

## Gene Section

### Mini Review

# PTPN21 (protein tyrosine phosphatase, non-receptor type 21)

Antonio Feliciello

Dipartimento di Biologia e Patologia Molecolare e Cellulare, Istituto di Endocrinologia ed Oncologia Sperimentale, 80131 Napoli, Italia

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### Identity

**Hugo:** PTPN21

**Other names:** PTPD1; PTPRL10

**Location:** 14q31.3

### DNA/RNA

#### Transcription

cDNA approximately 6.2 kb; at nucleotide 333-335 ATG of transcription initiation sites.

#### Pseudogene

No

### Protein

#### Description

PTPD1 is a protein of 130 kDa composed 1174 amino acids.

It is constituted by an N-terminal sequence homologous to the Four-point-one Ezrin-Radixin-Moesin (FERM domain) protein family; a C-terminal catalytic domain (PTP) with the essential cysteine residue at position 1108; two putative SH3 domain binding domains (residues 565-574 and 334-343); an acidic region in the residues 712-722; two highly conserved SH2 binding motifs (Y158ESQ and Y217GEE) within the FERM domain that mediate interaction with src tyrosine kinase.

### Expression

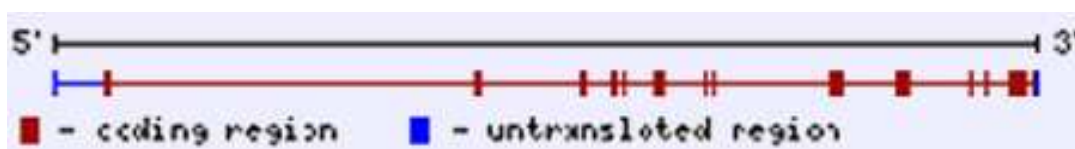
PTPD1 is widely expressed in a variety of tissues including placenta, lung, kidney, colon, skeletal muscle, and in most cell lines (HEK293, fibroblast, MCF-7; T82; B16).

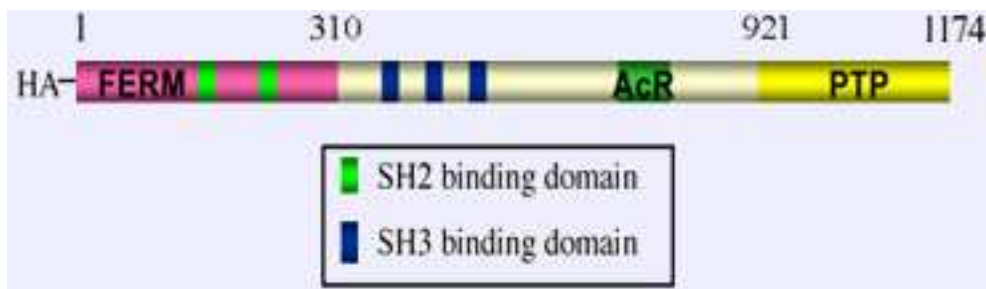
### Localisation

PTPD1 localizes at the outer mitochondrial membrane, the plasma membrane, Golgi apparatus, endoplasmic reticulum, actin filaments and adhesion plaques.

### Function

PTPD1 is member of non-receptor tyrosine phosphatases that binds to- and activates src tyrosine kinase. PTPD1/src complex up-regulates epidermal growth factor receptor (EGFR) phosphorylation and increases ERK 1 / ERK 2 signaling in response to EGF. PTPD1 forms a stable complex with actin, src tyrosine kinase and FAK (Focal Adhesion Kinase). PTPD1 regulates FAK signalling and actin cytoskeleton remodelling, and promotes cell scattering and migration. Mitochondrial PTPD1 in complex with AKAP121 and src is required for efficient maintenance of mitochondrial membrane potential and oxidative ATP synthesis. PTPD1 has been also implicated in the regulation of the Tec family kinases and activation of Stat3 signaling pathway.





PTPD1 Interactors: KIF1C kinesin family member 1C, BMX non-receptor tyrosine kinase, Src v-src sarcoma (Schmidt-Ruppin A-2) viral oncogene homolog (avian), TEC tyrosine kinase implicated in the signaling pathways of hematopoietic and antigen receptors, FAK tyrosine kinase of focal adhesion, Actin filaments.

### Homology

PTPD1 belongs to the same family of tyrosine phosphatase PTPH1 and PTPMEG1.

## Implicated in

### Sporadic colorectal cancer

**Note:** PTPD1 is overexpressed in MIN (microsatellite instability pathway) colorectal cancer cells lines.

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