

Nori® Rat TNFRI ELISA Kit DataSheet

Tumor necrosis factor receptor 1 (TNFR1), also known as tumor necrosis factor receptor superfamily member 1A (TNFRSF1A) and CD120a, is a ubiquitous membrane receptor that binds tumor necrosis factor- α (TNF α).^[1] The protein is a member of the tumor necrosis factor receptor superfamily, which also contains TNFRSF1B. TNFR1 is one of the major receptors for the tumor necrosis factor- α . This receptor can activate the transcription factor NF- κ B, mediate apoptosis, and function as a regulator of inflammation. Antiapoptotic protein BCL2-associated athanogene 4 (BAG4/SODD) and adaptor proteins TRADD and TRAF2 have been shown to interact with this receptor, and thus play regulatory roles in the signal transduction mediated by the receptor.^[2] Germline mutations of the extracellular domains of this receptor were found to be associated with the human genetic disorder called tumor necrosis factor associated periodic syndrome (TRAPS) or periodic fever syndrome.^[3] Impaired receptor clearance is thought to be a mechanism of the disease. Mutations in the TNFRSF1A gene is associated with elevated risk of multiple sclerosis. Serum levels of TNFRSF1A are elevated in schizophrenia and bipolar disorder,^[4] and high levels are associated with more severe psychotic symptoms.^[5] High serum levels is also associated with cognitive impairment and dementia.^{[6][7]} TNFR1 is an ATPase regulated by silencer of death domain.^[8]

References

1. Schall TJ, et al. (1990). *Cell*. 61 (2): 361–70.
2. Hsu H, et al. (1996). *Cell*. 84 (2): 299–308.
3. Kümpefel T, Hohlfeld R (2009). *Nat Rev Neurol*. 5 (10): 528–9. doi:10.1038/nrneurol.2009.154.
4. Hope S, et al. (2009). *Bipolar Disord*. 11 (7): 726–34.
5. Hope S, et al. (2013). *Schizophr. Res*. 145 (1-3): 36–42.
6. Buchhave P, et al. (2010). *Neurobiol. Aging*. 31 (11): 1877–84.
7. Diniz BS, et al. (2010). *J. Alzheimers Dis*. 22 (4): 1305–11.
8. Miki K, Eddy EM (2002). *Mol. Cell. Biol*. 22 (8): 2536–43.

PRINCIPLE OF THE ASSAY

This kit is for quantification of total TNFRI. This is a shorter ELISA assay that reduces time to 50% compared to the conventional method, and the entire assay only takes 3 hours. This assay employs the quantitative sandwich enzyme immunoassay technique and uses biotin-streptavidin chemistry to improve the performance and the sensitivity of the assays. An antibody specific for Rat TNFRI has been pre-coated onto a microplate. Standards and samples are pipetted into the wells and any TNFRI present is bound by the immobilized antibody. After washing away any unbound substances, a detection antibody specific for Rat TNFRI is added to the wells. Following wash to remove any unbound antibody reagent, a detection reagent is added. After intensive wash a substrate solution is added to the wells and color develops in proportion to the amount of TNFRI bound in the initial step. The color development is stopped, and the intensity of the color is measured.

This package insert must be read in its entirety before using this product.

Storage Store at 4°C. The kit can be used in 3 months.



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MATERIALS PROVIDED

Description	Quantity	Description	Quantity	Description	Quantity
Antibody Precoated Plate	1	20 x PBS	1	Substrate Solution	1
Detection Antibody	1	20 x Assay Buffer	1	Stop Solution	1
HRP Conjugate	1	Reagent Diluent	1	DataSheet/Manual	1
Standard	3	MSDS/CoA	1	96-well plate sheet	2

Bring all reagents to room temperature before use.

Reagent Preparations

Rat TNFRI Detection Antibody (1 vial) – The lyophilized Detection Antibody should be stored at 4°C or -20°C in a manual defrost freezer for up to 6 months, if not used immediately. Centrifuge for 1 min at 6000 x g to bring down the material prior to open the vial. The vial contains sufficient Detection Antibody for a 96-well plate. Add 200 µL of sterile 1 x PBS to the antibody vial and vortex for 20 sec and allow it to sit for 5 min prior to open the vial. If the entire 96-well plate is used, take 200 µL of detection antibody to 10.5 mL of Reagent Diluent to make **working dilution of Detection Antibody** and mix thoroughly prior to the assay. If the partial antibody is used store the rest at -20°C until use.

Rat TNFRI Standard (3 vials) – The lyophilized Rat TNFRI Standard has 3 vials. Each vial contains the standard sufficient for generating a standard curve. The non-reconstituted standard can be stored at 4°C or -20°C for up to 3 months if not used immediately. Centrifuge for 1 min at 6000 x g to bring down the material prior to open the vial. Add 500 µL of 1 x Assay Buffer to one Standard vial to make the high standard concentration of 800 pg/ml. Vortex for 20 sec and allow it to sit for 5 min prior to use. A seven-point standard curve is generated using 2-fold serial dilutions in 1 x Assay Buffer, each in duplicate, vortex for 20 sec for each of dilution steps.

HRP Conjugate (53 µL) – Centrifuge for 1 min at 6000 x g to bring down the material prior to open the vial. The vial contains sufficient HRP Conjugate for one 96-well plate. If the volume is less than 53 µL, add sterile 1 x PBS to a final volume of 53 µL and vortex briefly. Make 1:200 dilutions in Reagent Diluent. If the entire 96-well plate is used, add 53 µL of HRP Conjugate to 10.5 mL of Reagent Diluent prior to the assay. The rest of undiluted HRP Conjugate can be stored at 4°C for up to 6 months. **DO NOT FREEZE.**

20 x PBS, pH 7.3, 30 mL- Dilute to 1 x PBS with deionized distilled water and mix well prior to use.

20 x Assay Buffer, 20 mL- Dilute to 1 x Assay Buffer with 1 x PBS prior to use.

Reagent Diluent, 21 mL.

Substrate Solution, 10.5 mL.

Stop Solution, 5.5 mL.



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Assay Procedure

1. Lift the plate cover from the top left and cover the wells that are not used. Vortex briefly the samples prior to the assay. Add 100 μ L of **diluted sample** (see below) or **standard** per well and use duplicate wells for each standard or sample. Cover the 96-well plate and incubate 1 hour at room temperature.
2. Aspirate each well and wash with **1 x Assay Buffer**, repeating the process one time for a total of two washes. Wash by filling each well with 1 x Assay Buffer (300 μ L) using a multi-channel pipette, manifold dispenser or auto-washer. Complete removal of liquid at each step is essential for good performance. After the last wash, remove any remaining Assay Buffer by aspirating or by inverting the plate and blotting it against clean paper towels.
3. Add 100 μ L of the **working dilution of Detection Antibody** to each well. Cover the plate and incubate 1 hour at room temperature.
4. Repeat the aspiration/wash as in step 2.
5. Add 100 μ L of the **working dilution of HRP Conjugate** to each well. Cover the plate and incubate for 20 minutes at room temperature. Avoid placing the plate in direct light.
6. Repeat the aspiration/wash as in step 2.
7. Add 100 μ L of **Substrate Solution** to each well. Incubate for 5-20 minutes (**depending on signal**) at room temperature. Avoid placing the plate in direct light.
8. Add 50 μ L of **Stop Solution** to each well. Gently tap the plate to ensure thorough mixing.
9. Determine the optical density of each well immediately, using a microplate reader set to 450 nm. If wavelength correction is available, set to 540 nm or 570 nm. If wavelength correction is not available, subtract readings at 540 nm or 570 nm from the readings at 450 nm. This subtraction will correct for optical imperfections in the plate. Readings made directly at 450 nm without correction may be higher and less accurate.

Sample dilution: Samples should be diluted with four volumes of 1 x Assay Buffer and **vortex for 1 min** prior to assay. If the OD value still exceeds the upper limit of the standard curve, further dilution is recommended till it falls in the detection range and the dilution factor must be used for calculation of the concentration.

Precaution and Technical Notes

1. It is critical to follow the procedure step by step otherwise appropriate color development may not occur as expected.
2. A standard curve should be generated for each set of samples assayed. Thorough mixing of standards at each of dilution steps is critical to acquire a normal standard curve and **vortex again (10 sec) before pipetting to the 96-well plate**.
3. HRP Conjugate contains enzyme, DO NOT mass up with Detection Antibody.
4. The Stop Solution is an acid solution, handle with caution.
5. This kit should not be used beyond the expiration date on the label.
6. A thorough and consistent wash technique is essential for proper assay performance.
7. Use a fresh reagent reservoir and pipette tips for each step.
8. It is recommended that all standards and samples be assayed in duplicate.
9. Avoid microbial contamination of reagents and buffers. This may interfere with the sensitivity of the assay.

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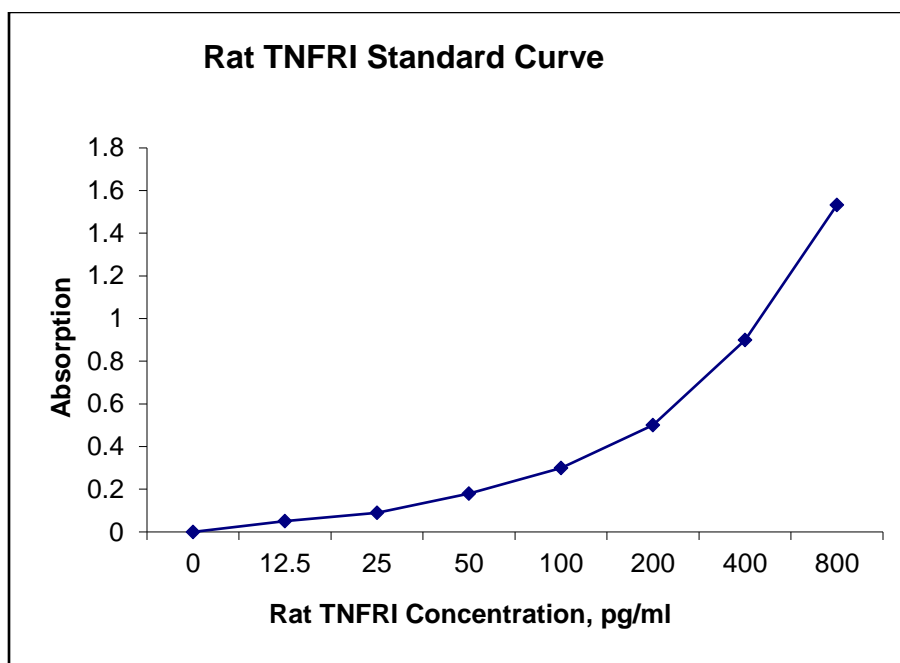
Calculation of Results

Average the duplicate readings for each standard, control, and sample and subtract the average zero (blank) standard optical density.

Create a standard curve by reducing the data using computer software capable of generating a four-parameter logistic (4-PL) curve-fit. As an alternative, construct a standard curve by plotting the mean absorbance for each standard on the y-axis against the concentration on the x-axis and draw a best fit curve through the points on the graph. The data may be linearized by plotting the log of the TNFRI concentrations versus the log of the O.D. and the best fit line can be determined by regression analysis. This procedure will produce an adequate but less precise fit of the data. If samples have been diluted, the concentration read from the standard curve must be multiplied by the dilution factor.

The Standard Curve

The graph below represents typical data generated when using this Rat TNFRI ELISA Kit. The standard curve was calculated using a computer generated 4-PL curve-fit. For this case, a Bio-Rad iMark™ Microplate Reader and a Microplate Manager 6 Software were used to generate this curve. The correlation coefficient (r^2) is 0.999-1.000.





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Specificity

The following recombinant Rat proteins prepared at 10 ng/ml were tested and exhibited no cross-reactivity or interference.

ApoAI, BMP1, BMP2, BMP3, BMP4, HGF, HSP27, IFN γ , IL-1 β , IL-1RA, IL-2, IL-5, IL-6, IL-8, IL-10, IL-12, IL-13, IL-15, IL-17C, IL-23, MMP-2, MMP-9, sIL-2R, sIL-6R, TGF β 1, TGF β 2, TGF β 3, TLR1, TLR2, TLR3, TNF- α , TNF RI, TNF RII, VEGF.

Calibration

This kit is calibrated against a highly-purified CHO cell-expressed recombinant Rat TNFRI.

Detection Range

12-800 pg/ml

Assay Sensitivity

2 pg/ml

Assay Precision

Intra-Assay %CV: 4; Inter-Assay %CV: 9

Sample types: plasma, serum, cell/tissue lysates, cell culture supernatant, synovial fluid (SF), bronchoalveolar lavage (BAF), cerebrospinal fluid (CSF), urine, other biological fluid.

For Research Use Only

Related products

20 x Sample Diluent, GR103058

20 x PBS, Cat. GR103004-20

20 x ELISA Assay Buffer, Cat. GR103028

10 x ELISA Reagent Diluent, Cat. GR103055

Universal Blocking Buffer, Cat. GR103005

2 x Recombinant Protein Stabilizer, Cat. GR03014-2

5 x Recombinant Protein Stabilizer, Cat. GR103014-5

ELISA G-Blue Substrate Solution, Cat. GR103021

Rat TNFRI Standard

Rat TNFRI detection antibody

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Troubleshooting Guide

Problem	Possible causes	Solution
Poor standard curve	<ul style="list-style-type: none"> Inaccurate pipetting Improper standard curve OD₄₅₀ too high for the high standard point 	<ul style="list-style-type: none"> Check pipettes Check and use the correct dilution buffer Vortex 30 sec for each of standard dilution steps and vortex again (10 sec) before pipetting to the 96-well plate. Reduce substrate incubation time
Low signal	<ul style="list-style-type: none"> Improper preparation of standard, samples, detection antibody, and/or HRP Conjugate Too brief incubation times Inadequate reagent volume or improper dilution 	<ul style="list-style-type: none"> Briefly spin down vials before opening. Reconstitute the powder thoroughly. Ensure sufficient incubation time including substrate incubation. Check pipettes and ensure correct preparation.
96-well Large CV	<ul style="list-style-type: none"> Inaccurate pipetting and mixing Improper standard/sample dilutions. Air bubbles in wells. 	<ul style="list-style-type: none"> Check pipettes and ensure thorough mixing. Use the correct dilution buffers Remove bubbles in wells.
High background	<ul style="list-style-type: none"> Plate is insufficiently washed. Contaminated wash buffer 	<ul style="list-style-type: none"> Review the datasheet for proper wash. If using a plate washer, ensure that all ports are unobstructed. Make fresh wash buffer
No signal detected	<ul style="list-style-type: none"> The procedure was misconducted. 	<ul style="list-style-type: none"> Ensure the step-by-step protocol was correctly followed and no misstep was conducted.
Low sensitivity	<ul style="list-style-type: none"> Improper storage of the ELISA kit Stop solution 	<ul style="list-style-type: none"> Store standards and detection antibody at -20°C after reconstitution, others at 4°C. Keep substrate protected from light. Adding stop solution to each well before reading plate