

# Gliadin IgG and Gliadin IgA ELISA Kits

## Quantitative/qualitative assays for gliadin IgG and gliadin IgA antibodies

Product codes GD 16, 17 & 77 (96 tests)

For *in vitro* diagnostic use

100108

### 1. Intended use

The Gliadin IgG and Gliadin IgA kits are rapid ELISA methods for the detection of antibodies to gliadin, a principal component of wheat, barley and rye gluten. The assays are intended to aid the diagnosis of celiac disease. The components of the kit are for *in vitro* diagnostic use only.

### 2. Explanation of the Test

Gliadin is a mixture of glutamine-containing, alcohol soluble proteins, termed prolamins, present in wheat, barley and rye gluten. These proteins are associated with the harmful effects of celiac disease and gluten-sensitive enteropathy in humans. The proteins cause characteristic changes in the small intestinal mucosa. If patients are placed on a strictly gluten-free diet, the symptoms of the disease can be avoided. Serum IgG and IgA antibodies to gliadin have been closely associated with celiac disease.

### 3. Principle of the test

Diluted serum samples are incubated with gliadin immobilised on microtitre wells. After washing away unbound serum components, rabbit anti-human IgG or IgA conjugated to horseradish peroxidase is added to the wells, and this binds to surface-bound antibodies in the second incubation. Unbound conjugate is removed by washing, and a solution containing 3,3',5,5'-tetramethylbenzidine (TMB) and enzyme substrate is added to trace specific antibody binding. Addition of Stop Solution terminates the reaction and provides the appropriate pH for colour development. The optical densities of the standards, controls and samples are measured using a microplate reader at 450nm. Optical density is directly proportional to antibody activity in the sample.

### 4. Materials included in the kit

- **Microplate:** 96 wells in 12 X 8 break-apart strips, pre-coated with gliadin, with holder in a foil bag with desiccant
- **Reagent 1: Sample Diluent** 150mM Tris-buffered saline, pH 7.2 with antimicrobial agent, 10ml, (blue), concentrate (x15)
- **Reagent 2: Wash Buffer** 100mM Tris-buffered saline with detergent, pH 7.2, 100 ml, concentrate (x10)
- **Reagent 3: Conjugate** rabbit anti-human IgG (red) or IgA (yellow) conjugated to horseradish peroxidase in protein stabilising solution and antimicrobial agent, 12 ml, ready to use
- **Reagent 4: TMB Substrate** aqueous solution of TMB and hydrogen peroxide, 12 ml, ready to use
- **Reagent 5: Stop Solution** 0.25M sulphuric acid, 12 ml, ready to use
- **Standards:** 0, 6.25, 12.5, 25, 50 & 100 U/ml, 1ml of 10mM Tris-buffered saline containing human serum IgG/IgA antibodies to gliadin, ready to use
- **Standard for qualitative use:** 10 U/ml (IgG only), 4 U/ml (IgA only), 1ml of 10mM Tris-buffered saline containing human serum IgG/IgA antibodies to gliadin, ready to use
- **Positive Control:** 1ml of 10mM Tris-buffered saline containing human serum antibodies to gliadin, ready to use
- **Negative Control:** 1ml of 10mM Tris-buffered saline containing normal human serum, ready to use.
- **Instructions for use**

### 5. Other equipment required

1. Test tubes for dilution • graduated cylinder for preparing wash buffer • precision pipettes and disposable tips to deliver 10µl, 100µl, 1ml • EIA microplate washer or multi-channel pipette or wash bottle • distilled or de-ionised water • absorbent paper • EIA microplate reader with 450nm and optional 620nm reference filter. Alternatively, a suitable automated system may be used.
2. Instrumentation, whether manual or automated, should meet the following criteria: pipettes with better than 3% imprecision with no carry over between pipetting steps; microplate washers should remove 99% of fluid; automated machines should minimise time between washing and adding the next reagent.

### 6. Precautions

### 6.1 Safety Precautions

1. All reagents in this kit are for *in vitro* diagnostic use only.
2. Only experienced laboratory personnel should use this test. The test protocol must be followed strictly.
3. All human source material used in the preparation of standards and controls for this product have been tested and found negative for antibodies to HIV, HbsAg and HCV. No test method, however, can offer complete assurance that infectious agents are absent. Therefore, all reagents containing human material should be handled as if potentially infectious. Operators should wear gloves and protective clothing when handling any patient sera or serum based products.
4. Reagents of this kit contain antimicrobial agents and the TMB Substrate contains 3,3', 5,5'-tetramethylbenzidine. Avoid contact with the skin and eyes. Rinse immediately with plenty of water if any contact occurs.
5. The Stop Solution contains 0.25M sulphuric acid. Avoid contact with skin and eyes. Rinse immediately with plenty of water if contact occurs.
6. Any liquid that has been brought into contact with potentially infectious material has to be discarded in a container with a disinfectant. Disposal must be performed in accordance with local legislation.

