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Gene Section
Short Communication

RAP1A (RAP1A, member of RAS oncogene family)

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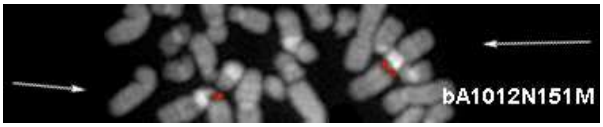
Identity

HGNC (Hugo): RAP1A

Location: 1p13.3



Probe(s) - Courtesy Mariano Rocchi, Resources for Molecular Cytogenetics.

DNA/RNA

Description

6 coding exons covering 18095 bp on chromosome 1.

Protein

Description

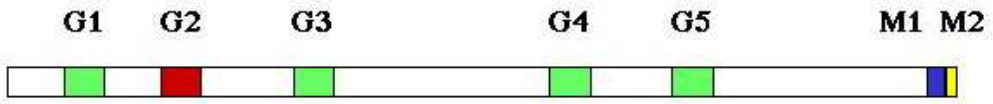
Rap1 is a member of the Ras superfamily of monomeric GTPases, closely related to Ras. There are two isoforms, Rap1A and Rap1B that share 95% identity and are encoded by two different genes. Rap1 proteins share 50% identity with Ras proteins, including the regions involved in GDP/GTP binding (hence Rap1A has very similar biochemical properties to Ras), C-terminal CAAX domain leading to prenylation (geranylgeranylation in the case of Rap1A), and effector region identical to that of Ras proteins causing Ras and Rap1 to share some potential effectors.

Expression

Ubiquitous ; higher in brain and hemopo•etic tissues.

Localisation

Rap1 is bound to membranes. In many cell types, it is found in a perinuclear compartment overlapping the Golgi. Rap1 proteins (A and B) are phosphorylated near the C-ter by cAMP-dependent protein kinase. This results in translocation of part of the Rap1 pool to the cytosol.



G1 - G5 : domains involved in GDP/GTP binding and hydrolysis
G1 + G3 : involved in binding beta and gamma phosphates of GTP
G4 + G5 : involved in interaction with the guanine base
G2: involved in interaction with effectors, and with Mg^{2+} ion
M1: polybasic or palmitoylation site
M2: prenylation site

Function

The function of Rap1 is still a matter of debate. Its overexpression is able to compete with the activation of Raf-1 by active Ras. Active Rap1B has been shown to activate the B-Raf kinase and the MEK-ERK cascade. In several cellular models, Rap1 has been shown to be involved in the regulation of integrin-mediated cell adhesion.

Homology

95% to Rap1B, 60% identical to Rap2, 50 % to Ras proteins.

Mutations

Germinal

Unknown.

Implicated in

No implication in pathologies characterized so far.

References

Bos JL, de Rooij J, Reedquist KA. Rap1 signalling: adhering to new models. Nat Rev Mol Cell Biol. 2001 May;2(5):369-77

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