

Rat TrkA ELISA Kit

Catalog No. EK0847

Size 96T(8×12 divisible strips)

For quantitative detection of rat TrkA in cell culture supernates, cell lysates and tissue homogenates.

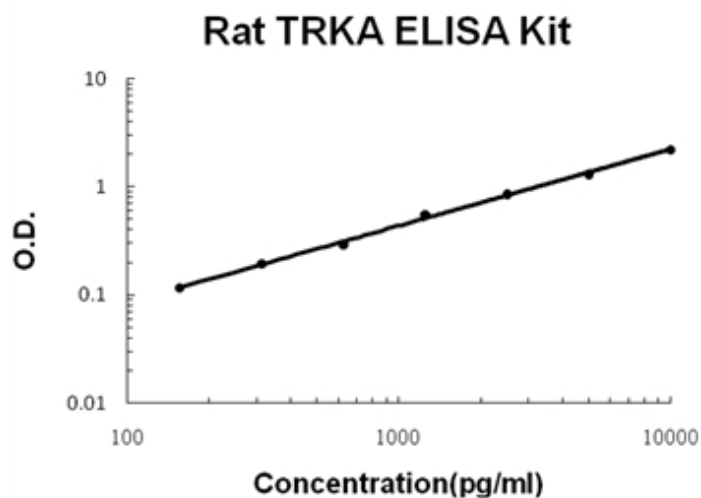
Typical Data Obtained from Rat TrkA

(TMB reaction incubate at 37°C for 25 min)

Concentration(pg/ml)	0	156	312	625	1250	2500	5000	10,000
O.D	0.039	0.116	0.193	0.292	0.554	0.857	1.311	2.209

Typical Rat TrkA ELISA Kit Standard Curve

This standard curve was generated at Boster for demonstration purpose only. A standard curve must be run with each assay.



Range	156pg/ml-10,000pg/ml
Sensitivity	< 10pg/ml
Specificity	Natural and recombinant rat TrkA
Cross-reactivity	No detectable cross-reactivity with other relevant proteins

Storage

Store at 4°C for 6 months, at -20°C for 12 months. Avoid multiple freeze-thaw cycles (Shipped with wet ice.)

Principle

This rat TrkA ELISA Kit was based on standard sandwich enzyme-linked immune-sorbent assay technology. A monoclonal antibody from mouse specific for TrkA has been precoated onto 96-well plates. Standards and test samples are added to the wells, a biotinylated detection polyclonal antibody from goat specific for TrkA is added subsequently and then followed by washing with PBS or TBS buffer. Avidin-Biotin-Peroxidase Complex was added and unbound conjugates were washed away with PBS or TBS buffer. HRP substrate TMB was used to visualize HRP enzymatic reaction. TMB was catalyzed by HRP to produce a blue color product that changed into yellow after adding acidic stop solution. The density of yellow is proportional to the rat TrkA amount of sample captured in plate.

Kit Components

Catalog number	Description	Quantity
-	96-well plate precoated with anti- rat TrkA antibody	1
ST0000-10	Lyophilized recombinant rat TrkA standard	10ng/tube×2
AR1107	Biotinylated anti- rat TrkA antibody	130µl (dilution 1:100)
AR1103	Avidin-Biotin-Peroxidase Complex (ABC)	130µl (dilution 1:100)
AR1106-1	Sample diluent buffer	30 ml
AR1106-2	Antibody diluent buffer	12ml
AR1106-3	ABC diluent buffer	12ml
AR1104	TMB color developing agent	10ml
AR1105	TMB stop solution	10ml

Material Required But Not Provided

1. Microplate reader in standard size.
2. Automated plate washer.
3. Adjustable pipettes and pipette tips. Multichannel pipettes are recommended in the condition of large amount of samples in the detection.
4. Clean tubes and Eppendorf tubes.
5. Washing buffer (neutral PBS or TBS).

ØPreparation of 0.01M **TBS**: Add 1.2g Tris, 8.5g NaCl; 7 450µl of purified acetic acid or 700µl of concentrated hydrochloric acid to 1000ml H₂O and adjust pH to 7.2-7.6. Finally, adjust the total volume to 1L.

ØPreparation of 0.01 M **PBS**: Add 8.5g sodium chloride, 1.4g Na₂HPO₄ and 0.2g NaH₂PO₄ to 1000ml distilled water and adjust pH to 7.2-7.6. Finally, adjust the total volume to 1L.

Notice for Application of Kit

1. To inspect the validity of experiment operation and the appropriateness of sample dilution proportion, pilot experiment using standards and a small number of samples is recommended.
2. The TMB Color Developing agent is colorless and transparent before using, contact us freely if it is not the case.
3. Before using the Kit, spin tubes and bring down all components to the bottom of tubes.
4. Duplicate well assay is recommended for both standard and sample testing.
5. Don't let 96-well plate dry, for dry plate will inactivate active components on plate.
6. Don't reuse tips and tubes to avoid cross contamination.
7. To avoid to use the reagents from different batches together.
8. In order to avoid marginal effect of plate incubation due to temperature difference (reaction may be stronger in the marginal wells), it is suggested that the diluted ABC and TMB solution will be pre-warmed in 37°C for 30 min before using.

