

# Ascaris lumbricoides IgG ELISA

Enzyme immunoassay for the qualitative determination of IgG-class antibodies against *Ascaris lumbricoides* in human serum or plasma.

REF

**RE58701**



**96**



**2-8°C**

EU:



U.S.: *For research use only.  
Not for use in diagnostic procedures.*



## 1. INTRODUCTION

Ascaridae are big nematodes. The male individuals are up to 25 cm, the female ones are up to 40 cm long. *Ascaris lumbricoides* is among the Ascaridae the species with the highest importance for human medicine, because it is the only one with humans as main host.

The sexually mature roundworm lives in the small intestine. The females produce up to 200 000 eggs daily, which attain to the environment by faeces. Infectious larvae develop inside the eggs and after oral ingestion they hatch in the upper part of the small intestine. They penetrate the wall of the intestine and get into the venous blood with which they get into liver and lung, where they leave the vessels and skin in the aveoles. The larvae migrate into the trachea and through the pharynx after swallowing back to the small intestine where the maturation to the adult worm takes place. Ca. 10-12 weeks after infestation the roundworms will be excreted with faeces. The adult worm lives for around 18 months.

*Ascaris lumbricoides* is one of the most abundant exciter of infectious diseases worldwide. Main endemic areas are Eastern Asia, Africa and Middle and South America. Children are more often affected than adults. The infestation leads to Ascariasis mostly with latent progression. The migrating larvae can lead to inflammatory, eosinophile infiltration of the lung and cause cough, dyspnoea and light fever. Conglomerates of the worms can cause intestinal blockage. If the worms migrate into gall, pancreas or stomach the corresponding clinical symptoms result.

Species	Disease	Symptoms	Mechanism of Infection
<i>Ascaris lumbricoides</i>	Ascariasis	Adult worms cause no symptoms in general. Conglomerates of worms can cause abdominal pain and ileus. Infection of gall, stomach or pancreas leads to corresponding symptoms. Migrating larvae are able to cause pumonal symptoms like cough and dyspnoea.	Ingestion of infectious Ascaridae eggs (classical way of infestation is the consumption of head dunged salad)

The presence of an infection may be identified by:

- Microscopy: Detection of eggs in faeces
- Serology: Detection of antibodies by ELISA

## 2. INTENDED USE

The IBL *Ascaris lumbricoides* IgG-ELISA is intended for the qualitative determination of IgG class antibodies against *Ascaris lumbricoides* in human serum or plasma (citrate).

## 3. PRINCIPLE OF THE ASSAY

The qualitative immunoenzymatic determination of IgG-class antibodies against *Ascaris lumbricoides* is based on the ELISA (Enzyme-linked Immunosorbent Assay) technique.

Microtiter strip wells are precoated with *Ascaris lumbricoides* antigens to bind corresponding antibodies of the specimen. After washing the wells to remove all unbound sample material horseradish peroxidase (HRP) labelled Protein A conjugate is added. This conjugate binds to antigen-antibody complexes. The immune complex formed by the bound conjugate is visualized by adding Tetramethylbenzidine (TMB) substrate which gives a blue reaction product.

The intensity of this product is proportional to the amount of *Ascaris*-specific IgG antibodies in the specimen. Sulphuric acid is added to stop the reaction. This produces a yellow endpoint colour. Absorbance at 450 nm is read using an ELISA microwell plate reader.

## 4. MATERIALS

### 4.1. Reagents supplied

- **Ascaris lumbricoides Coated Wells (IgG):** 12 breakapart 8-well snap-off strips coated with *Ascaris lumbricoides* antigens; in resealable aluminium foil.
- **IgG Sample Diluent \*\*\*:** 1 bottle containing 100 ml of buffer for sample dilution; pH 7.2 ± 0.2; coloured yellow; ready to use; white cap.
- **Stop Solution:** 1 bottle containing 15 ml sulphuric acid, 0.2 mol/l; ready to use; red cap.
- **Washing Solution (20x conc.):** 1 bottle containing 50 ml of a 20-fold concentrated buffer (pH 7.2 ± 0.2) for washing the wells; white cap.
- **Protein A Conjugate\*\*:** 1 bottle containing 20 ml of peroxidased Protein A; coloured blue, ready to use; black cap.
- **TMB Substrate Solution:** 1 bottle containing 15 ml 3,3',5,5'-tetramethylbenzidine (TMB); ready to use; yellow cap.
- **Ascaris lumbricoides IgG Positive Control\*\*\*:** 1 bottle containing 2 ml; coloured yellow; ready to use; red cap.
- **Ascaris lumbricoides IgG Cut-off Control\*\*\*:** 1 bottle containing 3 ml; coloured yellow; ready to use; green cap.
- **Ascaris lumbricoides IgG Negative Control\*\*\*:** 1 bottle containing 2 ml; coloured yellow; ready to use; blue cap.

