Recombinant Human Active Chk1

Certificate of Analysis

Catalog Number: 1630-KS
Lot Numbers: 1500991

Specifications and Use

Source	♦ Recombinant full-length human Chk1 was expressed by baculovirus in *Sf* 9 insect cells using an N-terminal GST tag. The gene accession number is NM_001274.
Molecular Mass	♦ The approximate molecular weight is 82 kDa (see Figure 1 below).
Purity	♦ The purity was determined to be > 95% by densitometry (see Figure 1 below).
Formulation	♦ Supplied in 50 mM Tris-HCl, pH 7.5, 150 mM NaCl, 10 mM Glutathione, 0.1 mM EDTA, 0.25 mM DTT, 0.1 mM PMSF, 25% Glycerol.
Size	♦ 10 µg.
Concentration	♦ 0.1 µg/µL.
Activity	♦ The specific activity of Chk1 was determined to be 220 nmol/min/mg using a synthetic peptide substrate (see Activity Assay Protocol).
Storage	♦ This product is stable at ≤ -70 °C for up to 1 year from the date of receipt. For optimal storage, aliquot into smaller quantities after centrifugation and store at recommended temperature. ♦ **Avoid repeated freeze-thaw cycles.**

Chk1

Chk1 is a 56 kDa Serine/Threonine protein kinase that was originally identified in fission yeast to play a role in activation of the DNA damage checkpoint in the G2 phase of the cell cycle (1). Chk1 appears to function downstream of several of the known fission yeast checkpoint gene products, including that encoded by Rad3, a gene with sequence similarity to the ATM gene mutated in patients with ataxia telangiectasia (2).

References

1. Walworth, N. *et al*. (1993) Nature **363**:368.
2. Walworth, N.C. *et al*. (1996) Science **271**:353.

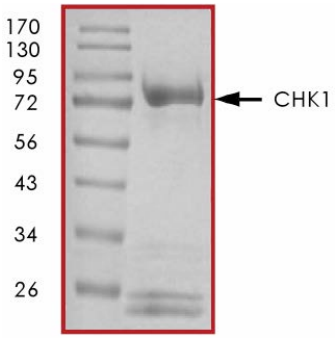

Figure 1: The approximate molecular weight is 82 kDa and the purity is > 95%.

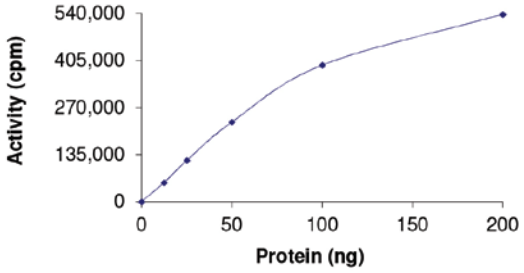

Figure 2: Enzymatic assay results. The specific activity of Chk1 was determined to be 220 nmol/min/mg as per activity assay protocol (on reverse).

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Activity Assay Protocol

Solutions Required

- **Active Kinase** - Active Chk1 (0.1 μg/μL) diluted with Kinase Dilution Buffer I to the concentrations shown in Figure 2.
  Note: *These are suggested working dilutions. Optimal dilutions should be determined by each laboratory for each application.*
- **Kinase Assay Buffer I, pH 7.2** - 25 mM MOPS, 12.5 mM β-glycerolphosphate, 25 mM $MgCl_2$, 5 mM EGTA, 2 mM EDTA. Add 0.25 mM DTT to the Kinase Assay Buffer I prior to use.
- **Kinase Dilution Buffer I, pH 7.2** - Kinase Assay Buffer I diluted at a 1:4 ratio (5X dilution) with distilled or deionized water.
- **10 mM ATP Stock Solution** - Prepare the ATP Stock Solution by dissolving 55 mg of ATP in 10 mL of Kinase Assay Buffer I. Store in 200 μL aliquots at ≤ -20 °C.
- **[^{33}P]-ATP Assay Cocktail** - Prepare 250 μM [^{33}P]-ATP Assay Cocktail in a designated radioactive work area by combining 150 μL of 10 mM ATP Stock Solution, 100 μL of [^{33}P]-ATP (1 mCi/100 μL), and 5.75 mL of Kinase Assay Buffer I. Store in 1.0 mL aliquots at ≤ -20 °C.
- **Substrate** - Chk-tide synthetic peptide substrate (KKKVSRSGLYRSPSMPENLNRPR) diluted in distilled or deionized water to a final concentration of 1.0 mg/mL.

Assay Procedure

1. Thaw the [^{33}P]-ATP Assay Cocktail in a shielded container in a designated radioactive work area.
2. Thaw the Active Chk1, Kinase Assay Buffer I, Substrate, and Kinase Dilution Buffer on ice.
3. In a pre-cooled microfuge tube, add the following reaction components bringing the initial reaction volume up to 20 μL.

Reaction Component	Amount
Diluted Active Chk1	10 μL
Substrate (1.0 mg/mL Stock Solution)	5.0 μL
Distilled Water (4 °C)	5.0 μL

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 or deionized water.
5. Initiate the reaction by the addition of 5.0 μL [^{33}P]-ATP Assay Cocktail, bringing the final volume up to 25 μL. Incubate the mixture in a water bath at 30 °C for 15 minutes.
6. After the 15 minute incubation period, terminate the reaction by spotting 20 μL of the reaction mixture onto individual pre-cut strips of phosphocellulose P81 paper.
7. Air dry the pre-cut P81 strip and sequentially wash in a 1% phosphoric acid solution (dilute 10 mL of phosphoric acid and make a 1 liter solution with distilled or deionized water) with constant gentle stirring. It is recommended that the strips be washed a total of three times for approximately 10 minutes each.
8. Count the radioactivity (cmp) on the P81 paper in the presence of scintillation fluid in a scintillation counter.
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 [^{33}P]-ATP Specific Activity (SA) (cpm/pmol)
Specific Activity (SA) = cpm for 5.0 μL [^{33}P]-ATP/pmole of ATP (in 5.0 μL of a 250 μM ATP stock solution, *i.e*. 1250 pmoles)

Calculation of Kinase Specific Activity (SA) (pmol/minutes/μg or nmol/minutes/mg)
Corrected cpm from reaction / [(SA of ^{33}P-ATP in cpm/pmol) x (Reaction time in minutes) x (Enzyme amount in μg or mg)] x [(Reaction volume) / (Spot Volume)]

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