Preparation

1. Sample Preparation and Storage

Store samples to be assayed within 24 hours at 2-8°C. For long-term storage, aliquot and freeze samples at -20°C. Avoid repeated freeze-thaw cycles.

- Ø **Cell culture supernates:** Remove particulates by centrifugation, assay immediately or aliquot and store samples at -20°C.
- Ø **Tissue Homogenates:** Rinse tissue with PBS to remove excess blood, chopped into 1-2 mm pieces, and homogenize with a tissue homogenizer in PBS or in lysate solution (Mammal Tissue Protein Extraction Reagent, Catalog# AR0101), lysate solution: tissue net weight = 10ml:1g (i.e. Add 10ml lysate solution to 1g tissue). Centrifuge at approximately 5000 X g for 5 min. Assay immediately or aliquot and store homogenates at -20°C. Avoid repeated freeze-thaw cycles.
- Ø **Cell Lysates:** Collect cells and rinse cells with PBS. Homogenize and lyse cells thoroughly in lysate solution (Cell Protein Extraction Reagent, Catalog# AR0103). Centrifuge cell lysates at approximately 10000 X g for 5 min to remove debris. Aliquots of the cell lysates were removed and assayed.

2. Sample Dilution Guideline

The user needs to estimate the concentration of the target protein in the sample and select a proper dilution factor so that the diluted target protein concentration falls near the middle of the linear regime in the standard curve. Dilute the sample using the provided diluent buffer. The following is a guideline for sample dilution. Several trials may be necessary in practice. **The sample must be well mixed with the diluents buffer.**

- Ø **High target protein concentration (100-1000ng/ml).** The working dilution is 1:100. i.e. Add 1µl sample into 99 µl sample diluent buffer.
- Ø **Medium target protein concentration (10-100ng/ml).** The working dilution is 1:10. i.e. Add 10µl sample into 90 µl sample diluent buffer.
- Ø **Low target protein concentration (156-10,000pg/ml).** The working dilution is 1:2. i.e. Add 50µl sample to 50 µl sample diluent buffer.
- Ø **Very Low target protein concentration (\leq 156pg/ml).** No dilution necessary, or the working dilution is 1:2.

3. Reagent Preparation and Storage

A. Reconstitution of the rat TrkA standard : TrkA standard solution should be prepared no more than 2 hours prior to the experiment. Two tubes of TrkA standard (10ng per tube) are included in each kit. Use one tube for each experiment.

- a. 10,000pg/ml of rat TrkA standard solution: Add 1ml sample diluent buffer into one tube, keep the tube at room temperature for 10 min and mix thoroughly.
- b. 5000pg/ml \rightarrow 156pg/ml of rat TrkA standard solutions: Label 6 Eppendorf tubes with 5000pg/ml, 2500pg/ml, 1250pg/ml, 625pg/ml, 312pg/ml, 156pg/ml respectively. Aliquot 0.3ml of the sample diluent buffer into each tube. Add 0.3ml of the above 10,000pg/ml TrkA standard solution into 1st tube and mix. Transfer 0.3ml from 1st tube to 2nd tube and mix. Transfer 0.3ml from 2nd tube to 3rd tube and mix, and so on.

Note: The standard solutions are best used within 2 hours. The 10ng/ml standard solution should be stored at 4°C for up to 12 hours, or at -20°C for up to 48 hours. Avoid repeated freeze-thaw cycles.

B. Preparation of biotinylated anti-rat TrkA antibody working solution: The solution should be prepared no more than 2 hours prior to the experiment.

- a. The total volume should be: 0.1ml/well x (the number of wells). (Allowing 0.1-0.2 ml more than total volume)
- b. Biotinylated anti-rat TrkA antibody should be diluted in 1:100 with the antibody diluent buffer and mixed thoroughly. (i.e. Add 1µl Biotinylated anti-rat TrkA antibody to 99µl antibody diluent buffer.)

- C. Preparation of Avidin-Biotin-Peroxidase Complex (ABC) working solution: The solution should be prepared no more than 1 hour prior to the experiment.
- The total volume should be: 0.1ml/well x (the number of wells). (Allowing 0.1-0.2 ml more than total volume)
 - Avidin- Biotin-Peroxidase Complex (ABC) should be diluted in 1:100 with the ABC dilution buffer and mixed thoroughly. (i.e. Add 1 μ l ABC to 99 μ l ABC diluent buffer.)

Assay Procedure

The ABC working solution and TMB color developing agent must be kept warm at 37°C for 30 min before use. When diluting samples and reagents, they must be mixed completely and evenly. Standard TrkA detection curve should be prepared for each experiment. The user will decide sample dilution fold by crude estimation of TrkA amount in samples.

