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Product Information

MEK1, active, GST-tagged, human
Precisio® Kinase
recombinant, expressed in *Sf*9 cells

Catalog Number **M8822**
Lot Number 050M0843
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 *Sf*9 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: ≥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 050M0843:
>95% (densitometry)

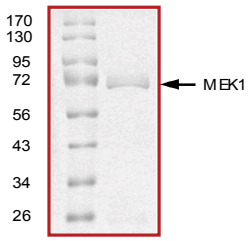
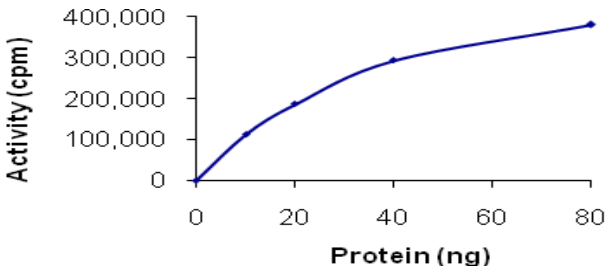


Figure 2.
Specific Activity of Lot Number 050M0843:
325 nmole/min/mg



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-^{32}P-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-^{32}P-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 ^{32}P 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-^{32}P-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-^{32}P-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 precut strip of phosphocellulose P81 paper.
8. Air dry the precut 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-^{32}P-ATP counts introduced into the reaction. Spot 5 μl of the γ-^{32}P-ATP Assay Cocktail on a precut 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)

$$SR = \frac{\text{cpm of 5 μl of γ-}^{32}\text{P-ATP Assay Cocktail}}{\text{nmole of ATP}}$$

   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).