

Product Information

**MEK1, active, GST-tagged, human
PRECISIO® Kinase
recombinant, expressed in Sf9 cells**

Catalog Number **M8822**
Lot Number 090M0846
Storage Temperature -70°C

Synonyms: MAP2K1, MKK1, MAPKK1, PRKMK1

Product Description

MEK1 is a member of the dual specificity protein kinase family that acts as a mitogen-activated protein kinase (MAPK) kinase. MEK1 lies upstream of MAPK/ERK and stimulates the enzymatic activity of MAPK/ERK upon a wide variety of extra and intracellular signals. As an essential component of MAPK/ERK signal transduction pathway, MEK1 is involved in many cellular processes such as proliferation, differentiation, transcription regulation, and development.¹ Constitutive activation of MEK1 results in cellular transformation. Thus, MEK1 represents a likely target for pharmacologic intervention in proliferative diseases such as cancer.²

This recombinant product was expressed by baculovirus in Sf9 insect cells using an N-terminal GST-tag. The gene accession number is NM 002755. It is supplied in 50 mM Tris-HCl, pH 7.5, with 150 mM NaCl, 0.25 mM DTT, 0.1 mM EGTA, 0.1 mM EDTA, 0.1 mM PMSF, and 25% glycerol.

Molecular mass: ~72 kDa

Purity: $\geq 70\%$ (SDS-PAGE, see Figure 1)

Specific Activity: 276–374 nmole/min/mg (see Figure 2)

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 on dry ice and storage at -70°C is recommended. After opening, aliquot into smaller quantities and store at -70°C . Avoid repeated handling and multiple freeze/thaw cycles.

Figure 1.
SDS-PAGE Gel of Lot Number 090M0846:
>95% (densitometry)

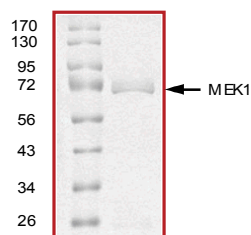
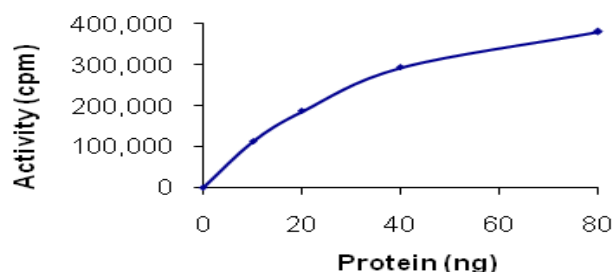


Figure 2.
Specific Activity of Lot Number 090M0846:
325 nmole/min/mg



Procedure

Preparation Instructions

Kinase Assay Buffer – 25 mM MOPS, pH 7.2, 12.5 mM glycerol 2-phosphate, 25 mM MgCl_2 , 5 mM EGTA, and 2 mM EDTA. Just prior to use, add DTT to a final concentration of 0.25 mM.

Kinase Dilution Buffer – Dilute the Kinase Assay Buffer 5-fold with a 50 ng/ μL BSA solution.

Kinase Solution – Dilute the active MEK1 (0.1 µg/µl) with Kinase Dilution Buffer to the desired concentration.

Note: The lot-specific specific activity plot may be used as a guideline (see Figure 2). It is recommended that the researcher perform a serial dilution of active MEK1 kinase for optimal results.

10 mM ATP Stock Solution – Dissolve 55 mg of ATP in 10 ml of Kinase Assay Buffer. Store in 200 µl aliquots at –20 °C.

γ-³²P-ATP Assay Cocktail (250 µM) – Combine 5.75 ml of Kinase Assay Buffer, 150 µl of 10 mM ATP Stock Solution, 100 µl of γ-³²P-ATP (1 mCi/100 µl). Store in 1 ml aliquots at –20 °C.

Substrate Solution – Inactive ERK1 (0.2 µg/ml); Myelin Basic Protein (MBP) diluted in water at a final concentration of 1 mg/ml.

1% phosphoric acid solution – Dilute 10 ml of concentrated phosphoric acid to a final volume of 1 L with water.

Kinase Assay

This assay involves the use of the ³²P radioisotope. All institutional guidelines regarding the use of radioisotopes should be followed.

1. Thaw the active MEK1, Kinase Assay Buffer, Inactive ERK1, and Kinase Dilution Buffer on ice. The γ-³²P-ATP Assay Cocktail may be thawed at room temperature.
2. In a pre-cooled microcentrifuge tube, prepare an activation mixture with a final volume of 20 µl:
 - 5 µl of Kinase Solution
 - 10 µl of Inactive ERK1 (0.2 µg/µl)
 - 5 µl of Kinase Assay Buffer
3. Start the reaction by adding 5 µl of 250 µM ATP and incubate in a water bath at 30 °C for 15 minutes.
4. In a microcentrifuge tube, add the following solutions to a volume of 20 µl:
 - 5 µl of activated mixture (step 3)
 - 5 µl of MBP Substrate Solution
 - 10 µl of cold water (4 °C)
5. Set up a blank control as outlined in step 4, substituting 5 µl of cold water (4 °C) for the Substrate Solution.

6. Initiate each reaction with the addition of 5 µl of the γ-³²P-ATP Assay Cocktail, bringing the final reaction volume to 25 µl. Incubate the mixture in a water bath at 30 °C for 15 minutes.
7. After the 15 minute incubation, stop the reaction by spotting 20 µl of the reaction mixture onto an individually pre-cut strip of phosphocellulose P81 paper.
8. Air dry the pre-cut P81 strip and sequentially wash in the 1% phosphoric acid solution with constant gentle stirring. It is recommended the strips be washed a total of 3 times of ~10 minutes each.
9. Set up a radioactive control to measure the total γ-³²P-ATP counts introduced into the reaction. Spot 5 µl of the γ-³²P-ATP Assay Cocktail on a pre-cut P81 strip. Dry the sample for 2 minutes and read the counts. Do not wash this sample.
10. Count the radioactivity on the P81 paper in the presence of scintillation fluid in a scintillation counter.
11. Determine the corrected cpm by subtracting the blank control value (see step 3) from each sample and calculate the kinase specific activity

Calculations:

1. Specific Radioactivity (SR) of ATP (cpm/nmole)

$$SR = \frac{\text{cpm of 5 } \mu\text{l of } \gamma\text{-}^{32}\text{P-ATP Assay Cocktail}}{\text{nmole of ATP}}$$

cpm – value from control (step 7)
nmole – 1.25 nmole (5 µl of 250 µM ATP Assay Cocktail)

2. Specific Kinase Activity (SA) (nmole/min/mg)

$$\text{nmole/min/mg} = \frac{\Delta\text{cpm} \times (25/20)}{SR \times E \times T}$$

SR = specific radioactivity of the ATP (cpm/nmole ATP)

Δcpm = cpm of the sample – cpm of the blank (step 3)

25 = total reaction volume

20 = spot volume

T = reaction time (minutes)

E = amount of enzyme (mg)

References

1. Seger, R. et al., The MAPK signaling cascade. *FASEB J.*, **9**, 726-735 (1995).
2. Sebolt-Leopold, J.S. et al., Blockade of the MAP kinase pathway suppresses growth of colon tumors *in vivo*. *Nature Med.*, **5**, 810-816 (1999).

PRECISIO is a registered trademark of Sigma-Aldrich® Biotechnology LP and Sigma-Aldrich Co.

TLD,MAM 09/10-1

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.