- Aliquot 0.1ml per well of the 10,000pg/ml, 5000pg/ml, 2500pg/ml, 1250pg/ml, 625pg/ml, 312pg/ml, 156pg/ml rat TrkA standard solutions into the precoated 96-well plate. Add 0.1ml of the sample diluent buffer into the control well (Zero well). Add 0.1ml of each properly diluted sample of rat cell culture supernates, cell lysates or tissue lysates to each empty well. **See "Sample Dilution Guideline" above for details.** It is recommended that each rat TrkA standard solution and each sample be measured in duplicate.
- Seal the plate with the cover and incubate at 37°C for 90 min.
- Remove the cover, discard plate content, and blot the plate onto paper towels or other absorbent material. Do NOT let the wells completely dry at any time.
- Add 0.1ml of biotinylated anti-rat TrkA antibody working solution into each well and incubate the plate at 37°C for 60 min.
- Wash plate 3 times with 0.01M TBS or 0.01M PBS, and each time let washing buffer stay in the wells for 1 min. Discard the washing buffer and blot the plate onto paper towels or other absorbent material.
(Plate Washing Method: Discard the solution in the plate without touching the side walls. Blot the plate onto paper towels or other absorbent material. Soak each well with at least 0.3 ml PBS or TBS buffer for 1~2 minutes. Repeat this process two additional times for a total of THREE washes. Note: For automated washing, aspirate all wells and wash THREE times with PBS or TBS buffer, overfilling wells with PBS or TBS buffer. Blot the plate onto paper towels or other absorbent material.)
- Add 0.1ml of prepared ABC working solution into each well and incubate the plate at 37°C for 30 min.
- Wash plate 5 times with 0.01M TBS or 0.01M PBS, and each time let washing buffer stay in the wells for 1-2 min. Discard the washing buffer and blot the plate onto paper towels or other absorbent material. (See Step 5 for plate washing method).
- Add 90 μ l of prepared TMB color developing agent into each well and incubate plate at 37°C in dark for 25-30 min (**Note:** For reference only, the optimal incubation time should be determined by end user. And the shades of blue can be seen in the wells with the four most concentrated rat TrkA standard solutions; the other wells show no obvious color).
- Add 0.1ml of prepared TMB stop solution into each well. The color changes into yellow immediately.
- Read the O.D. absorbance at 450nm in a microplate reader within 30 min after adding the stop solution.

For calculation, (the relative O.D.₄₅₀) = (the O.D.₄₅₀ of each well) - (the O.D.₄₅₀ of Zero well). The standard curve can be plotted as the relative O.D.₄₅₀ of each standard solution (Y) vs. the respective concentration of the standard solution (X). The rat TrkA concentration of the samples can be interpolated from the standard curve.

Note: if the samples measured were diluted, multiply the dilution factor to the concentrations from interpolation to obtain the concentration before dilution.

Summary

1. Add samples and standards and incubate the plate at 37°C for 90 min. Do not wash.
2. Add biotinylated antibodies and incubate the plate at 37°C for 60 min. Wash plate 3 times with 0.01M TBS.
3. Add ABC working solution and incubate the plate at 37°C for 30 min. Wash plate 5 times with 0.01M TBS.
4. Add TMB color developing agent and incubate the plate at 37°C in dark for 25-30 min.
5. Add TMB stop solution and read.

Background

Tropomyosin receptor kinase A (TrkA) are efficacious in attenuating skeletal pain.¹ TrkA mutants were able to activate signaling cascades and were even more efficient in promoting neurite outgrowth than the wild-type receptor.² TrkA is part of a sub-family of protein kinases which includes TrkB and TrkC. Also, there are other neurotrophic factors structurally related to NGF: BDNF (for Brain-Derived Neurotrophic Factor), NT-3 (for Neurotrophin-3) and NT-4 (for Neurotrophin-4). While TrkA mediates the effects of NGF, TrkB is bound and activated by BDNF, NT-4, and NT-3. Further, TrkC binds and is activated by NT-3.³ TrkA receptor was found in keratoconus-affected corneas, along with an increased level of repressor isoform of Sp3 transcription factor.⁴ The standard product used in this kit is extracellular part (A33-P418) of recombinant rat TRKA, consisting of 386 amino acids with the molecular weight of 69KDa.

Reference

1. Castañeda-Corral G, Jimenez-Andrade JM, Bloom AP, Taylor RN, Mantyh WG, Kaczmarek MJ, Ghilardi JR, Mantyh PW. *Neuroscience*. 2011 Mar 31;178:196-207. Epub 2011 Jan 26.
2. Georgieva MV, de Pablo Y, Sanchis D, Comella JX, Llovera M. *J Neurochem*. 2011 Feb 19.
3. Benito-Gutiérrez E, Garcia-Fernández J, Comella JX (February 2006). "Origin and evolution of the Trk family of neurotrophic receptors". *Mol. Cell. Neurosci*. 31 (2): 179-92.
4. Lambiase A, Merlo D, Mollinari C, Bonini P, Rinaldi AM, D' Amato M, Micera A, Coassin M, Rama P, Bonini S, Garaci E (November 2005). "Molecular basis for keratoconus: lack of TrkA expression and its transcriptional repression by Sp3". *Proc. Natl. Acad. Sci. U.S.A.* 102 (46): 16795-800.