

RAC1 Protein, Human, Recombinant (GST)

General Information

Synonyms:	Rac-1;p21-Rac1;MIG5;ras-related C3 botulinum toxin substrate 1 (rho family, small GTP binding protein Rac1);TC-25
Protein Construction:	A DNA sequence encoding the mature form of human Rac1 isoform A (NP_008839.2) (Met 1-Cys 189) was expressed with the GST tag at the N-terminus. Predicted N terminal: Met
Species:	Human
Expression Host:	Baculovirus Insect Cells
Accession:	P63000
Molecular Weight:	47 kDa (predicted); 44 kDa (reducing conditions)

QC Testing

Biological Activity:	Activity testing is in progress. It is theoretically active, but we cannot guarantee it. If you require protein activity, we recommend choosing the eukaryotic expression version first.
Purity:	> 95 % as determined by SDS-PAGE
Endotoxin:	< 1.0 EU/μg of the protein as determined by the LAL method.
Formulation:	Lyophilized from a solution filtered through a 0.22 μm filter, containing PBS, pH 7.4. Typically, a mixture containing 5% to 8% trehalose, mannitol, and 0.01% Tween 80 is incorporated as a protective agent before lyophilization.

Preparation and Storage

Reconstitution:

A Certificate of Analysis (CoA) containing reconstitution instructions is included with the products. Please refer to the CoA for detailed information.

Stability & Storage:

It is recommended to store recombinant proteins at -20°C to -80°C for future use. Lyophilized powders can be stably stored for over 12 months, while liquid products can be stored for 6-12 months at -80°C. For reconstituted protein solutions, the solution can be stored at -20°C to -80°C for at least 3 months. Please avoid multiple freeze-thaw cycles and store products in aliquots.

Actual storage temperature shall be subject to the COA.

Shipping:

In general, lyophilized powders are shipped with blue ice, while solutions are shipped with dry ice.

Protein Background

RAC1 is a GTPase that belongs to the RAS superfamily of small GTP-binding proteins. Members of this superfamily appear to regulate a diverse array of cellular events, including the control of cell growth, cytoskeletal reorganization, and the activation of protein kinases. Two transcript variants encoding different isoforms have been found for RAC1 gene. RAC1 is a plasma membrane-associated small GTPase which cycles between active

GTP-bound and inactive GDP-bound states. In its active state, binds to a variety of effector proteins to regulate cellular responses such as secretory processes, phagocytosis of apoptotic cells, epithelial cell polarization and growth-factor induced formation of membrane ruffles. RAC1 p21/rho GDI heterodimer is the active component of the cytosolic factor sigma 1, which is involved in stimulation of the NADPH oxidase activity in macrophage. RAC1 is essential for the SPATA13-mediated regulation of cell migration and adhesion assembly and disassembly. RAC1's isoform B has an accelerated GEF-independent GDP/GTP exchange and an impaired GTP hydrolysis, which is restored partially by GTPase-activating proteins. It is able to bind to the GTPase-binding domain of PAK but not full-length PAK in a GTP-dependent manner, suggesting that the insertion does not completely abolish effector interaction. Stat3 is an important transcription factor that regulates both proinflammatory and anti-apoptotic pathways in the heart. It forms a multiprotein complex with RAC1 and PKC in an H/R-dependent manner by expression of constitutively active Rac1 mutant protein, and by RNA silencing of RAC1. Selective inhibition of PKC with calphostin C produces a marked suppression of Stat3 S727 phosphorylation. The association of Stat3 with Rax1 occurs predominantly at the cell membrane, but also inside the nucleus, and occurs through the binding of the coiled-coil domain of Stat3 to the 54 NH(2)-terminal residues of RAC1. Transfection with a peptide comprising the NH(2)-terminal 17 amino acid residues of RAC1-dependent signaling pathways resulting in a physical association between Rac1 and Stat3 and the formation of a novel multiprotein complex with PKC.

Reference

- Kogai T, et al.. (2012) Regulation of sodium iodide symporter gene expression by Rac1/p38 β mitogen-activated protein kinase signaling pathway in MCF-7 breast cancer cells. *J Biol Chem.* 287(5):3292-300.
- Osborn-Heaford HL, et al.(2012) Mitochondrial Rac1 GTPase import and electron transfer from cytochrome c are required for pulmonary fibrosis. *J Biol Chem.* 287(5):3301-12.
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