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1-866-9 KINASE (54-6273)

Catalogue #	Aliquot Size
M09-11G-05	5 µg
M09-11G-10	10 µg
M09-11G-20	20 µg

MEKK1, Active

Recombinant human protein expressed in Sf9 cells

Catalog # M09-11G

Lot # S021-1

Product Description

Recombinant human MEKK1 (900-1748) was expressed by baculovirus in Sf9 insect cells using an N-terminal GST tag. The gene accession number is XM_042066.

Gene Aliases

MAP3K1; MEKK; MAPKKK1

Formulation

Recombinant protein stored in 50mM Tris-HCl, pH 7.5, 150mM NaCl, 10mM glutathione, 0.1mM EDTA, 0.25mM DTT, 0.1mM PMSF, 25% glycerol.

Storage and Stability

Store product at –70°C. For optimal storage, aliquot target into smaller quantities after centrifugation and store at recommended temperature. For most favorable performance, avoid repeated handling and multiple freeze/thaw cycles.

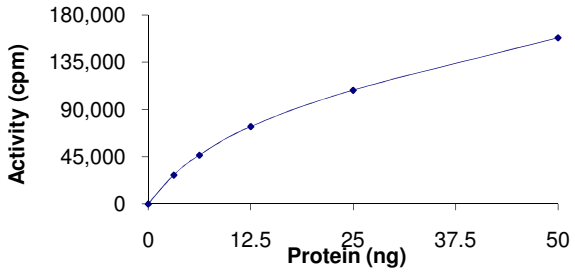
Scientific Background

MEKK1 or MEK kinase, is a serine/threonine kinase that is downstream of mitogenic and metabolic stimuli, including insulin and many growth factors. MEKK1 functions not only as an upstream activator of ERK and JNK through its kinase domain, but also as an E3 ligase through its PHD domain, providing a negative regulatory mechanism for decreasing ERK1/ERK2 activity by ubiquitination and degradation (1). MEKK1 -/- embryonic stem cells from mice show loss or altered responses of JNK to microtubule disruption and cold stress (2). Furthermore, activation of JNK is lost and that of ERK is diminished in response to hyperosmolarity and serum factors in MEKK1 -/- cells.

References

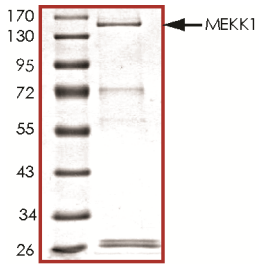
1. Lu, Z. et al: The PHD domain of MEKK1 acts as an E3 ubiquitin ligase and mediates ubiquitination and degradation of ERK1/2. Molec. Cell 9: 945-956, 2002.
2. Yujiri, T. et al: Role of MEKK1 in cell survival and activation of JNK and ERK pathways defined by targeted gene disruption. Science 282: 1911-1914, 1998.

Specific Activity



The specific activity of MEKK1 was determined to be **~698 nmol /min/mg** in a coupled assay as per activity assay protocol.

Purity



The purity was determined to be **>70%** by densitometry.
Approx. MW **155kDa**.

MEKK1, Active

Recombinant human protein expressed in Sf9 cells

Catalog Number	M09-11G
Specific Activity	698 nmol/min/mg
Specific Lot Number	S021-1
Purity	>70%
Concentration	0.1µg/µl
Stability	1yr At –70°C from date of shipment
Storage & Shipping	Store product at –70°C. For optimal storage, aliquot target into smaller quantities after centrifugation and store at recommended temperature. For most favorable performance, avoid repeated handling and multiple freeze/thaw cycles. Product shipped on dry ice.

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Activity Assay Protocol

Reaction Components

Active Kinase (Catalog #: M09-11G)

Active MEKK1 (0.1µg/µl) diluted with Kinase Dilution Buffer III (Catalog #: K23-09) and assayed as outlined in sample activity plot. (Note: these are suggested working dilutions and it is recommended that the researcher perform a serial dilution of Active MEKK1 for optimal results).

Kinase Dilution Buffer III (Catalog #: K23-09)

Kinase Assay Buffer I (Catalog #: K01-09) diluted at a 1:4 ratio (5X dilution) with 50ng/µl BSA solution.

