

Product Information

**CAMK2 γ , active, GST-tagged, human
PRECISIO® Kinase
recombinant, expressed in *Sf9* cells**

Catalog Number **C0749**
Lot Number 041M0971
Storage Temperature -70°C

Synonyms: CAMK, CAMK-II, MGC26678

Product Description

CAMK2 γ is a member of the CAMKII family, which consists of ubiquitous serine/threonine protein kinases that have been implicated in diverse effects of hormones and neurotransmitters. CAMK2 γ has six alternatively spliced variants that encode six different isoforms. Some of these variants have been identified in human tumors.¹ Transgenic mice expressing a partially calcium-independent mutant form of CAMK2 γ showed a 1.5 to 2-fold increase in the thymus of these mice, at least in part due to an increase in the life span of double-positive thymocytes.² There was an increase in the number of T cells in the secondary lymphoid organs that had acquired an antigen-dependent memory phenotype.

This recombinant product was expressed by baculovirus in *Sf9* insect cells using an N-terminal GST-tag. The gene accession number is NM 172169. 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: ~60 kDa

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

Specific Activity: 211–285 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 041M0971:
>80% (densitometry)

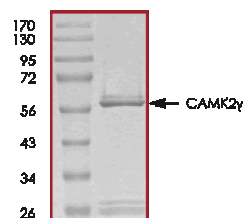
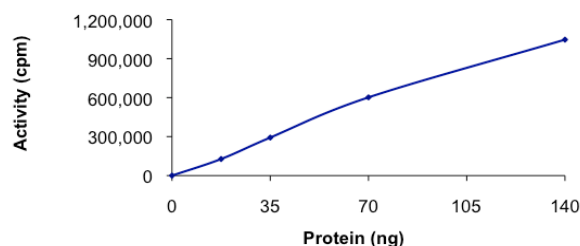


Figure 2.
Specific Activity of Lot Number 041M0971:
259 nmole/min/mg



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 CAMK2 γ (0.1 μ g/ μ l) 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 the researcher perform a serial dilution of active CAMK2 γ kinase for optimal results.

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

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

Substrate Solution – Dissolve the Autocamtide 2 synthetic peptide substrate (KKALRRQETVDAL-amide) 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 CAMK2 γ , 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 μ l:
 10 μ l of Kinase Solution
 7.5 μ l of Substrate Solution
 2.5 μ l of 5 mM CaCl₂ solution containing 0.75 μ g Calmodulin
3. Set up a blank control as outlined in step 2, substituting 7.5 μ l of cold water (4 °C) for the Substrate Solution.
4. Initiate each reaction with the addition of 5 μ l of the γ -³²P-ATP Assay Cocktail, bringing the final reaction volume to 25 μ l. 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 μ l 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 μ l 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)

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

cpm – value from control (step 7)
 nmole – 1.25 nmole (5 μ l of 250 μ M 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)

Δ cpm = 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. Tombes, R.M. et al., Identification of novel human tumor cell-specific CaMK-II variants. *Biochim. Biophys. Acta*, **1355**, 281-292 (1997).
2. Bui, J.D. et al., A role for CaMKII in T cell memory. *Cell*, **100**, 457-467 (2000).

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