Store at -80°C

#7915

HTScan® PDGFRα D842V Kinase Assay Kit

☑ 100 Assays
(96 Well Format)

Cell Signaling TECHNOLOGY®

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Products Included	Product #	Kit Quantity
Phospho-Tyrosine Mouse mAb (P-Tyr-100)	9411	30 µl
HTScan® Tyrosine Kinase Buffer (4X)	9805	15 ml
ATP (10 mM)	9804	1 ml
DTT (1000x, 1.25M)		80 µl
FLT3 (Tyr589) Biotinylated Peptide	1305	1.25 ml
PDGFRα D842V Kinase (recombinant human)	7914	2 X 5 µg

Description: The kit provides a means of performing kinase activity assays with recombinant human PDGFRα D842V kinase. It includes active PDGFRα D842V kinase (supplied as a GST fusion protein), a biotinylated peptide substrate and a phospho-tyrosine monoclonal antibody for detection of the phosphorylated form of the substrate peptide.

Peptide Core Sequence: DNEY*FYV

Molecular Weights: Peptide substrate, Biotin-FLT3 (Tyr589): 1945 Daltons. GST-PDGFRα D842V Kinase: 76 kDa.

Source/Purification: The GST-kinase fusion protein was produced using a baculovirus expression system with a construct expressing human PDGFRα D842V (Lys550-Leu1090) (GenBank Accession No. NM_006206) with an amino-terminal GST tag. The protein was purified by one-step affinity chromatography using glutathione-agarose.

Quality Control: The substrate peptide was selected by screening a panel of 150 pairs of tyrosine containing peptides as potential substrate candidates. Phospho-Tyrosine mAb (P-Tyr-100) #9411 was used for detection. The quality of the biotinylated peptides was evaluated by reverse-phase HPLC and by mass spectrometry.

Purified PDGFRα D842V kinase was quality controlled for purity by SDS-PAGE followed by Coomassie stain. The specific activity of the PDGFRα D842V kinase was 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 the PDGFRα D842V kinase activity using the PDGFRα D842V substrate peptide provided in this kit. Sensitivity of PDGFRα D842V to Gleevec was determined using the PDGFRα substrate peptide (#1325) and detection antibody provided in this kit [Fig.5].

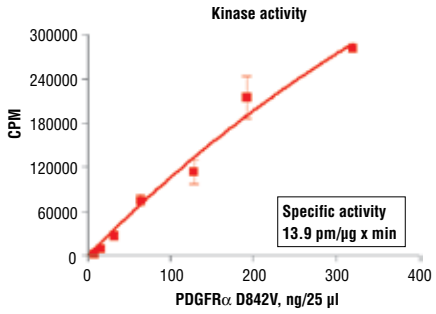

Figure 1. PDGFRα D842V kinase activity was measured in a radiometric assay using the following reaction conditions: 60 mM HEPES-NaOH, pH 7.5, 5 mM $MgCl_2$, 5 mM $MnCl_2$, 3 µM Na-orthovanadate, 1.2 mM DTT, 100 µM ATP, 100 µM FLT3 (Tyr589) Biotinylated Peptide (#1305) and variable amount of Recombinant PDGFRα D842V. Reaction mixture incubated at room temperature for 10 minutes.

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. Enzymes are supplied in 50 mM Tris-HCL (pH 8.0), 100 mM NaCl, 5 mM DTT, 15 mM reduced glutathione and 20% glycerol. Store at –80°C.

Keep enzymes on ice during use.

Avoid repeated freeze-thaw cycles.

Companion Products:

Tyrosine Kinase Substrate Screening Kit #7450

PDGFRα D842V Kinase #7914

Phospho-Tyrosine Mouse mAb (P-Tyr-100) #9411

FLT3 (Tyr589) Biotinylated Peptide #1305

Staurosporine #9953

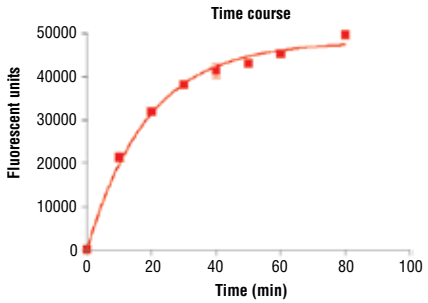

Figure 2. Time course of PDGFRα D842V kinase activity: DELFIA® data generated using Phospho-Tyrosine Mouse mAb (P-Tyr-100) #9411 to detect phosphorylation of PDGFRα D842V substrate peptide (#1305) by PDGFRα D842V kinase. In a 50 µl reaction, 100 ng PDGFRα D842V and 1.5 µM substrate peptide were used per reaction. (DELFIA® is a registered trademark of PerkinElmer, Inc.)