\* contains 0.1 % Bronidox L after dilution

\*\* contains 0.2 % Bronidox L

\*\*\* contains 0.1 % Kathon

### 4.2. Materials supplied

- 1 Strip holder
- 1 Cover foil
- 1 Test protocol

### 4.3. Materials and Equipment needed

- ELISA microwell plate reader, equipped for the measurement of absorbance at 450/620nm
- Incubator 37°C
- Manual or automatic equipment for rinsing wells
- Pipettes to deliver volumes between 10 and 1000 µl
- Vortex tube mixer
- Deionised or (freshly) distilled water
- Disposable tubes
- Timer

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## 5. STABILITY AND STORAGE

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The reagents are stable up to the expiry date stated on the label when stored at 2...8 °C.

## 6. REAGENT PREPARATION

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*It is very important to bring all reagents, samples and controls to room temperature (20...25°C) before starting the test run!*

### 6.1. Coated snap-off strips

The ready to use breakapart snap-off strips are coated with Ascaris antigen. Store at 2...8°C. *Immediately after removal of strips, the remaining strips should be resealed in the aluminium foil along with the desiccant supplied and stored at 2...8 °C; stability until expiry date.*

### 6.2. Protein A Conjugate

The bottle contains 20 ml of a solution with Protein A, horseradish peroxidase, buffer, stabilizers, preservatives and an inert blue dye. The solution is ready to use. Store at 2...8°C. *After first opening stability until expiry date when stored at 2...8°C.*

### 6.3. Controls

The bottles labelled with Positive, Cut-off and Negative Control contain a ready to use control solution. It contains 0.1% Kathon and has to be stored at 2...8°C. *After first opening stability until expiry date when stored at 2...8°C.*

### 6.4. IgG Sample Diluent

The bottle contains 100 ml phosphate buffer, stabilizers, preservatives and an inert yellow dye. It is used for the dilution of the patient specimen. This ready to use solution has to be stored at 2...8°C. *After first opening stability until expiry date when stored at 2...8°C.*

### 6.5. Washing solution (20xconc.)

The bottle contains 50 ml of a concentrated buffer, detergents and preservatives. Dilute Washing Solution 1+19; e.g. 10 ml Washing Solution + 190 ml fresh and germ free redistilled water. The diluted buffer is stable for 5 days at room temperature. *Crystals in the solution disappear by warming up to 37 °C in a water bath. After first opening the concentrate is stable until the expiry date.*

### 6.6. TMB Substrate Solution

The bottle contains 15 ml of a tetramethylbenzidine/hydrogen peroxide system. The reagent is ready to use and has to be stored at 2...8°C, away from the light. *The solution should be colourless or could have a slight blue tinge. If the substrate turns into blue, it may have become contaminated and should be thrown away. After first opening stability until expiry date when stored at 2...8°C.*

### 6.7. Stop Solution

The bottle contains 15 ml 0.2 M sulphuric acid solution (R 36/38, S 26). This ready to use solution has to be stored at 2...8°C. *After first opening stability until expiry date..*

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## 7. SPECIMEN COLLECTION AND PREPARATION

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Use human serum or plasma (citrate) samples with this assay. If the assay is performed within 5 days after sample collection, the specimen should be kept at 2...8°C; otherwise they should be aliquoted and stored deep-frozen (-70...-20°C). If samples are stored frozen, mix thawed samples well before testing. *Avoid repeated freezing and thawing.*

*Heat inactivation of samples is not recommended.*

### 7.1. Sample Dilution

Before assaying, all samples should be diluted 1+100 with IgG Sample Diluent. Dispense 10µl sample and 1ml IgG Sample Diluent into tubes to obtain a 1+100 dilution and thoroughly mix with a Vortex.

