

Product Information

Raf-1, human recombinant, expressed in *E. coli*

Catalog Number **R3652**
Storage Temperature $-70\text{ }^{\circ}\text{C}$

Synonym: Raf-1 Protein Kinase

Product Description

Raf-1 is a serine/threonine protein kinase with an apparent molecular mass of 74 kDa, which is the first upstream kinase in the MAPK signal transduction pathway. Additional upstream activators include Ras and Src. Raf-1 is subject to phosphorylation and associates with 14-3-3 adaptor proteins and Hsp 90, among others. An important downstream effector of Raf-1 kinase is its substrate, MEK. Inactive Raf-1 is delivered to the cell membrane by active GTP-Ras, where it is activated and phosphorylates MEK. This pathway regulates numerous cellular processes such as cell growth and differentiation. Interactions between PAK1, Raf-1, and MEK1 lead to activation of the ERK cascade. This cascade is a transducer cell signaling pathway responsible for growth, differentiation, apoptosis, and viral latency.

Structurally, Raf-1 consists of an N-terminal regulatory domain and a C-terminal catalytic domain. Phosphorylation sites are present at Ser⁴³ and Ser²⁵⁹ in the regulatory domain. These sites modulate Ras binding, and inhibit activation and coupling to MEK. The catalytic domain contains phosphorylation sites at Ser³³⁸, Tyr³⁴¹, Thr⁴⁹¹, Ser⁴⁹⁴, and Ser⁶²¹. These sites are involved in activation and modulation as well.

The product is supplied as a solution in 50 mM Tris-HCl, pH 7.0, containing 14 mM 2-mercaptoethanol, 1 mM benzamidine, 0.1 mM PMSF, 1 mM EDTA, and 10% glycerol.

Specific Activity: ~20 units/mg protein.

Unit Definition: One unit is the amount of enzyme that activates one unit of MEK by 10% per minute at pH 7.0 at 30 °C. One unit of MEK is the amount of enzyme that incorporates 1 nmole of phosphate into myelin basic protein per minute at pH 7.0 at 30 °C.

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Storage/Stability

The product ships in dry ice and storage at $-70\text{ }^{\circ}\text{C}$ is recommended. Avoid freeze-thaw cycles. Store working aliquots at $-70\text{ }^{\circ}\text{C}$. The product remains active for 24–48 hours at 2–8 °C.

References

1. Coles, L.C., and Shaw, P.E., PAK1 primes MEK1 for phosphorylation by Raf-1 kinase during cross-cascade activation of the ERK pathway. *Oncogene*, **21**, 2236-2244 (2002).
2. Sun, H. et al., Regulation of the protein kinase Raf-1 by oncogenic Ras through phosphatidylinositol 3-kinase, Cdc42/Rac and Pak. *Curr. Biol.*, **10**, 281-284 (2000).
3. Yip-Schneider, M.T. et al., Regulation of the Raf-1 kinase domain by phosphorylation and 14-3-3 association. *Biochem. J.*, **351**, 151-159 (2000).

LS,LCM,MAM 04/11-1

Sigma brand products are sold through Sigma-Aldrich, Inc.

Sigma-Aldrich, Inc. warrants that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product(s) for their particular use. Additional terms and conditions may apply. Please see reverse side of the invoice or packing slip.