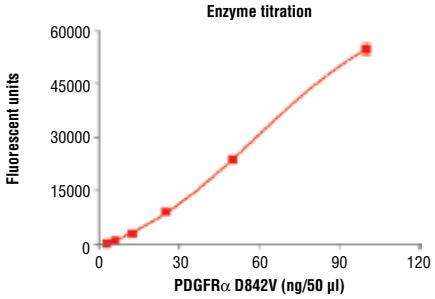

Figure 3. Dose dependence curve of PDGFRα D842V kinase activity: DELFIA® data generated using Phospho-Tyrosine Mouse mAb (P-Tyr-100) #9411 to detect phosphorylation of substrate peptide (#1305) by PDGFRα D842V kinase. In a 50 µl reaction, increasing amounts of PDGFRα D842V and 1.5 µM substrate peptide were used per reaction at room temperature for 30 minutes. (DELFIA® is a registered trademark of PerkinElmer, Inc.)

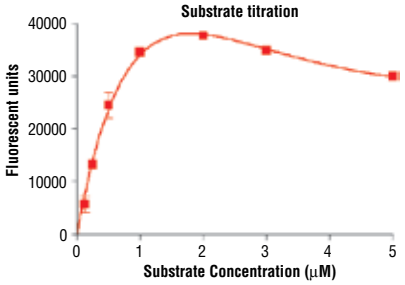

Figure 4. Peptide concentration dependence of PDGFRα D842V kinase activity: DELFIA® data generated using Phospho-Tyrosine Mouse mAb (P-Tyr-100) #9411 to detect phosphorylation of substrate peptide (#1305) by PDGFRα D842V kinase. In a 50 µl reaction, 100 ng of PDGFRα D842V and increasing concentrations of substrate peptide were used per reaction at room temperature for 30 minutes. (DELFIA® is a registered trademark of PerkinElmer, Inc.)

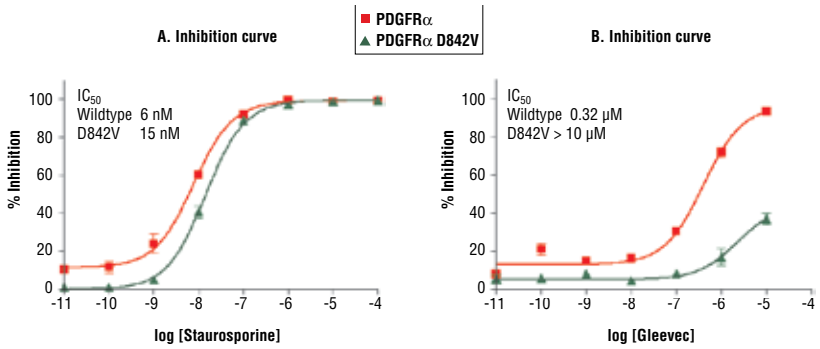

Figure 5. Sensitivities of wild type and mutant PDGFRα D842V kinases to Staurosporine (A) and Gleevec (B) were compared: DELFIA® data generated using Phospho-Tyrosine mAb (P-Tyr-100) #9411 to detect phosphorylation of PDGFRα substrate peptide (#1305) by the PDGFRα kinases. In a 50 µl reaction, 100 ng of kinase, 1.5 µM substrate peptide, 20 µM ATP and increasing concentration of indicated inhibitors were used per reaction well at room temperature for 30 minutes. (DELFIA® is a registered trademark of PerkinElmer, Inc.)