### 6.2 Technical Precautions

1. Strips and solutions should not be used if the foil bag is damaged or liquids have leaked.
2. Allow all reagents and the microplate to reach room temperature before use. Ensure that the microplate foil bag containing any unused strips is well sealed and contains the desiccant to avoid moisture. Store at 2 – 8°C after use.
3. The sample diluent X15 concentrate contains 0.09% sodium azide as preservative. Prepare sufficient working strength diluent for the assay run. However, if the working strength diluent is to be stored for more than 1 week, add sodium azide (0.9g/L). Store unused sample diluent concentrate and dilute sample diluent at 2 – 8°C.
4. When automating, consider excess volumes required for setting up the instrument and dead volume of robot pipette
5. Include the Positive and Negative Control in every test run to monitor for reagent stability and correct assay performance.
6. Strictly observe the indicated incubation times and temperature.
7. Ensure that no cross-contamination occurs between wells. Keep all pipettes and other equipment used for Conjugate completely separate from the TMB Substrate.
8. When pipetting Enzyme Conjugate or TMB Substrate, aliquots for the required numbers of wells should be taken to avoid multiple entry of pipette tips into the reagent bottles. Never pour unused reagents back into the original bottles.
9. Do not allow microwells to dry between incubation steps.
10. Strictly follow the described wash procedure. Inefficient washing may cause high background signal.
11. Avoid direct sunlight and exposure to heat sources during all incubation steps.
12. Replace colour-coded caps on their correct vials to avoid cross-contamination
13. It is important to dispense all samples and controls into the wells without delay. Therefore ensure that all samples are ready to dispense.

### 7. Shelf life and storage conditions

On arrival, store the kit at 2 – 8°C. Once opened the kit is stable for 3 months (or until its expiry date if less than 3 months). Do not use kits beyond their expiry date. Do not freeze any kit component. The diluted Wash Buffer and Sample Diluent (see Technical Precautions) have a shelf life of 3 months if stored in a closed bottle at 2 – 8°C.

### 8. Specimen collection and storage

Serum or plasma samples may be used and should be stored at -20°C for long-term storage. Frozen samples must be mixed well after thawing and prior to testing. Repeated freezing and thawing can affect results. Addition of preservatives to the serum sample may adversely affect the results. Microbially contaminated, heat-treated or specimens containing particulate matter should not be used. Grossly haemolysed, icteric or lipaemic specimens should be avoided.

### 9. Preparation of reagents

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Genesis is a subsidiary of Omega Diagnostics Group plc

1. Dilute the Sample Diluent (**Reagent 1**) 1:14 in distilled water to make sufficient buffer for the assay run e.g. add 10ml sample diluent concentrate to 140 ml water.
2. Dilute the Wash Buffer (**Reagent 2**) 1: 9 in distilled water to make sufficient buffer for the assay run e.g. add 50ml wash buffer concentrate to 450ml water.

#### 10. Assay Procedure

1. Dilute patient samples 1:100 in diluted Sample Diluent (e.g. 10µl serum plus 1ml diluent).
2. Assemble the number of strips required for the assay.
3. For quantitative assays, dispense 100 µl of each Standard, the Negative and Positive Controls and the diluted patient samples into appropriate wells. For qualitative assays, dispense only the 10 U/ml Standard (IgG assays) or the 4 U/ml Standard (IgA assays), together with controls and samples.
4. Incubate for **30** minutes at room temperature.
5. After 30 minutes, decant or aspirate the well contents and wash the wells 3 times using automated washing or the manual wash procedure (see below). Careful washing is the key to good results. **Do not allow the wells to dry out.**

##### Manual Wash Procedure:

Empty the wells by inversion. Using a multi-channel pipette or wash bottle, fill the wells with Wash Buffer. Empty by inversion and blot the wells on absorbent paper. Repeat this wash process 2 more times.

6. Dispense 100µl of Conjugate (**Reagent 3**) into each well. Incubate the wells for **30** minutes at room temperature.
7. After 30 minutes, discard the well contents and carefully wash the wells 4 times with Wash Buffer. Ensure that the wells are empty but do not allow to dry out.
8. Using a repeating dispenser, rapidly dispense 100µl of TMB Substrate (**Reagent 4**) into each well. Incubate the plate for **10** minutes.
9. Add 100µl of Stop Solution (**Reagent 5**) to each well. To allow equal reaction times, the Stop Solution should be added to the wells in the same order as the TMB Substrate.
10. Read the optical density (OD) of each well at 450nm in a microplate reader within 10 minutes. A 620nm filter may be used as a reference wavelength.