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## 8. ASSAY PROCEDURE

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### 8.1. Test Preparation

Please read the test protocol carefully **before** performing the assay. Result reliability depends on strict adherence to the test protocol as described. The following test procedure is only validated for manual procedure. If performing the test on ELISA automatic systems we recommend to increase the washing steps from three to five and the volume of washing solution from 300µl to 350µl to avoid washing effects. Prior to commencing the assay, the distribution and identification plan for all specimens and controls should be carefully established on the result sheet supplied in the kit. Select the required number of microtiter strips or wells and insert them into the holder.

Please allocate at least:

1 well	(e.g. A1)	for the substrate blank,
1 well	(e.g. B1)	for the negative control,
2 wells	(e.g. C1+D1)	for the cut-off control and
1 well	(e.g. E1)	for the positive control.

*It is recommended to determine controls and patient samples in duplicate.*

Perform all assay steps in the order given and without any appreciable delays between the steps.

A clean, disposable tip should be used for dispensing each control and sample.

Adjust the incubator to 37° ± 1°C.

1. Dispense 100µl controls and diluted samples into their respective wells. Leave well A1 for substrate blank.
2. Cover wells with the foil supplied in the kit.
3. **Incubate for 1 hour ± 5 min at 37±1°C.**
4. When incubation has been completed, remove the foil, aspirate the content of the wells and wash each well three times with 300µl of Washing Solution. Avoid overflows from the reaction wells. The soak time between each wash cycle should be >5sec. At the end carefully remove remaining fluid by tapping strips on tissue paper prior to the next step!

*Note: Washing is critical! Insufficient washing results in poor precision and falsely elevated absorbance values.*

5. Dispense 100µl Protein A conjugate into all wells except for the blank well (e.g. A1). Cover with foil.
6. **Incubate for 30 min 37±1°C.**
7. Repeat step 4.
8. Dispense 100µl TMB Substrate Solution into all wells
9. **Incubate for exactly 30 min at room temperature in the dark.**
10. Dispense 100µl Stop Solution into all wells in the same order and at the same rate as for the TMB Substrate Solution.  
*Any blue colour developed during the incubation turns into yellow.*  
*Note: Highly positive patient samples can cause dark precipitates of the chromogen! These precipitates have an influence when reading the optical density. Predilution of the sample with physiological sodium chloride solution, for example 1+1, is recommended. Then dilute the sample 1+100 with dilution buffer and multiply the results in U by 2.*
11. Measure the absorbance of the specimen at 450/620nm within 30 min after addition of the Stop Solution.

## 8.2. Measurement

Adjust the ELISA Microwell Plate Reader **to zero** using the **substrate blank in well A1**.

*If - due to technical reasons - the ELISA reader cannot be adjusted to zero using the substrate blank in well A1, subtract the absorbance value of well A1 from all other absorbance values measured in order to obtain reliable results!*

Measure the absorbance of all wells at **450 nm** and record the absorbance values for each control and patient sample in the distribution and identification plan.

*Dual wavelength reading using 620 nm as reference wavelength is recommended.*

Where applicable calculate the **mean absorbance values** of all duplicates.

## 9. RESULTS

### 9.1. Run Validation Criteria

In order for an assay to be considered valid, the following criteria must be met:

- **Substrate blank** in A1: Absorbance value < **0.100**.
- **Negative control** in B1: Absorbance value < **0.200** and < **cut-off**.
- **Cut-off control** in C1 and D1: Absorbance value **0.150 – 1.300**.
- **Positive control** in E1: Absorbance value > **cut-off**.

If these criteria are not met, the test is not valid and must be repeated.

### 9.2. Calculation of Results

The cut-off is the mean absorbance value of the Cut-off control determinations.

*Example: Absorbance value Cut-off control 0.39 + absorbance value Cut-off control 0.37 = 0.76 / 2 = 0.38*

*Cut-off = 0.38*

### 9.3. Interpretation of Results

Samples are considered **POSITIVE** if the absorbance value is higher than 10% over the cut-off.

Samples with an absorbance value of 10% above or below the cut-off should not be considered as clearly positive or negative

→ **grey zone**

It is recommended to repeat the test again 2 - 4 weeks later with a fresh sample. If results in the second test are again in the grey zone the sample has to be considered **NEGATIVE**.

Samples are considered **NEGATIVE** if the absorbance value is lower than 10% below the cut-off.

