Version 10-09/22

User's Manual

Tetanus IgG ELISA Kit

REF **DEIA10378**

Σ **96T**

RUO

This product is for research use only and is not intended for diagnostic use.

For illustrative purposes only. To perform the assay the instructions for use provided with the kit have to be used.

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PRODUCT INFORMATION

Intended Use

Enzyme immunoassays (microtiter strips) for the quantitative determination of IgG antibodies against Tetanus in human serum and plasma.

General Description

Tetanus, also called lockjaw, is an infection disease caused by the toxin from Gram-positive bacteria Clostridium tetani. Spores of this bacterium are introduced into the body through puncture wound. Under these anaerobic conditions the bacteria grow and produce toxins (tetanospasmin, tetanolysin), which cause the typical muscle spasms in the jaw and elsewhere in the body.

The outcome of this avoidable infectious disease is so dangerous (lethality 50 %) that a wide prophylaxis through better hygienic conditions and an individual protection by antibodies (vaccination) is required. Vaccine recommendations across the lifespan, including both primary series and booster doses are given by the medical societies (WHO, RKI) and are often country-specific. Sufficient protection is achieved by vaccination and following booster injections. In children under the age of seven, the tetanus vaccine is administered as a combined vaccine, which also includes vaccines against diphtheria and pertussis (DPT). Immunity is generally achieved by three lifetime doses of the vaccine; booster shots of the vaccine are recommended every ten years to maintain immunity. For adults and children over seven also combined vaccines of tetanus and diphtheria (DT, DTaP) are commonly used.

There is only a very low vaccination risk and only limited side effects to these vaccines. Nevertheless it is advisable to detect the immunity with a qualified test before boostering especially for older patients or patients with immunodeficiencies.

Serological determination of tetanus toxoid antibodies indicate whether a basic immunization or a booster is necessary ("vaccination management"). This enables the physician to match immune status and active immunization for each patient individually. Several methods like RIA, FIA, ELISA or neutralisation test are used to determine the antibody titer. ELISA kits have been found to be some of the most effective diagnostic tools to determine tetanus antitoxins in human serum because of their high sensitivity, easy handling and excellent automatization.

Principles of Testing

Solid phase enzyme-linked immunosorbent assay (ELISA) based on the sandwich principle. The wells are coated with antigen. Specific antibodies of the sample binding to the antigen coated wells are detected by a secondary enzyme conjugated antibody (E-Ab) specific for human IgG. After the substrate reaction the intensity of the color developed is proportional to the amount of IgG-specific antibodies detected. Results of samples can be determined directly using the standard curve.

Reagents And Materials Provided

Quantity	Symbol	Component
1 x 12 x 8	MTP	**Microtiter Plate** Break apart strips. Coated with specific antigen.
1 x 5 x 2 mL	CAL A-E	**Standards A-E** 0; 0.1; 1.0; 2.5; 5.0 IU/mL Ready to use. Calibrated against WHO 76/589. Contains: Human serum, IgG antibodies against Tetanus, PBS, stabilizers.
1 x 15 mL	ENZCONJ IgG	**Enzyme Conjugate IgG** Red colored. Ready to use. Contains: anti-human IgG, conjugated to peroxidase, protein-containing buffer, stabilizers.
1 x 60 mL	DILBUF	**Diluent Buffer** Ready to use. Contains: PBS Buffer, BSA, < 0.1 % NaN_3.
1 x 60 mL	WASHBUF CONC	**Wash Buffer,** Concentrate (10x) Contains: PBS Buffer, Tween 20.
1 x 15 mL	TMB SUBS	**TMB Substrate Solution** Ready to use. Contains: TMB.
1 x 15 mL	TMB STOP	**TMB Stop Solution** Ready to use. 0.5 M H_2SO_4.
2 x	FOIL	**Adhesive Foil** For covering of Microtiter Plate during incubation.
1 x	BAG	**Plastic Bag** Resealable. For dry storage of non-used strips.

Materials Required But Not Supplied

1. Micropipettes (Multipette Eppendorf or similar devices, < 3 % CV). Volumes: 5; 50; 100; 500 µL
2. Calibrated measures
3. Tubes (1 mL) for sample dilution
4. 8-Channel Micropipettor with reagent reservoirs
5. Wash bottle, automated or semi-automated microtiter plate washing system
6. Microtiter plate reader capable of reading absorbance at 450 nm (reference wavelength 600-650 nm)
7. Bidistilled or deionised water
8. Paper towels, pipette tips and timer

Storage

The kit is shipped at ambient temperature and should be stored at 2-8°C. Keep away from heat or direct sun light. The storage and stability of specimen and prepared reagents is stated in the corresponding chapters.

The microtiter strips are stable up to 3 months after the first opening when stored at 2-8°C in the tightly closed bag.

