Store at -80°C

#7577

HTScan® PDK1 Kinase Assay Kit

☑ 100 Assays
(96 Well Format)

Cell Signaling TECHNOLOGY®

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rev. 04/20/09

Products Included	Product #	Kit Quantity
Phospho-PKA C (Thr197) Antibody	4781	30 µl
Kinase Buffer (10X)	9802	15 ml
ATP (10 mM)	9804	1 ml
PKA (Thr197) Biotinylated Peptide	1024	2 x 1.25 ml
PDK1 Kinase	7386	5 µg

Description: The kit provides a means of performing kinase activity assays with recombinant human PDK1 kinase. It includes active PDK1 kinase (supplied as a GST fusion protein), a biotinylated peptide substrate and a phospho-serine/threonine antibody for detection of the phosphorylated form of the substrate peptide.

Peptide Core Sequence: RTWT*LCG

Molecular Weights: Biotin-peptide: 2,205 Daltons. PDK1 Kinase: 67 kDa.

Background: Phosphoinositide-dependent protein kinase 1 (PDK1) plays a central role in many signal transduction pathways (1,2), activating Akt and the PKC isoenzymes p70 S6 kinase and RSK (3). Through its effects on these kinases, PDK1 is involved in the regulation of a wide variety of processes, including cell proliferation, differentiation and apoptosis.

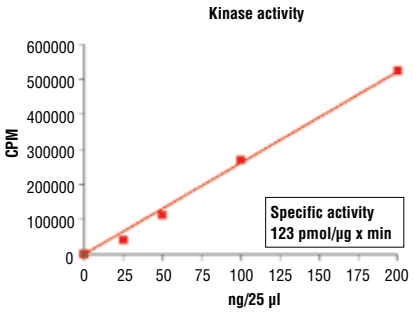

Figure 1. PDK1 kinase activity was measured in a radiometric assay using the following reaction conditions: 60 mM HEPES-NaOH, pH 7.5, 3 mM $MgCl_2$, 3 mM $MnCl_2$, 3 µM Na-orthovanadate, 1.2 mM DTT, variable ATP , 2.5 µg/50 µl PEG20,000, Substrate: tetra, 2.5 µg/50 µl and Recombinant PDK1: 50 ng/50 µl.

Source/Purification: The Kinase fusion protein was produced using a baculovirus expression system using sf9 cells and a recombinant virus encoding for the full length human PDK1 (Met1-Met460) (GenBank Accession No. NM_002613) with an amino-terminal His tag. The protein was purified by Immobilized Metal Affinity Chromatography (IMAC).

Quality Control: The substrate peptide was selected using our Serine/Threonine Kinase Substrate Screening Kit #7400. Phospho-PKA C (Thr197) Antibody #4781 was used for detection. The quality of the biotinylated peptide was evaluated by reverse-phase HPLC and by mass spectrometry.

Purified PDK1 kinase was quality controlled for purity by SDS-PAGE followed by Coomassie stain. PDK1 kinase activities were determined using a radiometric assay [Fig.1]. Time course [Fig.2], kinase dose-dependency [Fig.3] and substrate dose-dependency [Fig.4] assays were performed to verify PDK1 activity using the PDK1 substrate peptide provided in this kit. PDK1 sensitivity to the inhibitor staurosporine was measured using the PDK1 substrate peptide provided in this kit [Fig.5].

Background References:

(1) Belham, C. et al. (1999) *Curr. Biol.* 9, R93–R96.

(2) Toker, A. and Newton, A.C. (2000) *Cell* 103, 185–188.

(3) Williams, M.R. et al. (2000) *Curr. Biol.* 10, 439–448.

Storage: Antibodies are supplied in 10 mM sodium HEPES (pH 7.5), 150 mM NaCl, 100 µg/ml BSA and 50% glycerol. Do not aliquot the antibodies. Peptides are supplied at 6 µM in 0.001% DMSO. Enzyme is supplied in in 50 mM Tris-HCl, pH 7.5; 150 mM NaCl, 0.25 mM DTT, 0.1 mM EGTA, 0.1 mM EDTA, 0.1 mM PMSF, 25% glycerol, 7 mM glutathione.
Store at –80°C.

Keep enzymes on ice during use.

Avoid repeated freeze-thaw cycles.

Companion Products:

Serine/Threonine Kinase Substrate Screening Kit #7400

PDK1 Kinase #7386

Phospho-PKA C (Thr197) Antibody #4781

PKA (Thr197) Biotinylated Peptide #1024

Staurosporine #9953

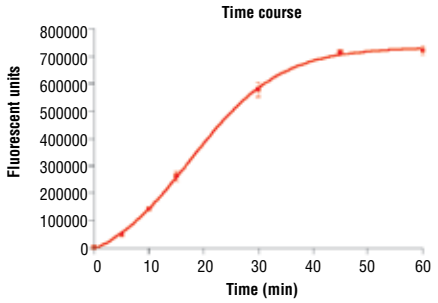

Figure 2. Time course of PDK1 kinase activity: DELFIA® data generated using Phospho-PKA C (Thr197) Antibody #4781 to detect phosphorylation of PDK1 substrate peptide (#1024) by PDK1 kinase. In a 50 µl reaction, 50 ng PDK1 and 3.0 µM substrate peptide were used per reaction. (DELFIA® is a registered trademark of PerkinElmer, Inc.)

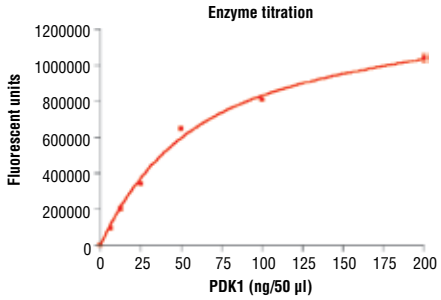

Figure 3. Dose dependence curve of PDK1 kinase activity: DELFIA® data generated using Phospho-PKA C (Thr197) Antibody #4781 to detect phosphorylation of substrate peptide (#1024) by PDK1 kinase. In a 50 µl reaction, increasing amounts of PDK1 and 3.0 µM substrate peptide were used per reaction at room temperature for 30 minutes. (DELFIA® is a registered trademark of PerkinElmer, Inc.)

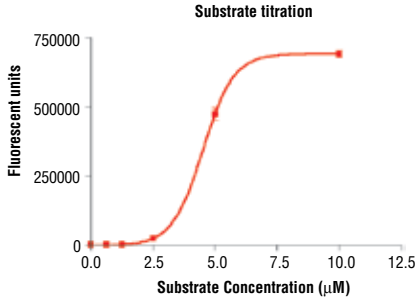

Figure 4. Peptide concentration dependence of PDK1 kinase activity: DELFIA® data generated using Phospho-PKA C (Thr197) Antibody #4781 to detect phosphorylation of substrate peptide (#1024) by PDK1 kinase. In a 50 µl reaction, 50 ng of PDK1 and increasing concentrations of substrate peptide were used per reaction at room temperature for 30 minutes. (DELFIA® is a registered trademark of PerkinElmer, Inc.)

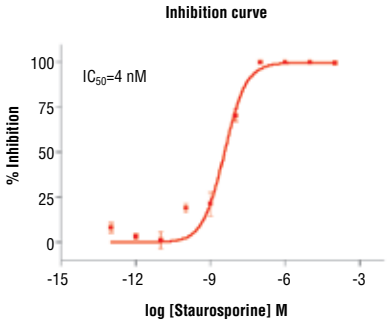

Figure 5. Staurosporine inhibition of PDK1 kinase activity: DELFIA® data generated using Phospho-PKA C (Thr197) Antibody #4781 to detect phosphorylation of PDK1 substrate peptide (#1024) by PDK1 kinase. In a 50 µl reaction, 50 ng PDK1, 3.0 µM substrate peptide, 20 µM ATP and increasing amounts of staurosporine were used per reaction at room temperature for 30 minutes. (DELFIA® is a registered trademark of PerkinElmer, Inc.)

Protocol for HTScan® PDK1 Kinase Assay Kit

Kinase

Note: Lot-specific information for this kinase is provided on the enzyme vial. Optimal assay incubation times and enzyme concentrations must be determined empirically for each lot of kinase under specified conditions.

A Additional Solutions and Reagents (Not included)

1. **Wash Buffer:** 1X PBS, 0.05% Tween-20 (PBS/T)
2. Bovine Serum Albumin (BSA)
3. **Stop Buffer:** 50 mM EDTA pH 8

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B Suggested Protocol for 100 Assays

1. Add 100 µl 10 mM ATP to each1.25 ml 6 µM substrate peptide tube to make 2X ATP/substrate cocktail ([ATP]=400 µM, [substrate] = 6 µm).
2. Transfer enzyme from –80°C to ice. Allow enzyme to thaw on ice.
3. **Microcentrifuge briefly at 4°C to bring liquid to the bottom of the vial. Return immediately to ice.**
4. Add 1 ml 10X kinase buffer [1 ml 10X Kinase Buffer 250 mM Tris-HCl pH 7.5, 100 mM $MgCl_2$, 1 mM Na_3VO_4, 50 mM β-glycerophosphate, 20 mM dithiothreitol (DTT)] to 1.5 ml dH_20 to make 2.5 ml 4X reaction buffer.
5. Transfer 1.2 ml of 4X Reaction buffer to each enzyme tube to make 4X reaction cocktail ([enzyme]) = 4 ng/µl in 4X reaction cocktail).
6. Add 12.5 µl of the 4X reaction cocktail to 12.5 µl/well of prediluted compound of interest (usually around 10 µM) and incubate for 5 minutes at room temperature.
7. Add 25 µl of 2X ATP/substrate cocktail to 25 µl/well preincubated reaction cocktail/compound.

Final Assay Conditions for a 50 µl Reaction

25 mM Tris-HCl (pH 7.5)
10 mM $MgCl_2$
5 mM β-glycerophosphate
0.1 mM Na_3VO_4
2 mM DTT
200 µM ATP
3 µM peptide
50 ng PDK1 Kinase

8. Incubate reaction plate at room temperature for 30 minutes.
9. Add 50 µl/well Stop Buffer (50 mM EDTA, pH 8) to stop the reaction.
10. Transfer 25 µl of each reaction to a 96-well streptavidin-coated plate containing 75 µl dH_2O/well and incubate at room temperature for 60 minutes.
11. *Wash three times with 200 µl/well PBS/T.
12. Dilute primary antibody, Phospho-PKA C (Thr197) Antibody #4781, 1:1000 in PBS/T with 1% BSA. Add 100 µl/well primary antibody.
13. Incubate at room temperature for 120 minutes.
14. *Wash three times with 200 µl/well PBS/T.
15. For DELFIA® or Colorimetric ELISA detection methods please use the following protocols.

DELFIA® Assay

1. Prepare appropriate dilution of Europium labeled secondary antibody in PBS/T with 1% BSA (1:500 dilution for anti-mouse IgG or 1:1000 for anti-rabbit IgG).
2. Add 100 µl/well secondary antibody solution.
3. Incubate at room temperature for 30 minutes.
4. *Wash five times with 200 µl/well PBS/T.
5. Add 100 µl/well DELFIA® Enhancement Solution.
6. Incubate at room temperature for 5 minutes.
7. Read plate using a Time Resolved Fluorescent plate reader using the following settings;
   - **a.** Excitation Filter: 340 nm
   - **b.** Emission Filter: 615 nm
   - **c.** Delay++: 400 µs

++ Delay time is the delay from the excitation pulse to the beginning of the measurement.

Companion Products for DELFIA®

DELFIA® Europium-labeled Anti-mouse IgG (PerkinElmer Life Sciences #AD0124)
DELFIA® Europium-labeled Anti-rabbit IgG (PerkinElmer Life Sciences #AD0105)
DELFIA® Enhancement Solution (PerkinElmer Life Sciences #1244-105)
DELFIA® Streptavidin coated, 96-well, yellow plate (PerkinElmer Life Sciences AAAND-0005)

Colorimetric ELISA Assay

1. Prepare appropriate dilution of HRP labeled secondary antibody in PBS/T with 1% BSA (1:500 dilution for anti-mouse IgG or 1:1000 for anti-rabbit IgG).
2. Add 100 µl/well secondary antibody solution.
3. Incubate at room temperature for 30 minutes.
4. *Wash five times with 200 µl/well PBS/T.
5. Add 100 µl/well TMB substrate.
6. Incubate at room temperature for 15 minutes.
7. Add 100 µl/well of stop solution.
8. Mix well.
9. Read the absorbance at 450 nm with a microtiter plate reader.

Companion Products For Colorimetric ELISA Assay

Anti-mouse IgG, HRP Linked Antibody #7076
Anti-rabbit IgG, HRP Linked Antibody #7074
TMB Solution #7004
Stop Solution #7002

***NOTE:** Use of an automated microplate washer as well as centrifugation of plates when appropriate, greatly improves reproducibility.

Please contact Cell Signaling Technology for HTS-ready antibodies (PBS formulated and carrier-free), and detailed peptide substrate sequence information.
Email: drugdiscovery@cellsignal.com