TECHNICAL MANUAL

Rat NSE (Neuron Specific Enolase) ELISA Kit

- **SKU CODE:** AEES00310
- **SIZE:** 24T/48T/96T
- **DETECTION PRINCIPLE:** Sandwich
- **RUO:** Research-Use-Only

Revised: 01/2026

Rat NSE (Neuron Specific Enolase) ELISA Kit

Please read entire manual carefully before starting experiment. DO NOT mix reagents and use reagents from different kits or batches to prevent assay failure.

Table of Contents

1. Key Features

Detection Method:

Sandwich

Sample Type:

Serum, Plasma and Other Biological Fluids

Reactivity:

Rat

Range:

0.31-20 ng/mL

Sensitivity:

0.19 ng/mL

2. Storage & Expiry

Assay Genie ELISA Kits are shipped on ice packs. Please store this ELISA Kit and/or components as described in section 4. Date of expiration is on the ELISA Box label.

3. Product Description

The Assay Genie Rat NSE (Neuron Specific Enolase) ELISA Kit is a highly sensitive assay for the quantitative measurement of Rat NSE in the following samples: Serum, Plasma and Other Biological Fluids.

This kit utilizes a sandwich enzyme-linked immunosorbent assay (ELISA) format. An antibody specific to the target protein is pre-coated onto the wells of a 96-well microplate. Samples and standards are added to the wells, allowing the target to bind to the immobilized antibody. After incubation, a biotinylated detection antibody is then added, which binds specifically to the captured target. Following a wash step to remove excess detection antibody, HRP-conjugated Streptavidin is introduced, forming a biotin-streptavidin-HRP complex. After a second washing step, Substrate Reagent is added to initiate a colorimetric reaction catalyzed by HRP. The reaction produces a blue product that turns yellow upon addition of the acidic Stop Solution.

The optical density (OD) is measured at 450 nm using a microplate reader. The OD450 value is directly proportional to the concentration of the target analyte in the sample, which can be determined by referencing a standard curve.

This dual function kit includes validated Bradford Reagent to quantify total protein concentration for accurate sample normalization.

4. Kit Contents

No	Component Name	Specifications	Storage
1	Micro ELISA Plate (Dismountable)	96T: 8 wells ×12 strips | 48T: 8 wells ×6 strips | 24T: 8 wells ×3 strips | 96T*5: 5 plates, 96T	-20°C, 12 months
2	Reference Standard	96T: 2 vials | 48T/24T: 1 vial | 96T*5: 10 vials	-20°C, 12 months
3	Concentrated Biotinylated Detection Ab(100×)	96T: 1 vial, 120 µL | 48T/24T: 1 vial, 60 µL | 96T*5: 5 vials, 120 µL	-20°C, 12 months
4	Concentrated HRP Conjugate (100×)	96T: 1 vial, 120 µL | 48T/24T: 1 vial, 60 µL | 96T*5: 5 vials, 120 µL	-20°C (Protect from light), 12 months
5	Reference Standard & Sample Diluent	96T/48T/24T: 1 vial, 20 mL | 96T*5: 5 vials, 20 mL	2–8°C, 12 months
6	Biotinylated Detection Ab Diluent	96T/48T/24T: 1 vial, 14 mL | 96T*5: 5 vials, 14 mL	2–8°C, 12 months
7	HRP Conjugate Diluent	96T/48T/24T: 1 vial, 14 mL | 96T*5: 5 vials, 14 mL	2–8°C, 12 months
8	Concentrated Wash Buffer(25×)	96T/48T/24T: 1 vial, 30 mL | 96T*5: 5 vials, 30 mL	2–8°C, 12 months
9	Substrate Reagent	96T/48T/24T: 1 vial, 10 mL | 96T*5: 5 vials, 10 mL	2–8°C (Protect from light)
10	Stop Solution	96T/48T/24T: 1 vial, 10 mL | 96T*5: 5 vials, 10 mL	2–8°C
11	Plate Sealer	96T/48T/24T: 5 pieces | 96T*5: 25 pieces	2–8°C
12	Technical Manual	1 copy	-
13	Certificate of Analysis	1 copy	-
14	Bradford Reagent	96T: 1 vial | 48T: 1 vial	4°C

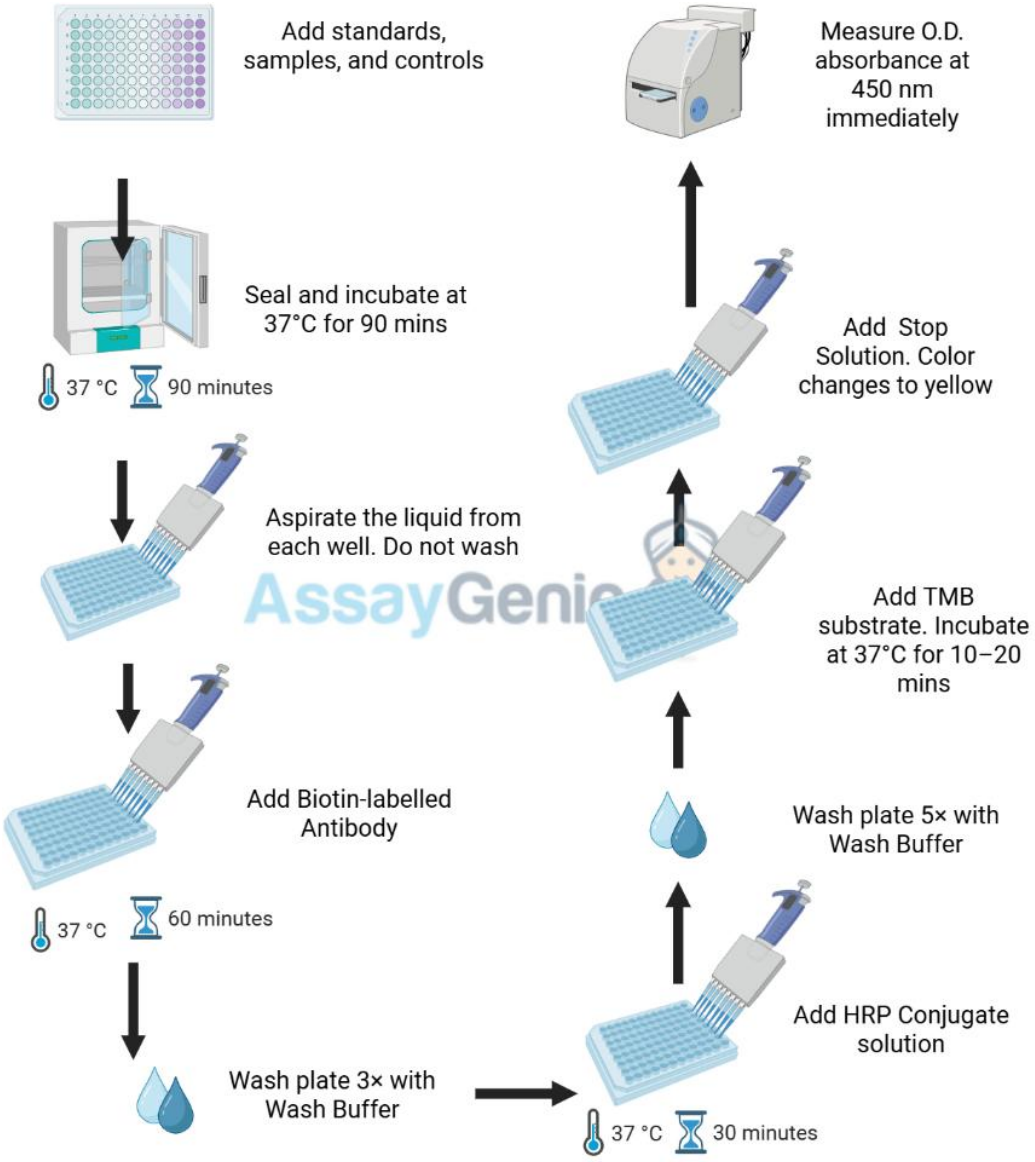
Additional materials required:

1. 37°C incubator.
2. Plate Reader with 450nm filter.
3. Precision pipettes and disposable pipette tips.
4. Distilled water.
5. Disposable tubes for sample dilution.
6. Absorbent paper.

5. Precautions

1. This kit is for research purposes only and not for diagnostics or therapeutic uses.
2. Store all components as listed in this manual. Do not use the ELISA Kit after its expiration date.
3. Allow all reagents and samples to reach room temperature before use.
4. Ensure unopened and unused plates are kept dry to avoid contamination.
5. Before using the kit, centrifuge tubes to spin down standard and/or antibody.
6. Prepare all reagents, samples and standards as directed in this manual.
7. Duplicate wells are recommended for both standard and sample testing.
8. Do not let the microplate wells dry during the assay.
9. Maintain consistent incubation times and temperatures as variations can affect results.
10. Do not reuse tips and tubes to avoid cross contamination.
11. Avoid using the reagents from different batches together.

6. Assay Summary



7. Sample Preparation

The procedures outlined in this document are provided as general recommendations for sample preparation in ELISA assays. Due to the variability of biological samples and specific assay requirements, users are advised to optimize protocols based on their own experimental conditions.

***Note**: For information regarding validation data in specific samples, please contact our Technical Support Team at techsupport@assaygenie.com.*

General Considerations

To prevent denaturation or degradation of target proteins, it is recommended to process samples promptly and store them under appropriate conditions.

- **Storage Conditions**:
    - **Short-term**: 2-8 °C for up to 5 days.
    - **Medium-term**: -20 °C for up to 6 months.
    - **Long-term**: -80 °C or cryopreservation in liquid nitrogen.
- **Thawing Protocol**: Frozen samples should be thawed rapidly in a 15-25 °C water bath to minimize ice crystal-induced damage. Thawed samples can be analyzed immediately or stored temporarily at 2-8 °C.
- **Freeze-Thaw Cycles**: Repeated freeze-thaw cycles should be strictly avoided due to their detrimental effect on protein stability.

A. Blood-Derived Samples

- **Serum:** Allow whole blood to coagulate at room temperature (2 h) or 2-8 °C overnight. Centrifuge at 1000 × g for 20 min and collect the supernatant. Store or use immediately.
- **Plasma:** Collect in anticoagulant tubes (EDTA, citrate, or heparin), mix gently, and centrifuge within 30 min at 1000 × g, 2-8 °C for 15 min. Store or assay as needed.

B. Tissue Homogenates

Tissue samples should be homogenized prior to use. Avoid buffers containing NP-40, Triton X-100, or DTT, as these strongly inhibit the assay. We recommend using 50 mM Tris + 0.9% NaCl + 0.1% SDS, pH 7.3.

The recommended protocol is as follows:

- **Sample Collection and Washing**
  - Place the target tissue on ice.
  - Rinse the tissue with pre-cooled PBS buffer (0.01 M, pH 7.4) to remove residual blood.
  - Weigh the tissue for further processing.
- **Homogenization**
  - Homogenize the tissue on ice using an appropriate lysis buffer.
  - The lysate volume should correspond to the tissue weight; typically, 9 mL PBS is used per 1 g of tissue. It is recommended to add protease inhibitors to the PBS (e.g., 1 mM PMSF). ***Note:*** *PBS buffer or mild RIPA lysis buffer can be used for homogenization. When using RIPA, adjust pH to 7.3.*
- **Cell Disruption**
  - Further disrupt the tissue using ultrasonic homogenization or freeze–thaw cycles.
    - Ultrasonic homogenization: Keep samples on an ice bath during sonication to avoid overheating.
    - Freeze–thaw cycles*:* Repeat twice for effective lysis.
- **Centrifugation and Storage**
  - Centrifuge the homogenate at 5000 × g for 5 minutes.
  - Collect the supernatant for immediate analysis, or aliquot and store at –20°C or –80°C for future assays.
- **Protein Concentration Measurement**
  - Determine total protein concentration using the Bradford Reagent included in this kit.

- For ELISA assays, the total protein concentration should generally be 1–3 mg/mL.
- Tissues with high endogenous peroxidase levels (e.g., liver, kidney, pancreas) may react with TMB substrate, causing false positives. If this occurs, treat samples with 1% H_2O_2 for 15 minutes before repeating the assay.

Note: *Liver, kidney, and pancreas samples often contain high levels of endogenous peroxidase, which may react with the chromogenic substrate at elevated sample concentrations, potentially resulting in false positive signals.*

If analysis of these tissues is required, a gradient dilution assay is recommended. A proportional decrease in signal with increasing dilution typically indicates minimal interference and supports the accuracy of the results.

To further minimise potential interference, samples can be pre-treated with 1% hydrogen peroxide (H_2O_2) for 15 minutes prior to testing. To prepare the treatment solution, add 1 µl of pure H_2O_2 to 100 µl of sample (1% v/v).

C. Cell Culture Supernatant

Centrifuge the sample at 2500 rpm for 5 minutes at 2–8°C. Carefully collect the clarified cell culture supernatant for immediate analysis, or aliquot and store it at –80°C for future assays.

D. Cell Lysates

- **Suspension Cell Lysate:** Centrifuge the cell suspension at 2500 rpm for 5 minutes at 2–8°C and collect the cell pellet. Wash the pellet with pre-cooled PBS (0.01 M, pH 7.4) and mix gently. Repeat centrifugation and discard the supernatant. Add 0.5–1 mL of cell lysis buffer containing an appropriate protease inhibitor (e.g., PMSF, final concentration: 1 mM). Lyse the cells on ice for 30–60 minutes or disrupt them using ultrasonic homogenization.

- **Adherent Cell Lysate:** Remove the supernatant and wash the cells three times with pre-cooled PBS. Add 0.5–1 mL of cell lysis buffer supplemented with an appropriate protease inhibitor (e.g., PMSF at a final concentration of 1 mmol/L). Scrape the adherent cells using a cell scraper and transfer the cell suspension to a centrifuge tube. Lyse the cells on ice for 30–60 minutes or disrupt the cells by ultrasonic treatment.

Follow next steps for protein extraction and supernatant collection:

- **Protein Release and DNA Disruption**
  - During lysis, pipette gently or intermittently shake the tube to enhance protein extraction.
  - Mucilaginous material formed during lysis is DNA, which can be broken down by ultrasonic disruption (3–5 mm probe, 150–300 W, 3–5 seconds per cycle, with 30-second intervals for 1–2 minutes total).
- **Supernatant collection**
  - After lysis or ultrasonic treatment, centrifuge the lysate at 10,000 rpm for 10 minutes at 2–8°C. Collect the supernatant for immediate use or aliquot and store at –80°C for future assays.

Notes: *Refer to the "Tissue Sample Notes" for additional buffer and inhibitor recommendations.*

E. Other Sample Types

For more information about how to process other sample types, (e.g., body fluids, breast milk & more), please contact our Tech Support Team at techsupport@assaygenie.com.

7.1. Protein Quantification (Optional)

To quantify total protein levels, use the Bradford Reagent included in this kit. Visit https://www.assaygenie.com/bradford-protein-assay-protocol/ to view the full protocol.

8. Standard and Reagent Preparation

Manual Washing

Discard the solution in the plate without touching the side of the wells. Clap the plate on absorbent filter paper or other absorbent material. Fill each well completely with 350 µl wash buffer and soak for 1 to 2 mins, then aspirate contents from the plate, and clap the plate on absorbent filter paper or other absorbent material. Repeat this procedure for the designated number of washes.

Automated Washing

Aspirate all wells, then wash plate with 350 µl wash buffer. After the final wash, invert plate, and clap the plate on absorbent filter paper or other absorbent material. It is recommended that the washer is set for a soaking time of 1 minute.

Note: *Set the height of the needles; be sure the fluid can be taken up completely.*

Sample Dilution Guidelines

Determine the concentration of the target protein in the test sample and then select the optimal dilution factor to ensure the target protein concentration falls within the optimal detection range of the kit. Dilute the samples with the dilution buffer provided with the kit. Several dilution tests may be required to achieve the optimal results. The test samples must be well mixed with the dilution buffer. Standard and sample dilution should be performed before starting the experiment.

Note: *Dilution may be necessary to minimize matrix effects. However, if the target concentration in the sample is very low, the pre-treated sample can be added directly to the assay without dilution.*

Reagent Preparation

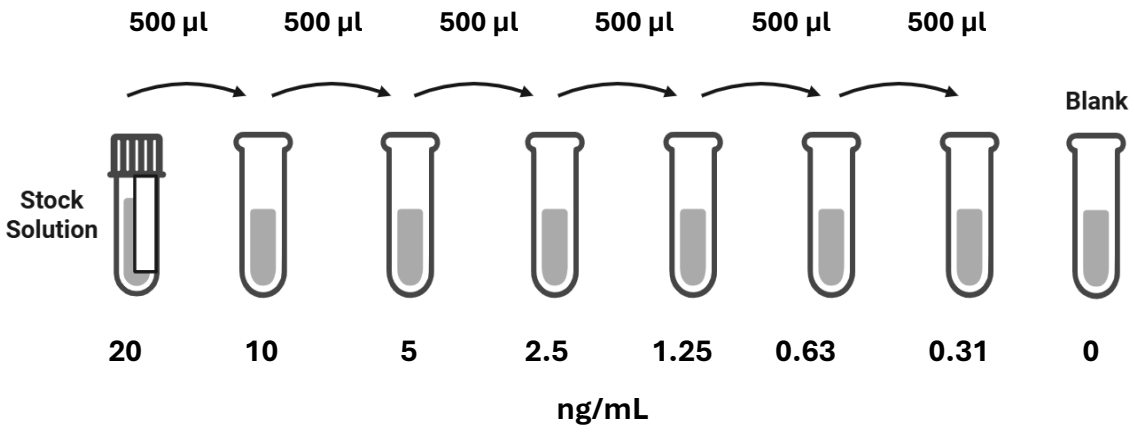
Bring all reagents and samples to room temperature 20 minutes before use (18 - 25°C). For repeated assays, please use only strips and standards required and store remaining reagents at the appropriate temperatures.

A. Wash Buffer:

Dilute 30 mL of Concentrated Wash Buffer with 720 mL of deionized or distilled water to prepare 750 mL of Wash Buffer (recommended resistivity of ultrapure water is 18MΩ). ***Note:*** *If crystals have formed in the concentrate, warm at 40°C in water bath (heating temperature should not exceed 50°C) and mix gently until crystals have completely dissolved. The solution should be cooled to room temperature before use.*

B. Standard Dilution:

1. Centrifuge the standard tube for 1 min at 10,000 x g.
2. Add 1 mL of Reference Standard & Sample Diluent, let it stand for 10 min and invert it gently several times. After it dissolves fully, mix it thoroughly with a pipette. This reconstitution produces a working solution of 20 ng/mL. Then make serial dilutions as needed. The recommended dilution gradient is as follows: 20, 10, 5 2.5, 1.25, 0.63, 0.31 and 0 ng/mL. ***Note:*** *The final tube serves as the blank and should not receive any solution transferred from the preceding tube.*
3. Take 7 Eppendorf tubes add 500 µL of Reference Standard & Sample Diluent to each tube. Pipette 500 µL of the 20 ng/mL working solution to the first tube and mix up to produce a 10 ng/mL working solution. Pipette 500 µL of the solution from the former tube into the latter one according to these steps. The illustration below is for reference.



Note: *The reconstituted standard solution should be aliquoted and stored at −20 ℃. It must be used within 2 weeks, and repeated freeze–thaw cycles should be avoided. Gradient-diluted working standards should be freshly prepared immediately before use.*

C. Preparation of Biotinylated Detection Ab working solution:

The working solution should be prepared before starting the experiment.

1. Calculate the required amount before the experiment (100 µL/well). ***Note:*** *It is advisable to prepare an amount marginally exceeding the calculated requirement.*
2. Centrifuge the Concentrated Biotinylated Detection Ab at 800 x g for 1 min.
3. Dilute the 100x Concentrated Biotinylated Detection Ab to 1x working solution with Biotinylated Detection Ab Diluent. (Concentrated Biotinylated Detection Ab: Biotinylated Detection Ab Diluent= 1: 99)

D. Preparation of HRP Conjugate Working Solution:

The working solution should be prepared before starting the experiment.

1. Calculate the required amount before the experiment (100 µL/well). ***Note:*** *It is advisable to prepare an amount marginally exceeding the calculated requirement*.
2. Centrifuge the Concentrated HRP Conjugate solution at 800 x g for 1 min.
3. Dilute the 100x Concentrated HRP Conjugate to 1x working solution with HRP Conjugate Diluent (Concentrated HRP Conjugate: HRP Conjugate Diluent= 1: 99).

9. Assay Procedure

1. **Plate Setup:** Set standard, test sample and control (zero) wells on the pre-coated plate and record their positions. It is recommended to measure each standard and sample in duplicate. ***Note:*** *Dispense all solutions directly to the bottom of the plate wells, avoiding contact with the well walls. Take care to prevent foaming during the addition of solutions.*
2. **Standard, Samples & Control Loading:** Aliquot 100 µl of µl of standard working solution or samples and controls into the designated wells. **Note:** *Solutions should be added to the bottom of the micro-ELISA plate well, avoid touching the inside wall and causing foaming as much as possible.*
3. **First Incubation**: Seal the plate with a cover and incubate at 37 °C for 90 mins.
4. **Aspirate:** Aspirate the liquid from each well, DO NOT wash.
5. **Biotin-labelled Antibody Addition**: Add 100 µl of Biotin-labelled Antibody working solution to the bottom of each well (standard, test sample & zero wells) without touching the side walls.
6. **Second Incubation**: Seal the plate with a cover and incubate at 37°C for 60 mins.
7. **Washing:** Aspirate or decant the solution from the plate and add 350 µL of wash buffer to each well and incubate for 1-2 minutes at room temperature. Aspirate the solution from each well and clap the plate on absorbent filter paper to dry. Repeat this process 3 times. ***Note:*** *A microplate washer can be used in this step and other wash step.*
8. **HRP Conjugate Working Solution Addition:** Add 100 µL of HRP Conjugate working solution to each well.
9. **Third incubation:** Cover with a plate seal and incubate for 30 min at 37°C.
10. **Wash**: Aspirate or decant the solution from each well. Repeat the wash process five times as conducted in step 7.
11. **Substrate Reagent Addition and Colour Development**: Add 90 µl of Substrate Reagent into each well, cover the plate and incubate at 37°C in dark for 10-20 mins.

(***Note****: This incubation time is for reference only, the optimal time should be determined by the end-user. DO NOT exceed 30 minutes).*

12. **Stop Reaction**: Add 50 µl of Stop solution into each well and mix thoroughly. The colour changes into yellow immediately. ***Note:*** *Stop solution addition should be done in the same order as the substrate solution.*
13. **OD Measurement**: Read the O.D. absorbance at 450 nm in a microplate reader immediately after adding the stop solution.

10. Data Analysis

Average the duplicate readings for each standard, control, and sample, then subtract the mean optical density of the zero standard. Construct a standard curve by plotting Rat NSE concentration on the y-axis against absorbance on the x-axis and fit the data using an appropriate best-fit curve.

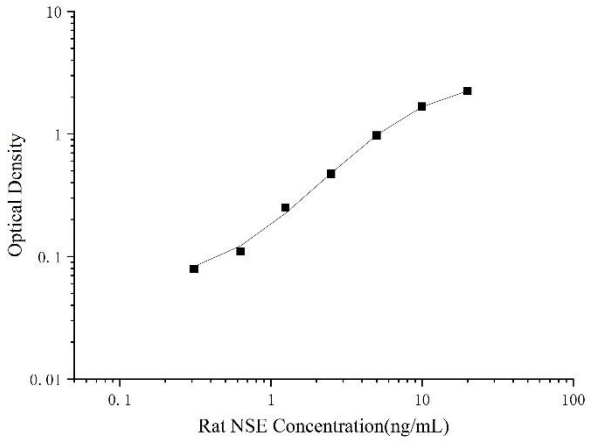
For diluted samples, multiply the concentration obtained from the standard curve by the corresponding dilution factor to determine the final concentration. Data analysis and curve fitting may be performed using suitable plotting software (e.g., Curve Expert).

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

11. Typical Data

Standard Curve

Results of a typical standard run of an ELISA kit are shown below. This standard curve was generated at our lab for demonstration purpose only. Each user should obtain their own standard curve as per experiment.



Precision

Intra-assay Precision (Precision within an assay): 3 samples with low, mid-range and high levels were tested 20 times on one plate, (n= replicate).

Inter-assay Precision (Precision between assays): 3 samples with low, mid-range and high level were tested on 3 different plates, 20 replicates in each plate.

	Intra-assay Precision			Inter-assay Precision		
Sample	**1**	**2**	**3**	**1**	**2**	**3**
n	**20**	**20**	**20**	**20**	**20**	**20**
Mean ng/mL	1.06	3	8.85	1.04	3.3	8.98
Standard deviation	0.06	0.13	0.55	0.07	0.22	0.72
CV (%)	5.99	4.41	6.25	6.44	6.78	8.06

Recovery

Matrices listed below were spiked with a certain level of Rat NSE and the recovery rates were calculated by comparing the measured value to the expected amount of Rat NSE in the samples.

Sample Type	Range (%)	Average Recovery (%)
Serum (n=8)	94-108	100
EDTA Plasma (n=8)	91-105	97
Cell Culture Media (n=8)	91-105	96

Linearity

The linearity of the kit was assayed by testing the samples spiked with appropriate concentration of Rat NSE and their serial dilutions.

		Serum (n=5)	EDTA Plasma (n=5)	Cell Culture Media (n=5)
1:2	**Range (%)**	89-104	95-109	86-98
	Average (%)	97	102	91
1:4	**Range (%)**	94-110	86-99	96-108
	Average (%)	102	93	102
1:8	**Range (%)**	96-110	87-99	96-110
	Average (%)	101	94	104
1:16	**Range (%)**	96-108	82-94	97-112
	Average (%)	102	87	105

12. ELISA Troubleshooting

Problem	Possible Causes	Solutions
Standard curve without signal	Incorrect reagent order; Mixed components from different kits; Missing reagents.	Ensure correct reagent order and use components from the same kit. Verify all reagents are added.
Overflow OD	Mixed components from different kits; Over-concentrated working solution.	Use correct components and prepare solutions at recommended concentrations.
Poor standard curve	Incorrect curve fitting model.	Try alternative curve fitting models.
Samples without signal	Sample concentration too low; Incompatible buffer; Incorrect preparation; Sample degradation or excessive freeze-thaw.	Reduce dilution or concentrate sample. Check buffer compatibility and follow proper preparation and storage.
High CV%	Precipitate formation; Unclean plate; Foaming; Uneven washing; Incomplete reagent mixing; Pipetting inconsistency.	Dilute samples if needed, avoid foaming, ensure uniform washing, mix reagents thoroughly, and use calibrated pipettes.
Low standard signal	Improperly reconstituted standards; Degraded standards; Incorrect pipetting; Expired kit; Improper storage; Over-dried wells.	Reconstitute standards properly, use fresh kits, follow storage recommendations, and prevent wells from drying.
Slow colour development	TMB not equilibrated; Incorrect microplate reader wavelength; Over-washing.	Pre-warm TMB (30 min at 37°C), confirm correct wavelength (450 nm), and follow recommended washing times.
High background	Insufficient washing; Contaminated wash buffer; Excess detection reagents; Delayed reading; TMB exposed to light.	Wash adequately, prepare fresh wash buffer, use correct reagent amounts, read results promptly, and incubate TMB in the dark.

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Assay Genie 100% money-back guarantee!

If you are not satisfied with the quality of our products and our technical team cannot resolve your problem, we will give you 100% of your money back.

Manufacturers Statement: This final kit system is assembled and quality-released by Assay Genie Limited.