Kinase Assay Buffer I (Catalog #: K01-09)

Buffer components: 25mM MOPS, pH 7. 2, 12.5mM β-glycerol-phosphate, 25mM $MgC1_2$, 5mM EGTA, 2mM EDTA. Add 0.25mM DTT to Kinase Assay Buffer prior to use.

[^{33}P]-ATP Assay Cocktail

Prepare 250µM [^{33}P]-ATP Assay Cocktail in a designated radioactive working area by adding the following components: 150µl of 10mM ATP Stock Solution (Catalog #: A50-09), 100µl [^{33}P]-ATP (1mCi/100µl), 5.75ml of Kinase Assay Buffer I (Catalog #: K01-09). Store 1ml aliquots at –20°C.

10mM ATP Stock Solution (Catalog #: A50-09)

Prepare ATP stock solution by dissolving 55mg of ATP in 10ml of Kinase Assay Buffer I (Catalog #: K01-09). Store 200µl aliquots at –20°C.

Substrate

Unactive MEK1 (Catalog #: M02-14BG) and ERK1 (Catalog #: M29-14G) were activated in a coupled reaction. Myelin Basic Protein (MBP) (Catalog #: M42-51N) diluted in distilled H_2O to a final concentration of 1mg/ml was subsequently used as a substrate for the activated ERK1.

Assay Protocol

Step 1. Thaw the Active MEKK1, Kinase Assay Buffer, Unactive ERK1 and Unactive MEK1 on ice. In a pre-cooled microfuge tube, add the following reaction components bringing the initial reaction volume up to 20µl:

- **Component 1.** 10µl of diluted Active MEKK1 (Catalog #M09-11G)
- **Component 2.** 1µl of Unactive MEK1 (0.2µg/µl) (Catalog #M02-14BG)
- **Component 3.** 1µl of Unactive ERK1 (0.2µg/µl) (Catalog #M29-14G)
- **Component 4.** 8µl of Kinase Dilution Buffer (Catalog #K23-09)

Step 2. Start the reaction by the addition of 5 µl ATP (250µM) and incubate in a water bath at 30°C for 25 minutes.

Step 3. After the 25 minute incubation period, remove 5µl and add to the following reaction components bringing the initial reaction volume up to 20µl on ice:

- **Component 1.** 5µl of reaction mixture
- **Component 2.** 10µl distilled H_2O on ice
- **Component 3.** 5µl of MBP substrate on ice(1 mg/ml) (Catalog #M42-51N)

Step 4. Set up the blank control as outlined in step 3, excluding the addition of the substrate. Replace the substrate with an equal volume of distilled H_2O.

Step 5. Initiate the reaction by the addition of 5µl [^{33}P]-ATP Assay Cocktail bringing the final volume up to 25µl and incubate the mixture in a water bath at 30°C for 15 minutes.

Step 6. After the 15 minute incubation period, terminate the reaction by spotting 20µl of the reaction mixture onto individual pre-cut strips of phosphocellulose P81 paper.

Step 7. Air dry the pre-cut P81 strip and sequentially wash in a 1% phosphoric acid solution (dilute 10ml of phosphoric acid and make a 1L solution with distilled H_2O) with constant gentle stirring. It is recommended that the strips be washed a total of 3 intervals for approximately 10 minutes each.

Step 8. Count the radioactivity on the P81 paper in the presence of scintillation fluid in a scintillation counter.

Step 9. Determine the corrected cpm by removing the blank control value (see Step 4) for each sample and calculate the kinase specific activity as outlined below.

Calculation of [P^{33}]-ATP Specific Activity (SA) (cpm/pmol)

Specific activity (SA) = cpm for 5µl [^{33}P]-ATP / pmoles of ATP (in 5µl of a 250µM ATP stock solution, i.e., 1250 pmoles)

Kinase Specific Activity (SA) (pmol/min/µg or nmol/min/mg)

Corrected cpm from reaction / [(SA of ^{33}P-ATP in cpm/pmol)*(Reaction time in min)*(Enzyme amount in µg or mg)]*[(Reaction Volume) / (Spot Volume)]

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