

# Protocol – Anti-Tirzepatide Neutralizing

## antibodies ELISA

Catalog #: 60039

**BENCHMARK**  
**antibodies**

For the quantitative measurement of Anti-Tirzepatide  
Neutralizing antibodies in serum, plasma, supernatants.

For research use only. Not for use in diagnostic procedures.

### Introduction

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Human Anti-Tirzepatide Neutralizing antibody ELISA Kit

This ELISA is a solid-phase competition enzyme-linked immunosorbent assay (cELISA) for the quantitative measurement of Anti-Tirzepatide Neutralizing antibodies in biological samples. This assay is highly specific and sensitive, providing a reliable method for quantitative analysis.

### Principle of the Assay

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This assay employs a competitive ELISA for the quantitative measurement of anti-Tirzepatide Neutralizing antibodies. Samples and Standards are mixed with 1X Biotinylated Detector Reagent and added to antigen-coated microplate wells. Anti-Tirzepatide Neutralizing antibodies present in the sample compete with the biotinylated detector reagent for binding to the immobilized antigen. Following incubation, unbound material is removed by washing. 1X HRP-Streptavidin Reagent is then added to bind the biotinylated detector reagent remaining on the plate. After a further wash, TMB Substrate Solution is added, producing a colorimetric signal that is inversely proportional to the concentration of anti-Tirzepatide Neutralizing antibodies in the sample. The reaction is terminated by the addition of Stop Solution, and absorbance is measured. Anti-Tirzepatide Neutralizing antibody concentrations are determined by comparison with the Standard Curve.

## Materials Provided & Storage Conditions

| Component                            | Description                               |
|--------------------------------------|-------------------------------------------|
| ELISA Microplate                     | 96-well (12 strips × 8) coated microplate |
| Lyophilized Standard                 | 2 vials                                   |
| Biotinylated Detector Reagent (100X) | 60 µL                                     |
| HRP-Streptavidin Reagent (100X)      | 120 µL                                    |
| Sample Dilution Buffer               | 20 mL                                     |
| Detector Dilution Buffer             | 10 mL                                     |
| HRP-Streptavidin Dilution Buffer     | 10 mL                                     |
| Wash Buffer Concentrate (25X)        | 30 mL                                     |
| Substrate Solution (TMB)             | 10 mL                                     |
| Stop Solution                        | 10 mL                                     |
| Plate Sealers                        | 5 adhesive sealing films                  |

\* Store the unopened kit at 2–8°C. Do not use past the expiration date. Do not combine materials from different lots.

## Other Supplies Required

- Microplate reader capable of absorbance measurements at 450 nm, with optional correction at 540 nm or 570 nm
- Adjustable single-channel and multichannel pipettes with compatible pipette tips
- Deionized or distilled water
- Squirt bottle, manifold dispenser, or automated microplate washer
- 37°C incubator; do not use a humidified cell culture incubator

## Precautions & Technical Hints

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- Add all reagents in the same order and at consistent time intervals to minimize variation between wells.
- To avoid cross-contamination, use fresh pipette tips for each Standard, sample, and reagent.
- Use a multichannel pipette for rapid dispensing. Use fresh multichannel reservoirs for dispensing reagents to prevent cross-contamination, especially for Substrate Solution (TMB).
- Substrate Solution (TMB) should be colorless before addition. Protect from light.
- Stop Solution is acidic. Treat all biological materials as potentially biohazardous. Wear protective gloves, clothing, and eye protection.

## Sample Collection & Storage

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The following are general guidelines. Sample stability has not been fully characterized.

- **Cell Culture Supernatants:** Remove particulates by centrifugation at  $1000 \times g$  for 15 minutes. Assay immediately or aliquot and store samples at  $\leq -20^{\circ}\text{C}$ .
- **Serum:** Use a serum separator tube (SST) and allow samples to clot for 30 minutes at room temperature before centrifugation for 15 minutes at  $1000 \times g$ . Remove serum and assay immediately or aliquot and store samples at  $\leq -20^{\circ}\text{C}$ .
- **Plasma:** Collect plasma using EDTA or heparin as an anticoagulant. Centrifuge for 15 minutes at  $1000 \times g$  within 30 minutes of collection. Assay immediately or aliquot and store samples at  $\leq -20^{\circ}\text{C}$ .
- **General Note:** Avoid repeated freeze-thaw cycles for all samples.

## Reagent Preparation

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Bring all reagents to room temperature before use. 1X Wash Buffer may be prepared in full at any time. Prepare only the required volume of 1X Biotinylated Detector Reagent and 1X HRP-Streptavidin Reagent, no more than 30 minutes before use.

- **1X Wash Buffer:** If crystals are present, warm to room temperature and mix gently until dissolved.  
Dilute 30 mL Wash Buffer Concentrate (25X) with 720 mL deionized water to prepare 750 mL 1X Wash Buffer.
- **1X Biotinylated Detector Reagent:** Dilute Biotinylated Detector Reagent (100X) 1:99 in Detector Dilution Buffer. Prepare enough for 50 µL per assay well.
- **1X HRP-Streptavidin Reagent:** Dilute HRP-Streptavidin Reagent (100X) 1:99 in HRP-Streptavidin Dilution Buffer. Prepare enough for 100 µL per assay well.

## Sample and Standards Preparation

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Prepare diluted samples and the Standard dilution series. Use all diluted Standards and samples within 2 hours. A second vial of Lyophilized Standard is provided for later experiments.

- **Samples:** Dilute samples in Sample Dilution Buffer. Matrix effects may influence assay performance; testing multiple sample dilutions is recommended. Serial dilutions may be required for high dilution factors.
- **Standard #1:** Add 1 mL Sample Dilution Buffer to the Lyophilized Standard vial. Mix gently by inversion, let stand for 2 minutes, and label as Standard #1.
- **Standards #2–7:** Label six tubes Standard #2–Standard #7, each with 0.3 mL Sample Dilution Buffer. Transfer 0.3 mL from Standard #1 to Standard #2 and mix gently by inversion. Repeat through Standard #7.
- **Standard #8:** Prepare a blank Standard tube labeled Standard #8 containing 0.3 mL Sample Dilution Buffer only.

## Assay Procedure

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1. Bring all reagents and samples to room temperature. Prepare Standards, 1X Wash Buffer, 1X Biotinylated Detector Reagent, 1X HRP–Streptavidin Reagent, and appropriately diluted samples. Place the required number of microplate strips into the plate frame. Duplicate Standard and sample measurements are recommended. Return unused strips to the foil pouch containing the desiccant pack, and reseal.
2. **Wash the plate wells twice before adding standards and samples.** Add 50  $\mu$ L of each Standard to the designated wells. Add 50  $\mu$ L of each sample to the designated wells. Immediately add Add 50  $\mu$ L of 1X Biotinylated Detector Reagent to all wells. Tap plate gently to mix. Apply a plate sealer and incubate at 37°C for 45 minutes. Record sample positions.
3. Aspirate the contents of each well and wash three times with 350  $\mu$ L of 1X Wash Buffer per wash. Ensure complete removal of liquid at each step. After the last wash, remove any remaining Wash Buffer by inverting the plate and blotting it against clean paper towels.
4. Add 100  $\mu$ L of 1X HRP–Streptavidin Reagent to all wells. Apply a plate sealer and incubate at 37°C for 30 minutes.
5. Aspirate the contents of each well and wash five times with 350  $\mu$ L of 1X Wash Buffer per wash. Wash and blot the plate as described above.
6. Add 90  $\mu$ L of Substrate Solution (TMB) to all wells. Incubate at 37°C, protected from direct light, for 10–20 minutes. Monitor color development. The reaction may be stopped when an appreciable color gradient is observed across the Standard dilution series.
7. Add 50  $\mu$ L of Stop Solution to each well. The color in the wells should change from blue to yellow. Gently tap the plate to mix the contents of each well.
8. Measure the Optical Density (OD) of each well within 30 minutes using a microplate reader set to 450 nm. If wavelength correction is available, set correction to 540 nm or 570 nm.

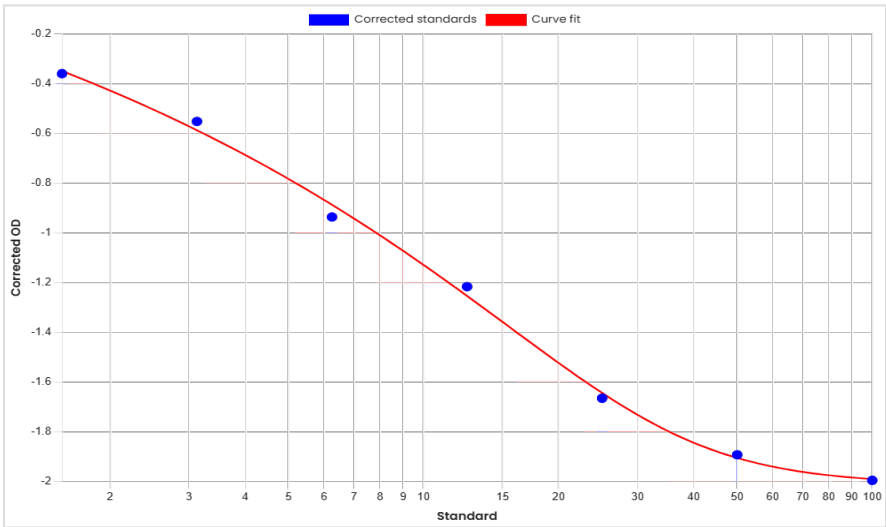
## Calculation of Results

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- Average duplicate readings for each Standard and sample, then subtract the mean OD of the blank Standard.
- Create a Standard Curve by plotting the mean absorbance for each Standard on the y-axis against the concentration on the x-axis. A four-parameter logistic (4PL) curve fit is recommended.
- A Standard Curve may be generated manually, with spreadsheet software, with microplate reader software, or using our provided tool: <https://benchmarkantibodies.com/graphing/>
- If samples have been diluted, the concentration read from the Standard Curve must be multiplied by the dilution factor.

# Performance Characteristics

## Standard Curve



Standard curve Human Anti-Tirzepatide Neutralizing antibody ELISA Kit 60039 [ng/mL]

## Standard Curve

| Standard    | Amount [ng/mL] | OD1  | OD2  | Average | Corrected |
|-------------|----------------|------|------|---------|-----------|
| Blank #8    | 0              | 2.22 | 2.28 | 2.25    | 2.25      |
| Standard #7 | 1.56           | 1.87 | 1.92 | 1.89    | 1.89      |
| Standard #6 | 3.13           | 1.68 | 1.72 | 1.7     | 1.7       |
| Standard #5 | 6.25           | 1.3  | 1.34 | 1.32    | 1.32      |
| Standard #4 | 12.5           | 1.02 | 1.05 | 1.04    | 1.04      |
| Standard #3 | 25             | 0.58 | 0.6  | 0.59    | 0.59      |
| Standard #2 | 50             | 0.36 | 0.37 | 0.36    | 0.36      |
| Standard #1 | 100            | 0.25 | 0.26 | 0.26    | 0.26      |

## Precision

| Sample         | n  | Mean  | Standard Deviation | CV (%) |
|----------------|----|-------|--------------------|--------|
| Intra Sample 1 | 20 | 3.1   | 0.16               | 5.16   |
| Intra Sample 2 | 20 | 11.97 | 0.6                | 4.98   |
| Intra Sample 3 | 20 | 47.53 | 2.43               | 5.12   |
| Inter Sample 1 | 20 | 3.13  | 0.15               | 4.69   |
| Inter Sample 2 | 20 | 11.55 | 0.63               | 5.43   |
| Inter Sample 3 | 20 | 48.63 | 2.4                | 4.93   |

## Recovery

| Matrix               | Recovery Range (%) | Average (%) |
|----------------------|--------------------|-------------|
| Serum(n=10)          | 86-101             | 95          |
| EDTAPlasma(n=10)     | 91-105             | 96          |
| Heparin Plasma(n=10) | 91-103             | 97          |

## Linearity

| Sample              | 1:2     | 1:4    | 1:8    |
|---------------------|---------|--------|--------|
| Serum(n=10)         | 94-105% | 86-98% | 85-94% |
| EDTAPlasma(n=10)    | 89-102% | 86-97% | 86-94% |
| HeparinPlasma(n=10) | 90-97%  | 87-99% | 86-98% |

## Stability

| 37°C / 1 Month | 2-8°C / 6 Months | 2-8°C / 12 Months |
|----------------|------------------|-------------------|
| 80             | 95-100           | 85-98             |

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