#### 9.3.1. Results in Units

Patient (mean) absorbance value x 10 = Units [U]  
Cut-off

*Example:  $\frac{1.204 \times 10}{0.38} = 32 \text{ U}$*

Cut-off:	10	U
Grey zone:	9-11	U
Negative:	<9	U
Positive:	>11	U

## 10. SPECIFIC PERFORMANCE CHARACTERISTICS

### 10.1. Precision

Interassay	n	Mean (U)	Cv (%)
Pos. Serum	4	13.58	2.8
Intraassay	n	Mean (E)	Cv (%)
Pos. Serum	8	1.51	2.3

### 10.2. Diagnostic Specificity

The diagnostic specificity is defined as the probability of the assay of scoring negative in the absence of the specific analyte. It is 95 %.

### 10.3. Diagnostic Sensitivity

The diagnostic sensitivity is defined as the probability of the assay of scoring positive in the presence of the specific analyte.

It is >95 %.

#### 10.4. Interferences

Interferences with hemolytic, lipemic or icteric sera are not observed up to a concentration of 10 mg/ml hemoglobin, 5 mg/ml triglycerides and 0.2 mg/ml bilirubin.

**Note:** The results refer to the groups of samples investigated; these are not guaranteed specifications.

### 11. LIMITATIONS OF THE PROCEDURE

Bacterial contamination or repeated freeze-thaw cycles of the specimen may affect the absorbance values. Diagnosis of an infectious disease should not be established on the basis of a single test result. A precise diagnosis should take into consideration clinical history, symptomatology as well as serological data. In immunocompromised patients and newborns serological data only have restricted value. Cross reaction of the antigens with antibodies against *Toxocara canis*, *Trichinella*, *Fasciola*, *Filaria* and *Strongyloides* cannot be excluded.

### 12. PRECAUTIONS AND WARNINGS

- In compliance with article 1 paragraph 2b European directive 98/79/EC the use of the in vitro diagnostic medical devices is intended by the manufacturer to secure suitability, performances and safety of the product. Therefore the test procedure, the information, the precautions and warnings in the instructions for use have to be strictly followed. The use of the testkits with analyzers and similar equipment has to be validated. Any change in design, composition and test procedure as well as for any use in combination with other products not approved by the manufacturer is not authorized; the user himself is responsible for such changes. The manufacturer is not liable for false results and incidents for these reasons. The manufacturer is not liable for any results by visual analysis of the patient samples.
- Only for in-vitro diagnostic use.
- All components of human origin used for the production of these reagents have been tested for anti-HIV antibodies, anti-HCV antibodies and HBsAg and have been found to be non-reactive. Nevertheless, all materials should still be regarded and handled as potentially infectious.
- Do not interchange reagents or strips of different production lots.
- No reagents of other manufacturers should be used along with reagents of this test kit.
- Do not use reagents after expiry date stated on the label.
- Use only clean pipette tips, dispensers, and lab ware.
- Do not interchange screw caps of reagent vials to avoid cross-contamination.
- Close reagent vials tightly immediately after use to avoid evaporation and microbial contamination.
- After first opening and subsequent storage check conjugate and control vials for microbial contamination prior to further use.
- To avoid cross-contamination and falsely elevated results pipette patient samples and dispense conjugate without splashing accurately to the bottom of wells.
- The ELISA is only designed for qualified personnel who are familiar with good laboratory practice.

WARNING: In the used concentration Bronidox L has hardly any toxicological risk upon contact with skin and mucous membranes!

WARNING: Sulphuric acid irritates eyes and skin. Keep out of the reach of children. Upon contact with the eyes, rinse thoroughly with water and consult a doctor!

#### 12.1. Disposal Considerations

Residues of chemicals and preparations are generally considered as hazardous waste. The disposal of this kind of waste is regulated through national and regional laws and regulations. Contact your local authorities or waste management companies which will give advice on how to dispose hazardous waste.

### BIBLIOGRAPHY

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3. McSharry, C.; Xia, Y., Holland, C.V. and Kennedy, M.W. (1999) Natural Immunity to *Ascaris lumbricoides* associated with immunoglobulin E antibody to ABA-1 allergen and inflammation indicators in children. *Infection and Immunity*, 67 (2), 484-489

# SCHEME OF THE ASSAY

Ascaris lumbricoides IgG-ELISA

## Test preparation

Prepare reagents and samples as described.  
 Establish the distribution and identification plan for all specimens and controls on the result sheet supplied in the kit.  
 Select the required number of microtiter strips or wells and insert them into the holder.

