**Product Information**

**EIF2AK2 (252-end) Active**
human, recombinant
GST-tagged, expressed in Sf9 cells

Catalog Number **E6907**
Lot Number 019K0644
Storage Temperature –70 °C

Synonyms: PKR; PRKR; EIF2AK1

**Product Description**

EIF2AK2 (also known as double-stranded RNA-activated protein kinase) is a protein kinase that has been shown to be involved in HIV/gp120-associated neurodegeneration.\(^1\) EIF2AK2 acts as a critical mediator of gp120 neurotoxicity and is a substrate for a family of protein kinases that respond to various forms of environmental stress. Activation of EIF2AK2 leads to its autophosphorylation and then phosphorylation of its natural substrate, the α subunit of eukaryotic protein synthesis initiation factor-2. EIF2AK2 plays a critical role in mRNA translation, cell proliferation, and apoptosis. A novel crosstalk between the EIF2AKs and p53 has implications in cell proliferation and tumorigenesis.\(^2\)

This recombinant product was expressed by baculovirus in Sf9 insect cells using an N-terminal GST-tag. The gene accession number is NM 002759. 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: ~64 kDa

Purity: ≥70% (SDS-PAGE, see Figure 1)

Specific Activity: 51–68 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.

**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.

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**Figure 1.**
SDS-PAGE Gel of Lot Number 019K0644:
>80% (densitometry)

**Figure 2.**
Specific Activity of Lot Number 019K0644:
59 nmole/min/mg

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**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 EIF2AK2 (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 EIF2AK2 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 – Dissolve the substrate myelin basic protein, MBP, 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 EIF2AK2, Kinase Assay Buffer, Substrate Solution, 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, add the following solutions to a volume of 20 µl:
   - 10 µl of Kinase Solution
   - 5 µl of Substrate Solution
   - 5 µl of cold water (4 °C)
3. Set up a blank control as outlined in step 2, substituting 5 µl of cold water (4 °C) for the Substrate Solution.
4. 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.
5. 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.
6. 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.
7. 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 precut P81 strip. Dry the sample for 2 minutes and read the counts. Do not wash this sample.
8. Count the radioactivity on the P81 paper in the presence of scintillation fluid in a scintillation counter.
9. 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)

   \[ SR = \frac{cpm \text{ of } 5 \mu l \text{ of } \gamma-32P-ATP \text{ Assay Cocktail}}{nmole \text{ of ATP}} \times \text{ value from control (step 7)} \]

   \[ nmole = 1.25 \text{ nmole (5 } \mu l \text{ of 250 } \mu M \text{ ATP Assay Cocktail)} \]

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

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

   \[ \Delta cpm = cpm \text{ of the sample } - cpm \text{ of the blank (step 3)} \]

   \[ 25 = \text{ total reaction volume} \]

   \[ 20 = \text{ spot volume} \]

   \[ T = \text{ reaction time (minutes)} \]

   \[ E = \text{ amount of enzyme (mg)} \]

**References**