

# PathScan® Total TrkA Sandwich ELISA Kit

✓ 1 Kit  
(96 assays)

**Orders** ■ 877-616-CELL (2355)  
orders@cellsignal.com

**Support** ■ 877-678-TECH (8324)  
info@cellsignal.com

**Web** ■ www.cellsignal.com

New 08/06

This product is for *in vitro* research use only and is not intended for use in humans or animals.

## Species Cross-Reactivity: H

**Introduction:** CST's PathScan® Total TrkA Sandwich ELISA Kit is a solid phase sandwich enzyme-linked immunosorbent assay (ELISA) that detects transfected levels of total TrkA protein. A TrkA Mouse mAb #4614\* has been coated onto the microwells. After incubation with cell lysates, both phospho- and nonphospho-TrkA proteins are captured by the coated antibody. Following extensive washing, TrkA Rabbit Antibody #4598\* is added to detect both the captured phospho- and nonphospho-TrkA protein. Anti-rabbit IgG, HRP-linked Antibody #7074\* is then used to recognize the bound detection antibody. HRP substrate, TMB, is added to develop color. The magnitude of optical density for this developed color is proportional to the quantity of total TrkA protein.

\* Antibodies in kit are custom formulations specific to kit.

## Companion Products:

TrkA Antibody #2505

PathScan® Phospho-TrkA (Tyr674/675) Sandwich ELISA Kit #7212

PathScan® Phospho-TrkA (Tyr490) Sandwich ELISA Kit #7210

Phospho-TrkA (Tyr490) Antibody #9141

Anti-rabbit IgG, HRP-linked Antibody #7074

**Specificity/Sensitivity:** CST's PathScan® Total TrkA Sandwich ELISA Kit #7208 detects transfected levels of total TrkA Protein. As shown in Figure 1, using PathScan® Phospho-TrkA (Tyr490) ELISA Kit #7210, a significant induction of Phospho-TrkA (Tyr490) is detected in 3T3/TrkA cells treated with NGF. The levels of total TrkA (phospho and non-phospho) detected by PathScan® Total TrkA Sandwich ELISA Kit #7208 remain unchanged. In Figure 3, Western blot analysis of protein captured in the TrkA mouse mAb #4614 coated microwell shows a major band corresponding to the TrkA protein. Using this kit, TrkA protein can also be detected in K562 cells.

Products Included	Volume	Solution Color
TrkA Mouse mAb coated microwells*	96 tests	
Trk Detection Ab	11 ml	green
Anti-rabbit IgG HRP-Linked Ab	11 ml	red
TMB Substrate	11 ml	colorless
STOP Solution	11 ml	colorless
Sealing Tape	2 sheets	
20X Wash Buffer	25 ml	colorless
Sample Diluent	25 ml	blue
10X Cell Lysis Buffer #9803**	15 ml	yellowish

\* 12 8-well modules -Each module is designed to break apart for 8 tests.

\*\*Kit should be stored at 4°C with the exception of 10X Cell Lysis Buffer, which is stored at -20°C (packaged separately).

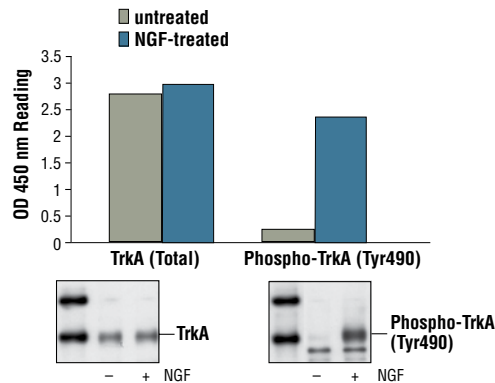


Figure 1: Treatment of 3T3/TrkA cells with NGF stimulates phosphorylation of TrkA at Tyr490, detected by PathScan® Phospho-TrkA (Tyr490) Sandwich ELISA kit #7210, but does not affect the level of total TrkA detected by PathScan® Total TrkA Sandwich ELISA kit #7208. OD 450 readings are shown in the top figure, while the corresponding Western blot using Phospho-TrkA (Tyr490) Antibody #9141 (right panel) or TrkA Rabbit mAb #2505 (left panel), is shown in the bottom figure. The human TrkA is expressed in 3T3/TrkA cells.

**Background:** The family of Trk receptor tyrosine kinases consists of TrkA, TrkB and TrkC. While the sequence of these family members is highly conserved, these family members are activated by different neurotrophins: TrkA by NGF, TrkB by BDNF or NT4 and TrkC by NT3. TrkA regulates proliferation and is important for development and maturation of the nervous system (1). Phosphorylation at Tyr490 is required for Shc association and activation of the Ras-MAP kinase cascade. Residues Tyr674/675 lie within the catalytic domain, and phosphorylation at this site reflects TrkA kinase activity (2-6). Point mutations, deletions and chromosomal rearrangements (chimera) cause ligand-independent receptor dimerization and activation of TrkA. Many malignancies (breast, colon, prostate and thyroid carcinomas and acute myeloid leukemia) have activated TrkA. Expression of TrkA is a good prognostic marker in neuroblastomas because it signals growth arrest and differentiation of cells originating from the neural crest (1).

**Background References:**

- (1) Pierotti, M.A. and Greco, A. (2006) *Cancer Lett.* 232, 90–98.
- (2) Segal, R.A. and Greenberg, M.E. (1996) *Annu. Rev. Neurosci.* 19, 463–489.
- (3) Stephens, R.M. et al. (1994) *Neuron* 12, 691–705.
- (4) Obermeier, A. et al. (1993) *EMBO J.* 12, 933–941.
- (5) Obermeier, A. et al. (1994) *EMBO J.* 13, 1585–1590.
- (6) Yao, R. and Cooper, G.M. (1995) *Science* 267, 2003–2006.