#### 11. Quality control

Quality control data is supplied on the lot-specific QC certificate included in the kit.

Controls are intended to monitor for substantial reagent failure.

Any well positive by spectrophotometer but without visible colour should be cleaned on the underside and re-read. If OD values below zero are observed, the wavelengths used should be verified, the reader re-blanked to air and the measurements repeated.

#### 12. Interpretation of Results

##### Qualitative results

Gliadin IgG: Samples with OD > 10 U/ml IgG standard are positive  
 Gliadin IgA: Samples with OD > 4 U/ml IgA standard are positive

##### Quantitative results

Plot the OD of each standard against its concentration and draw the best-fit curve through the points. Read the unknowns off this curve.

##### Expected values

Data based on 159 adult donors and 86 children

|                            | Gliadin IgG | Gliadin IgA |
|----------------------------|-------------|-------------|
| Adults > 16 years (n=159)  | 0 - 10 U/ml | 0 - 4 U/ml  |
| Children 0 - 16 years n=86 | 0 - 30 U/ml | 0 - 4 U/ml  |

Note: Elevated levels of gliadin IgG (>30 U/ml) were detected in 5% of pre-operative hospitalised children without evidence of celiac disease. For gliadin IgA, samples with gliadin IgA values between 3-4 U/ml are indeterminate.

#### 13. Limitations of the Procedure

1. For gliadin IgA determinations, it is important to know the IgA status of a patient by measuring the total serum IgA level, as there is a high incidence of IgA deficiency in celiac disease.
2. Anti-gliadin IgA or tissue transglutaminase IgA (GD70/GD71) should be evaluated in all patients with gliadin IgG values above 10 U/ml (30 U/ml for children) as a number of patients exhibit raised gliadin IgG in the absence of celiac disease.
3. Results should be interpreted with caution in patients with Down's syndrome and systemic autoimmune disease, as these groups are also associated with raised anti-gliadin antibodies.

#### 14. Performance Characteristics

##### Diagnostic Sensitivity and Specificity

Based on analysis of 53 confirmed disease positive celiac patients, 35 patients with treated celiac disease and Dermatitis Herpetiformis, 90 non-celiac controls and 194 adult blood donors.

| Gliadin IgG | Disease Positive | Disease Negative |
|-------------|------------------|------------------|
| Positive    | 45               | 17               |
| Negative    | 8                | 302              |

Sensitivity: 84.9%  
 Specificity: 94.7%

| Gliadin IgA | Disease Positive | Disease Negative |
|-------------|------------------|------------------|
| Positive    | 34               | 13               |
| Negative    | 19               | 306              |

Sensitivity: 64.2%  
 Specificity: 95.9%

#### 15. Reproducibility

##### Within assay precision

|              | Mean  | CV% | n  |
|--------------|-------|-----|----|
| IgA Positive | 134.5 | 4   | 10 |
| IgA Negative | 3.2   | 3   | 10 |
| IgG Positive | 32.4  | 2   | 10 |
| IgG Negative | 9.3   | 6   | 10 |

##### Between assay precision

|              | Mean | CV% | n |
|--------------|------|-----|---|
| IgA Positive | 140  | 7   | 3 |
| IgA Negative | 3.1  | 8   | 3 |
| IgG Positive | 141  | 5   | 3 |
| IgG Negative | 32.3 | 12  | 3 |

#### Method Summary

- Dilute sera 1:100 with Sample Diluent (**Reagent 1**)
- Dispense Standards, the Positive and Negative Controls and the diluted samples into the microplate wells
- Incubate for **30** minutes at room temperature.
- Wash the wells three times
- Dispense 100µl of Conjugate (**Reagent 3**) into each well
- Incubate at room temperature for **30** minutes
- Wash the wells four times
- Add 100µl of TMB Substrate (**Reagent 4**) to each well
- Incubate at room temperature for **10** minutes
- Add 100µl Stop Solution (**Reagent 5**) to each well
- Read the optical density at 450nm (single wavelength) or 450/620nm (dual wavelength).

#### Further reading

Maki, M *et al*, (1988) Changing pattern of childhood coeliac disease in Finland *Acta Paediatr. Scand.*, 77, 408-412  
 Guandalini, S *et al*, (1989) Diagnosis of coeliac disease: Time for a change? *Arch Dis Child* 64, 1320-1325  
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 Greco, L *et al*, (1991) Multi-centre study on the frequency of identified cases of coeliac disease in Europe and in the Mediterranean area. *ESPGAN, Capri*, 11-12 October 1991  
 Ceccarelli, M *et al*, (1991) Is childhood disease under-diagnosed? *Eur J Paediatrics* 150,821-822