Specimen Collection And Preparation

The usual precautions for venipuncture should be observed. It is important to preserve the chemical integrity of a blood specimen from the moment it is collected until it is assayed. Do not use grossly hemolytic, icteric or grossly lipemic specimens. Samples appearing turbid should be centrifuged before testing to remove any particulate material.

Keep away from heat or direct sun light. Avoid repeated freeze-thaw cycles.

Reagent Preparation

Preparation of Components

The contents of the kit for 96 determinations can be divided into 3 separate runs. The volumes stated below are for one run with 4 strips (32 determinations).

Dilute / dissolve	Component		Diluent	Relation	Remarks	Storage	Stability
20 mL	WASHBUF CONC	200 mL	bidist. water	1:11	Warm up at 37 °C to dissolve crystals, if necessary. Mix vigorously.	2-8 °C	8 w

Dilution of Samples

Sample	to be diluted	with	Relation	Remarks
Serum / Plasma	generally	DILBUF	1:101	e.g. 5 µL + 500 µL DILBUF

Samples containing concentrations higher than the highest standard have to be diluted further.

Assay Procedure

1. Pipette **100 µL** of each **Standard and diluted serum or plasma sample** into the respective wells.
2. Cover plate with adhesive foil. **Incubate 60 min at 18-25°C.**
3. Remove adhesive foil. Discard incubation solution. Wash plate **3 x** with **300 µL** of **diluted Wash Buffer**. Remove excess solution by tapping the inverted plate on a paper towel.
4. Pipette **100 µL** of **Enzyme Conjugate** into each well.
5. Cover plate with new adhesive foil. **Incubate 30 min** at **18-25°C.**
6. Remove adhesive foil. Discard incubation solution. Wash plate **3 x** with **300 µL** of **diluted Wash Buffer**. Remove excess solution by tapping the inverted plate on a paper towel.
7. For adding of Substrate and Stop Solution use, if available, an 8-channel Micropipettor. Pipetting should be carried out in the same time intervals for Substrate and Stop Solution. Use positive displacement and avoid formation of air bubbles.
8. Pipette **100 µL** of **TMB Substrate Solution** into each well.
9. **Incubate 20 min** at **18-25°C** in the dark (without adhesive foil).
10. Stop the substrate reaction by adding **100 µL** of **TMB Stop Solution** into each well. Briefly mix contents by gently shaking the plate. Color changes from blue to yellow.
11. **Measure** optical density with a photometer at **450 nm** (Reference-wavelength: 600-650 nm) within 60 min after pipetting of the Stop Solution.

PROCEDURE NOTES

1. Any improper handling of samples or modification of the test procedure may influence the results. The indicated pipetting volumes, incubation times, temperatures and pretreatment steps have to be performed strictly according to the instructions. Use calibrated pipettes and devices only.
2. Once the test has been started, all steps should be completed without interruption. Make sure that required reagents, materials and devices are prepared ready at the appropriate time. Allow all reagents and specimens to reach room temperature (18-25°C) and gently swirl each vial of liquid reagent and sample before use. Mix reagents without foaming.
3. Avoid contamination of reagents, pipettes and wells/tubes. Use new disposable plastic pipette tips for each component and specimen. Do not interchange caps. Always cap not used vials. Do not reuse wells/tubes or reagents.
4. It is advised to determine samples in duplicate to be able to identify potential pipetting errors.
5. Use a pipetting scheme to verify an appropriate plate layout.
6. Incubation time affects results. All wells should be handled in the same order and time sequences. It is recommended to use an 8-channel Micropipettor for pipetting of solutions in all wells.

7. Microplate washing is important. Improperly washed wells will give erroneous results. It is recommended to use a multichannel pipette or an automatic microplate washing system. Do not allow the wells to dry between incubations. Do not scratch coated wells during rinsing and aspiration. Rinse and fill all reagents with care. While rinsing, check that all wells are filled precisely with Wash Buffer, and that there are no residues in the wells.
8. Humidity affects the coated wells/tubes. Do not open the pouch until it reaches room temperature. Unused wells/tubes should be returned immediately to the resealed pouch including the desiccant.

Quality Control

The test results are only valid if the test has been performed following the instructions. Moreover the user must strictly adhere to the rules of GLP (Good Laboratory Practice) or other applicable standards/laws. All standards must be found within the acceptable ranges as stated on the QC Certificate. If the criteria are not met, the run is not valid and should be repeated. Each laboratory should use known samples as further controls. It is recommended to participate at appropriate quality assessment trials.

In case of any deviation the following technical issues should be proven: Expiration dates of (prepared) reagents, storage conditions, pipettes, devices, incubation conditions and washing methods.

Calculation

The obtained OD of the standards (y-axis, linear) are plotted against their concentration (x-axis, logarithmic) either on semi-logarithmic graph paper or using an automated method. A good fit is provided with cubic spline or point-to-point curve, because these methods give the highest accuracy in the data calculation.

For the calculation of the standard curve, apply each signal of the standards (one obvious outlier of duplicates might be omitted and the more plausible single value might be used).

The concentration of the samples can be read directly from the standard curve.

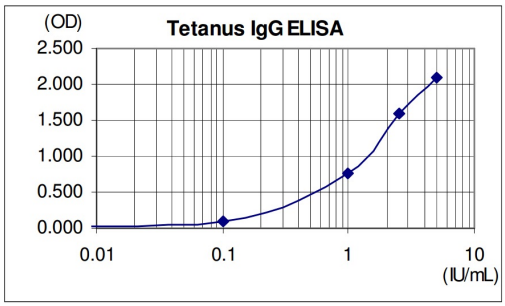
The initial dilution has been taken into consideration when reading the results from the graph. Results of samples of higher predilution have to be multiplied with the dilution factor.

Samples showing concentrations above the highest standard have to be diluted as described in PRE-TEST SETUP INSTRUCTIONS and reassayed.

Typical Calibration Curve

(Example. Do not use for calculation!)

Standard	Tetanus IgG (IU/mL)	OD_{Mean}
A	0.0	0.022
B	0.1	0.104
C	1.0	0.766
D	2.5	1.603
E	5.0	2.102



Interpretation Of Results

IU/mL	Interpretation
< 0.1	basic immunisation recommended
0.1 - 1.0	to be controlled after 1-2 years
1.0 - 5.0	to be controlled after 2-4 years
> 5.0	to be controlled after 4-8 years

The results themselves should not be the only reason for any therapeutical consequences. They have to be correlated to other clinical observations and diagnostic tests.

Evaluation

Apparently healthy subjects show the following values:

IU/mL	n = 56
< 0.1	0
0.1 – 1.0	10
1.0 – 5.0	32
> 5.0	14

It is recommended that each laboratory establishes its own range of normal values.

Performance Characteristics

Analytical Specificity (Cross-reactivity)	No significant cross-reactivities known.			
Analytical Sensitivity (Limit of Detection)	0.0172 IU/mL	Mean signal (Zero-Standard) + 2SD		
Precision	Mean (IU/mL)	CV (%)		
Intra-Assay	1.7	6.9		
Inter-Assay	2.7	10.4		
Linearity	Range (IU/mL)	Serial dilution up to	Range (%)	
	0.24–8.48	1:16	77-114	
Method Comparison versus ELISA	Classification (IU/mL)	IBL-Assay	Competitor Assay	
	< 0.1	2 %	0 %	
	0.11–1.0	20 %	16 %	
	1.0–5.0	52 %	75 %	
	> 5.0	27 %	9 %	

Precautions

1. For in-vitro diagnostic use only. For professional use only.
2. Before starting the assay, read the instructions completely and carefully. Use the valid version of the package insert provided with the kit. Be sure that everything is understood.

3. In case of severe damage of the kit package please contact us or your supplier in written form, latest one week after receiving the kit. Do not use damaged components in test runs, but keep safe for complaint related issues.
4. Obey lot number and expiry date. Do not mix reagents of different lots. Do not use expired reagents.
5. Follow good laboratory practice and safety guidelines. Wear lab coats, disposable latex gloves and protective glasses where necessary.
6. Reagents of this kit containing hazardous material may cause eye and skin irritations. See MATERIALS SUPPLIED and labels for details. Material Safety Data Sheets for this product are available.
7. Chemicals and prepared or used reagents have to be treated as hazardous waste according to national biohazard and safety guidelines or regulations.
8. Avoid contact with Stop solution. It may cause skin irritations and burns.
9. Some reagents contain sodium azide (NaN3) as preservatives. In case of contact with eyes or skin, flush immediately with water. NaN3 may react with lead and copper plumbing to form explosive metal azides. When disposing reagents, flush with a large volume of water to avoid azide build-up.
10. All reagents of this kit containing human serum or plasma have been tested and were found negative for anti-HIV I/II, HBsAg and anti-HCV. However, a presence of these or other infectious agents cannot be excluded absolutely and therefore reagents should be treated as potential biohazards in use and for disposal.

Limitations

Specimen collection has a significant effect on the test results. See SPECIMEN COLLECTION AND STORAGE for details.

For cross-reactivities, see PERFORMANCE.

Azide and thimerosal at concentrations > 0.1 % interfere in this assay and may lead to false results.

The following blood components do not have a significant effect (+/- 20 % of expected) on the test results up to the below stated concentrations:Hemoglobin 8.0 mg/mL, Bilirubin 0.3 mg/mL, Triglyceride 5.0 mg/mL.