Gene Section
Mini Review

GMPS (guanine monophosphate synthetase)
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Published in Atlas Database: February 2000
Online updated version: http://AtlasGeneticsOncology.org/Genes/GMPSID229.html
DOI: 10.4267/2042/37582

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Identity

Other names: GMPS-PEN
HGNC (Hugo): GMPS
Location: 3q24

DNA/RNA

Transcription
2212 bp mRNA; ORF: 2081 bp.

Protein

Description
693 amino acids; 76 kDa; there are two variant forms of human GMP synthetase; homodimerization; GMP synthetase contains two functional domains: a glutamine amidotransferase (glutaminase domain, with a conserved Cys-His-Glu triad), responsible for glutamine hydrolysis, and a synthetase domain; responsible for ATP hydrolysis and GMP formation.

Expression

Higher in proliferating, transformed cells than in nontransformed cells; in normal cells, higher expression in fibroblasts, followed by bone marrow, leukocytes, erythrocytes, placenta, and liver.

Localisation

Cytoplasmic.

Function

Enzyme of the de novo synthesis of guanine nucleotides: amidotransferase that catalyzes the amination of xanthosine 5’ monophosphate to form GMP in the presence of ATP and glutamine; GTP is also involved in many enzymatic reactions important for cell division.

Implicated in

t(3;11)(q25;q23)

Disease

Treatment related acute non lymphoblastic leukemia (M4 ANLL).

Hybrid/Mutated gene

Fusion of MLL to GMPS.

References


Tesmer JJ, Klem TJ, Deras ML, Davisson VJ, Smith JL. The crystal structure of GMP synthetase reveals a novel catalytic triad and is a structural paradigm for two enzyme families. Nat Struct Biol. 1996 Jan;3(1):74-86


Pegram LD, Megonigal MD, Lange BJ, Nowell PC, Rappaport EF, Felix CA. t(3;11)(q25;q23) fuses MLL with the GMPS (guanosine 5'-monophosphate synthetase) gene in treatment-related acute myeloid leukemia (AML). Blood 1999; 94 Suppl 1: Abst 2227

This article should be referenced as such: