KAMIYA BIOMEDICAL COMPANY

Human Anti-PEG IgG ELISA

For the quantitative determination of anti-PEG IgG in human serum or plasma

Cat. No. KT-1898

For Research Use Only. Not for use in diagnostic procedures.

PRODUCT INFORMATION
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PRODUCT
The ***K-ASSAY®*** Human Anti-PEG IgG ELISA is an enzyme immunoassay for the quantitative determination of anti-PEG IgG in human serum or plasma. For research use only. Not for use in diagnostic procedures.

INTRODUCTION
Attachment of polyethylene glycol (PEG) chains to therapeutic biologic agents, a process referred to as PEGylation, prolongs the circulating half-life of the modified protein by slowing proteolytic degradation and by masking it from the immune system. However, it has been reported that repeated injections of PEGylated proteins can induce anti-PEG antibodies that increase the rate of clearance and decrease drug efficacy (accelerated blood clearance, or ABC phenomenon). To aid research in this important area, we have developed a human anti-PEG IgG ELISA kit.

PRINCIPLE
The assay uses immobilized mono-mPEGylated BSA (20 kDa PEG chain) as the capture antigen (coated on microtiter wells) and horseradish peroxidase (HRP) conjugated anti-human/monkey IgG monoclonal antibody for detection. Serum and plasma samples are diluted and incubated alongside calibrators in the microtiter wells for 1 hour. The wells are subsequently washed. HRP conjugate is added and incubated for 45 minutes. Anti-PEG IgG molecules are thus sandwiched between immobilized PEG and the detection antibody conjugate. The wells are then washed to remove unbound HRP-labeled antibodies. TMB reagent is added and incubated for 20 minutes at room temperature. This results in the development of a blue color. Color development is stopped by the addition of Stop Solution, changing the color to yellow. Optical density is measured spectrophotometrically at 450 nm. The concentration of anti-PEG IgG is proportional to the absorbance at 450 nm and is derived from a calibration curve.

COMPONENTS
- PEG-BSA coated plate (12 x 8-wells) **Store at -20℃**
- Anti-IgG HRP Stock **Store at -20℃**
- Reference Stock Calibrator (lyophilized) **Store at -20℃**
- 20x HRP PEG Wash, 50 mL
- HRP PEG Diluent, 50 mL
- TMB, 11 mL
- Stop Solution, 11 mL

MATERIALS REQUIRED BUT NOT PROVIDED
- Pipettors and tips
- Distilled or deionized water
- Polypropylene or glass tubes
- Vortex mixer
- Absorbent paper or paper towels
- Plate incubator/shaker
- Plate washer
- Plate reader capable of measuring absorbance at 450 nm.
- Curve fitting software

STORAGE
The reference stock, HRP conjugate and the PEG-BSA coated plate should be stored at -20℃. All remaining kit components should be stored at 4℃. The microtiter plate should be kept in a sealed bag with desiccant. Kits will remain until the expiration date provided that the components are stored as described.

GENERAL INSTRUCTIONS
1. Please read and understand instructions thoroughly before using the kit.

2. All reagents should be allowed to reach room temperature (25°C) before use.
3. The wash procedure is critical. Insufficient washing will result in poor precision and falsely elevated absorbance readings.
4. Use only the wash solution and dilution buffer provided with the kit. PEG and PEGylated compounds are found in many buffers conventionally used in ELISA's and cannot be used with this kit.
5. Kits are validated using plate shakers set at 150 rpm and 25°C. Performance of the assay at lower temperatures and/or mixing speeds will likely result in lower absorbance values.
6. Optimal results are achieved if, at each step, reagents are pipetted into the wells of the microtiter plate within 5 minutes.

WASH SOLUTION PREPARATION

The wash solution is provided as a 20X stock. Prior to use, dilute the contents of the bottle (50 mL) with 950 mL of distilled or de-ionized water.

CALIBRATOR PREPARATION

1. The anti-PEG IgG calibrator is provided as a lyophilized stock. Reconstitute with 200 µL of distilled or de-ionized water.
2. Label 8 polypropylene or glass tubes as 100, 50, 25, 12.5, 6.25, 3.13, 1.56 and 0.78 u/mL.
3. In the tube labeled 100 u/mL prepare the 100 u/mL calibrator by diluting 42.3 µL of reconstituted calibrator with 457.7 µL of diluent.
4. Dispense 250 µL of diluent into the remaining tubes.
5. Prepare a 50 u/mL calibrator by diluting and mixing 250 µL of the 100 u/mL calibrator with 250 µL of diluent in the tube labeled 50 u/mL.
6. Similarly prepare the remaining calibrators by serial dilution.

SAMPLE PREPARATION

In studies, we found that anti-PEG IgG levels in human samples ranged from undetectable to 3,750 u/mL. Optimal dilutions must be determined empirically. However, we suggest that samples initially be diluted 20-fold. To avoid matrix effects, do not test dilutions less than 20-fold (i.e., 10-fold).

HRP CONJUGATE PREPARATION

Approximately 5 minutes before needed, dilute 1.75 µL of the HRP Conjugate stock with 1.0 mL diluent (equilibrated to room temperature) for each 8-well strip.

ASSAY PROCEDURE

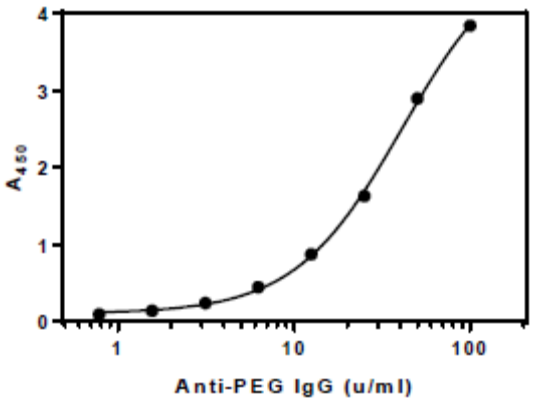
1. Secure the desired number of coated wells in the holder.
2. Dispense 100 µL of calibrators and diluted samples into the wells (we recommend testing in duplicate).
3. Incubate on a plate shaker at 150 rpm/25°C for 1 hour.
4. Aspirate the contents of the microtiter wells and wash the wells five times with 1x wash solution using a plate washer (400 µL/well).
5. Strike the wells sharply onto absorbent paper to remove all residual wash solution.
6. Add 100 µL of diluted HRP conjugate into each well.
7. Incubate on a plate shaker at 150 rpm/25°C for 45-minutes.
8. Wash as detailed above.
9. Dispense 100 µL of TMB into each well.
10. Incubate on a plate shaker at 150 rpm/25°C for 20-minutes.
11. Stop the reaction by adding 100 µL of stop solution to each well.
12. Gently mix. It is important to make sure that all the blue color changes to yellow.
13. Read the optical density at 450 nm with a microtiter plate reader within five minutes.

CALCULATION OF RESULTS

1. Using curve fitting software, construct a calibration curve by plotting absorbance values of the calibrators versus $\log_{10}$ of the concentration.
2. Fit the calibration curve to a four-parameter logistic regression (4PL) equation (x axis = $\log_{10}$ concentration) and determine the concentration of the diluted samples from the calibration curve (remember to derive the antilog).
3. Multiply the derived concentration by the dilution factor to determine the actual concentration in the samples.
4. If the A_{450} values of samples fall outside the calibration curve, samples should be diluted appropriately and re-tested.

TYPICAL CALIBRATION CURVE

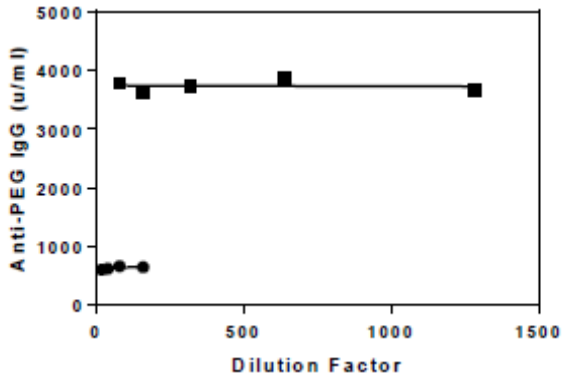
A typical calibration curve is shown below. This curve is for the purpose of illustration only. A calibration curve must be run with each experiment.



Anti-PEG IgG (u/ml)	A_{450}
100	3.841
50	2.895
25	1.627
12.5	0.872
6.25	0.444
3.13	0.240
1.56	0.139
0.78	0.093

ASSAY PERFORMANCE

Parallelism: To assess performance of the assay, two samples containing anti-PEG IgG at concentrations of 635 and 3,740 u/mL were serially diluted to produce values within the dynamic range of the assay.



ASSAY UNITS

We have worked with PEG antibodies from mice, rats, monkeys, and humans. Excepting mouse monoclonal antibodies that can be purified under gentle conditions, it has been our experience that elution of PEG antibodies from affinity columns causes significant and indeterminate inactivation. It is therefore very difficult to prepare and quantitate pure functional PEG antibodies for calibration purposes. For this reason, we decided to use nominal units for measurement. All batches of anti-PEG stock are calibrated to reference serum stored at Kamiya Biomedical Company.

FOR RESEARCH USE ONLY

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