## Assay procedure

	Substrate blank (e.g. A1)	Negative control	Positive control	Cut-off control	Sample (diluted 1+100)
Negative control	-	100µl	-	-	-
Positive control	-	-	100µl	-	-
Cut-off control	-	-	-	100µl	-
Sample (diluted 1+100)	-	-	-	-	100µl
Cover wells with foil supplied in the kit <b>Incubate for 1 h at 37°C</b> Wash each well three times with 300µl of washing solution					
Conjugate	-	100µl	100µl	100µl	100µl
Cover wells with foil supplied in the kit <b>Incubate for 30 min 37±1°C.</b> Wash each well three times with 300µl of washing solution					
TMB Substrate	100µl	100µl	100µl	100µl	100µl
<b>Incubate for exactly 30 min at room temperature in the dark</b>					
Stop Solution	100µl	100µl	100µl	100µl	100µl
Photometric measurement at 450 nm (reference wavelength: 620 nm)					

# Symbols / Symbole / Symbôles / Símbolos / Símbolos / Σύμβολα

	Cat.-No.: / Kat.-Nr.: / No.- Cat.: / Cat.-No.: / N.º Cat.: / N.-Cat.: / Αριθμός-Κατ.:
	Lot-No.: / Chargen-Bez.: / No. Lot: / Lot-No.: / Lote N.º: / Lotto n.: / Αριθμός -Παραγωγή:
	Use by: / Verwendbar bis: / Utiliser à: / Usado por: / Usar até: / Da utilizzare entro: / Χρησιμοποιείται από:
	No. of Tests: / Kitgröße: / Nb. de Tests: / No. de Determ.: / N.º de Testes: / Quantità dei tests: / Αριθμός εξετάσεων:
	Concentrate / Konzentrat / Concentré / Concentrar / Concentrado / Concentrato / Συμπύκνωμα
	Lyophilized / Lyophilisat / Lyophilisé / Liofilizado / Liofilizado / Liofilizzato / Λυοφιλιασμένο
	In Vitro Diagnostic Medical Device. / In-vitro-Diagnostikum. / Appareil Médical pour Diagnostics In Vitro. / Dispositivo Médico para Diagnóstico In Vitro. / Equipamento Médico de Diagnóstico In Vitro. / Dispositivo Medico Diagnostico In vitro. / Ιατρική συσκευή για In-Vitro Διάγνωση.
	Evaluation kit. / Nur für Leistungsbewertungszwecke. / Kit pour évaluation. / Juego de Reactivos para Evaluació. / Kit de avaliação. / Kit di valutazione. / Κιτ Αξιολόγησης.
	Read instructions before use. / Arbeitsanleitung lesen. / Lire la fiche technique avant emploi. / Lea las instrucciones antes de usar. / Ler as instruções antes de usar. / Leggere le istruzioni prima dell'uso. / Διαβάστε τις οδηγίες πριν την χρήση.
	Keep away from heat or direct sun light. / Vor Hitze und direkter Sonneneinstrahlung schützen. / Garder à l'abri de la chaleur et de toute exposition lumineuse. / Manténgase alejado del calor o la luz solar directa. / Manter longe do calor ou luz solar directa. / Non esporre ai raggi solari. / Να φυλάσσεται μακριά από θερμότητα και άμεση επαφή με το φως του ηλίου.
	Store at: / Lagern bei: / Stocker à: / Almacene a: / Armazemar a: / Conservare a: / Αποθήκευση στους:
	Manufacturer: / Hersteller: / Fabricant: / Productor: / Fabricante: / Fabricante: / Παραγωγός:
	Caution! / Vorsicht! / Attention! / ¡Precaución! / Cuidado! / Attenzione! / Προσοχή!
<p>Symbols of the kit components see MATERIALS SUPPLIED.          Die Symbole der Komponenten sind im Kapitel KOMPONENTEN DES KITS beschrieben.          Voir MATERIEL FOURNI pour les symbôles des composants du kit.          Símbolos de los componentes del juego de reactivos, vea MATERIALES SUMINISTRADOS.          Para símbolos dos componentes do kit ver MATERIAIS FORNECIDOS.          Per i simboli dei componenti del kit si veda COMPONENTI DEL KIT.          Για τα σύμβολα των συστατικών του κιτ συμβουλευτείτε το ΠΑΡΕΧΟΜΕΝΑ ΥΛΙΚΑ.</p>	

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