prognosis in both breast and ovarian cancer. High eEF1A2 protein expression predicts poor prognosis in lung cancer.

**Cytogenetics**

Fluorescence in situ hybridization (FISH), showed high copy numbers of EEF1A2 in 25% ovarian tumors.

**Oncogenesis**

The eEF1A2 gene is transforming and increases the in-vitro growth rate of mouse and human cells grown in-vitro and also enhances their tumori-genicity in mouse xenograft models.

**References**


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