Background: The proteins of the PDGF family consist of several disulphide-bonded dimeric isoforms: PDGF AA, PDGF AB, PDGF BB, PDGF CC and PDGF DD, which bind in a distinct pattern to two highly related RTKs: PDGFRα and PDGFRβ. PDGFRα and PDGFRβ contain between 75% and 85% sequence homology between their two intracellular kinase domains. The kinase insert and carboxy-terminal tail regions display approximately 27% to 28% homology. PDGFRα binds all PDGF isoforms except PDGF D, whereas PDGFRβ binds only PDGF B and D (1). PDGFRα and PDGFRβ not only form homo- and heterodimers, but also dimerize with EGFR, which can be stimulated by PDGF (2). The total number and the ratio of receptor subunits expressed varies between cell types, possibly accounting for the difference in responsiveness of various cell types to PDGF (3). Ligand binding induces receptor dimerization and autophosphorylation, allowing binding and activation of cytoplasmic SH2 domain-containing signal transduction molecules including Grb2, Src, GAP, PI3 kinase, PLCγ and Nck. A number of different signaling pathways are thereby initiated leading to cell growth, actin reorganization, migration and differentiation (4). Tyr751 in the kinase-insert region of PDGFRβ is the docking site for PI3 kinase (5). Phosphorylated pentapeptides derived from Tyr751 of PDGFRβ (pTyr751-Val-Pro-Met-Leu) inhibit the association of the carboxy-terminal SH2 domain of the p85 subunit of PI3 kinase with PDGFRβ (6). Tyr740 is also required for PDGFRβ mediated PI-3 kinase activation (7).

A subset of gastrointestinal stromal tumors (GIST) are associated with PDGFRα activating mutations (8,9). The most common mutation is D842V which located in the kinase activation loop domain and results in contitutively active PDGFRα (8,9). This mutation also renders the kinase resistant to Gleevec (Imatinib) inhibition (9,10) and predicts poor clinical response of the patients to Gleevec (10).

Background References:

(1) Deuel, T.F. et al. (1988) *Biofactors* 1, 213–217.

(2) Betsholtz, C. et al. (2001) *Bioessays* 23, 494–507.

(3) Coughlin, S.R. et al. (1988) *Prog. Clin. Biol. Res.* 266, 39–45.

(4) Ostman, A. and Heldin, C.H. (2001) *Adv. Cancer Res.* 80, 1–38.

(5) Panayotou, G. et al. (1992) *EMBO J.* 11, 4261–4272.

(6) Ramalingam, K. et al. (1995) *Bioorg. Med. Chem.* 3, 1263–1272.

(7) Kashishian, A. et al. (1992) *EMBO J.* 11, 1373–1382.

(8) Heinrich, M.C. et al. (2003) *Science* 299, 708–10.

(9) Corless, C.L. et al. (2005) *J. Clin. Oncol.* 23, 5357–64.

(10) Heinrich, M.C. et al. (2003) *J. Clin. Oncol.* 21, 4342–9.

Protocol for HTScan® PDGFRα D842V 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 10 µl 10 mM ATP to 1.25 ml 6 µM substrate peptide. Dilute the mixture with dH_20 to 2.5 ml to make 2X ATP/substrate cocktail ([ATP]=40 µM, [substrate]=3 µm).
2. Immediately 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 10 µl of DTT (1.25 M) to 2.5 ml of 4X HTScan® Tyrosine Kinase Buffer (240 mM HEPES pH 7.5, 20 mM $MgCl_2$, 20 mM $MnCl_2$, 12 µM Na_3VO_4) to make DTT/Kinase buffer.
5. Transfer 0.6 ml of DTT/Kinase buffer to each enzyme tube to make 4X reaction cocktail ([enzyme] = 8 ng/µL in 4X reaction cocktail).
6. Incubate 12.5 µl of the 4X reaction cocktail with 12.5 µl/well of prediluted compound of interest (usually around 10 µM) 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

60 mM HEPES pH 7.5
5 mM $MgCl_2$
5 mM $MnCl_2$
3 µM Na_3VO_4
1.25 mM DTT
20 µM ATP
1.5 µM peptide
100 ng PDGFRα D842V 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 and 75 µl dH_2O/well to a 96-well streptavidin-coated plate and incubate at room temperature for 60 minutes.
11. *Wash three times with 200 µl/well PBS/T
12. Dilute primary antibody, Phospho-Tyrosine mAb (P-Tyr-100), 1:1000 in PBS/T with 1% BSA. Add 100 µl/well primary antibody.
13. Incubate at room temperature for 60 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