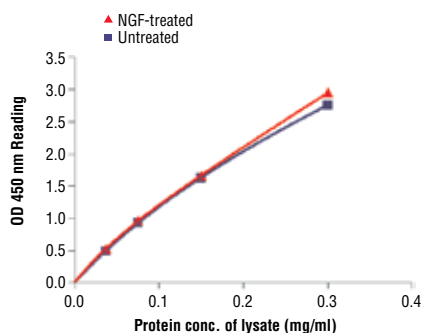


Figure 2: The relationship between protein concentration of lysates from untreated and NGF-treated 3T3/TrkA cells and kit assay optical density readings. After starvation, 3T3/TrkA cells (85% confluence) were treated with NGF (100 ng/ml) for 2 min at 37°C, and then lysed.

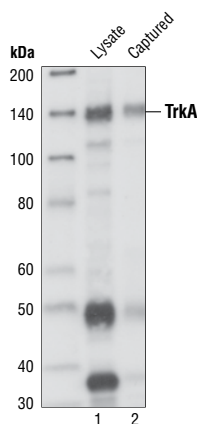


Figure 3: Kit specificity demonstrated by Western blot analysis of the ELISA-well captured protein. Lysates were prepared from 3T3 cells transfected with human TrkA and incubated in wells coated with capture antibody #4584. Wells were then washed, and captured protein was solubilized in SDS gel loading buffer. 3T3/TrkA lysate (lane 1) and captured protein (lane 2) were analyzed by Western blot using TrkA antibody #4598. A band corresponding to the TrkA protein is detected in the captured material (lane 2).

## Sandwich ELISA Protocol

### A Reagent Preparation

1. Bring all microwell strips to room temperature before use.
2. Prepare 1X Wash Buffer by diluting 20X wash buffer (included in each Pathscan® Sandwich ELISA Kit) in Milli-Q or equivalently purified water.
3. **1X Cell Lysis Buffer from CST #9803:** 20 mM Tris (pH 7.5), 150 mM NaCl, 1 mM ethylene diamine tetraacetate (EDTA), 1 mM ethylene glycol-bis(2-aminoethyl)-N,N,N',N'-tetraacetic acid (EGTA), 1% Triton X-100, 2.5 mM sodium pyrophosphate, 1 mM β-glycerophosphate, 1 mM Na<sub>3</sub>VO<sub>4</sub>, 1 μg/ml leupeptin. This buffer can be stored at 4°C for short-term use (1–2 weeks).

### B Preparing Cell Lysates

1. Aspirate media. Treat cells by adding fresh media containing regulator for desired time.
2. To harvest cells under nondenaturing conditions, remove media and rinse cells once with ice-cold PBS.
3. Remove PBS and add 0.5 ml ice-cold 1X Cell Lysis Buffer plus 1 mM phenyl-methylsulfonyl fluoride (PMSF) to each plate (10 cm<sup>2</sup>) and incubate the plate on ice for 5 minutes.
4. Scrape cells off the plate and transfer to an appropriate tube. Keep on ice.
5. Sonicate lysates on ice.
6. Microcentrifuge for 10 minutes at 4°C and transfer the supernatant to a new tube. The supernatant is the cell lysate. Store at –80°C in single-use aliquots.

### C Test Procedure

1. After the microwell strips have reached room temperature, break off the required number of microwells. Place the microwells in the strip holder. Unused microwells must be resealed and stored at 4°C immediately.
2. Add 100 μl of Sample Diluent (supplied in each Pathscan® Sandwich ELISA Kit, blue color) to a microcentrifuge tube. Transfer 100 μl of cell lysate into the tube and vortex for a few seconds. (Sample applied to the well can be diluted 1:1 when the suggested cell lysis buffer is used for cell extraction.) Individual data sheets for each kit provide information regarding an appropriate dilution factor for lysates and kit assay results.

3. Add 100 μl of each diluted cell lysate to the appropriate well. Seal with tape and press firmly onto top of microwells. Incubate the plate for 2 hours at 37°C. Alternatively, the plate can be incubated overnight at 4°C, which gives the best detection of target protein.
4. Gently remove the tape and wash wells:
  - a. Discard plate contents into a receptacle.
  - b. Wash 4 times with 1X Wash Buffer, 200 μl each time for each well.
  - c. For each wash, strike plates on fresh towels hard enough to remove the residual solution in each well, but do not allow wells to completely dry at any time. Clean the underside of all wells with a lint-free tissue.
5. Add 100 μl of Detection Antibody (green color) to each well. Seal with tape and incubate the plate for 1 hour at 37°C.
6. Repeat wash procedure as in Step C4.
7. Add 100 μl of HRP-Linked secondary antibody (red color) to each well. Seal with tape and incubate the plate for 30 minutes at 37°C.
8. Repeat wash procedure as in Step C4.
9. Add 100 μl of TMB Substrate to each well. Seal with tape and incubate the plate for 10 minutes at 37°C or 30 minutes at 25°C.
10. Add 100 μl of STOP Solution to each well. Shake gently for a few seconds.

**NOTE:** Initial color of positive reaction is blue, which changes to yellow upon addition of STOP Solution.

11. Read results.
  - a. Visual Determination — Read within 30 minutes after adding STOP Solution.
  - b. Spectrophotometric Determination — Wipe underside of wells with a lint-free tissue. Read absorbance at 450 nm within 30 minutes after adding STOP Solution.