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Gene Section
Mini Review

S100B (S100 calcium binding protein B)

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Identity

Hugo: S100B
Other names: NEF; S100; S100Beta
Location: 21q22.3

DNA/RNA

Description

The gene encompasses 17.3 kb of DNA; 3 exons (the first one contains the 5' untranslated region).

Transcription

1135 b mRNA; 279 b coding sequence.

Protein

Description

92 amino acids (including initial methionine that is generally processed in vivo);
10.5 kDa monomer (S100B can form homodimers and heterodimers with other proteins of the S100 family, described for S100A1).

Expression

S100B highest levels are found in brain. The protein is primarily found in astrocytes. Outside the central nervous system it can be found in chondrocytes and melanocytes.

Localisation

Nuclear and cytoplasmic. It has both intracellular and extracellular roles.

Function

The exact function of S100B is not fully understood. It inhibits microtubule assembly, has been involved in the regulation of cell cycle progression and differentiation and is able to induce neurite extension. This latest effect seems to be dependent on the concentration of S100B and occurs at nanomolar concentrations.
But micromolar levels of extracellular S100B stimulate apoptosis in vitro. Calcium binding induces a conformational change in S100B that allows the interaction with a variety of target proteins. These include p53 tumour suppressor, the microtubule-associated protein tau, the cytoskeletal protein tubulin (and its prokaryotic ancestor FtsZ), the scaffold protein IQGAP1, the intermediate filament protein glial fibrillary acidic protein (GFAP), the actin capping protein CapZ and the giant phosphoprotein AHNAK. Over-expression of S100B has been proposed to play a role in different neuro-pathologies.

Homology

S100B belongs to the S100 family of calcium binding proteins, a highly homologous family. These proteins contain two EF-hand calcium binding domains. The S100 genes are present exclusively in vertebrates.

Mutations

Note: Have not been reported.

Implicated in

Disease

Overexpression of S100B has been generally linked to neurodegeneration. It is over-expressed in the brain of patients suffering from Alzheimer's disease, epilepsy or amyotrophic lateral sclerosis. The gene coding for S100B maps in the Down's syndrome region of chromosome 21, and its over-expression, due to the trisomic state, may be responsible for the neurological disturbances in Down's syndrome.

Oncogenesis

S100B may be involved in the proliferation of melanoma cells. It has been shown to be elevated in

primary malignant melanomas. However, S100B is used as a predictor of survival prognosis as elevated levels of S100B in serum are associated with the survival rate.

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