

FOR RESEARCH USE ONLY

NOT FOR IN VITRO CLINICAL DIAGNOSIS

## 1,5-AG(1,5-Anhydroglucitol) ELISA Kit

Catalog NO.:FY-EU1192 size: 96T/48T

This manual must be read attentively and completely before using this product.  
If you have any problems, please contact us.

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### Intended Use

The kit is intended for use in quantitative determination of 1,5-AG concentrations in serum, plasma, tissue homogenates, cell lysates, cell culture supernates and other biological fluids.

### Specification

- ★ Sensitivity:0.6 µg/mL.
- ★ Detection Range:2.35-150 µg/mL.
- ★ No significant cross-reactivity or interference between 1,5-AG and analogues was observed.
- ★ Repeatability: Coefficient of variation is 8%.

## Principle of the Procedure

This ELISA kit uses the Competitive-ELISA principle. The micro ELISA plate provided in this kit has been pre-coated with 1,5-AG. During the reaction, 1,5-AG in the sample or standard competes with a fixed amount of 1,5-AG on the solid phase supporter for sites on the Biotinylated Detection Ab specific to 1,5-AG. Excess conjugate and unbound sample or standard are washed away, and Avidin-Horseradish Peroxidase (HRP) conjugate are added to each micro plate well and incubated. Then a TMB substrate solution is added to each well. The enzyme-substrate reaction is terminated by the addition of stop solution and the color turns from blue to yellow. The optical density (OD) is measured spectrophotometrically at a wavelength of 450 nm. The concentration of 1,5-AG in tested samples can be calculated by comparing the OD of the samples to the standard curve.

## Limitations of the Procedure

1. This kit is for laboratory scientific research only, we will not be responsible for any consequences if this kit is used for clinical diagnosis or any other procedures.
2. Due to the uncertainty of its validity, this kit may not be suitable for testing some special experimental samples, such as gene knockout experiments.
3. This kit should be used before its expiration date, and please strictly follow the instructions for storage.
4. Different manufacturers' kits or testing the same analyte by other methods may produce inconsistent results because we do not compare our products with those of other manufacturers.
5. Since the antibodies used in the kit are usually prepared from recombinant proteins as immunogen, and recombinant proteins can be limited by different fragmentation, expression and purification systems, it is not recommended to use this kit to detect recombinant proteins
6. In order to get the best experimental results, please use only the reagents

- provided by the manufacturer, and do not mix reagents from different batches.
7. Due to the existing conditions and the limitations of science and technology, we cannot fully identify and analyze the raw materials provided by the supplier comprehensively. Therefore, the kit may have some quality and technical risks.
  8. The possibility of interference cannot be excluded before all factors are tested in the ELISA immunoassay.
  9. In order to obtain reproducible results, each step in the experiment should be controlled and variations in sample collection, handling and storage may also lead to differences in sample measurements.
  10. Although each kit passes rigorous quality testing, differences in measured values between batches of kits can still be caused by factors such as shipping conditions and different laboratory equipment.

## Reagents&Materials Provided

| Item   | Specifications                                    | Storage                       |
|--|---|-------------------------------|
| Micro ELISA Plate<br>(Dismountable)              | 96T: 8 wells ×12 strips<br>48T: 8 wells ×6 strips | -20°C, 6 months               |
| Reference Standard                               | 96T: 2 vials<br>48T: 1 vial                       |                               |
| Concentrated Biotinylated<br>Detection Ab (100×) | 96T: 1 vial, 60μL<br>48T: 1 vial, 60μL            |                               |
| Concentrated HRP Conjugate<br>(100×)             | 96T: 1 vial, 120μL<br>48T: 1 vial, 60μL           | -20°C, 6 months               |
| Reference Standard & Sample<br>Diluent           | 1 vial, 20 mL                                     | 2-8°C, 6 months               |
| Biotinylated Detection Ab Diluent                | 1 vial, 13 mL                                     |                               |
| HRP Conjugate Diluent                            | 1 vial, 13mL                                      |                               |
| Concentrated Wash Buffer (25×)                   | 1 vial, 30 mL                                     |                               |
| Substrate Reagent                                | 1 vial, 10 mL                                     | 2-8°C (Protect from<br>light) |

|                         |               |                 |
|-------------------------|---------------|-----------------|
| Stop Solution           | 1 vial, 10 mL | 2-8°C, 6 months |
| Plate Sealer            | 5 pieces      | RT              |
| Product Description     | 1 copy        |                 |
| Certificate of Analysis | 1 copy        |                 |

## Materials & Equipment Required But Not Provided

Microplate reader with 450nm wavelength filter

Incubator capable of maintaining 37°C

Single or multi-channel pipettes with high precision

disposable pipette tips

EP tubes

Container for Wash Solution

Squirt bottle, manifold dispenser, or automated microplate washer

Deionized or distilled water

Absorbent paper for blotting the microplate

## Sample collection

**Serum:** Allow blood samples to clot for 2 hours at room temperature or overnight at 2-8°C before centrifugation for 15 min at 2000×g at 2-8°C. Supernatants should be taken for assay testing immediately or stored at -20°C or -80°C for later use.

**Plasma:** Collect plasma using EDTA or heparin as an anticoagulant. Centrifuge samples for 15 min at 2000×g at 2-8°C within 30 min of collection. Supernatants should be taken for assay testing immediately or stored at -20°C or -80°C for later use.

**Tissue homogenates:** Tissues should be rinsed in ice-cold PBS to remove excess blood thoroughly, weighed, minced into small pieces. then Tissue pieces

omogenized in PBS (tissue weight (g): PBS (mL) volume=1:9) with a glass homogenizer on ice. The resulting suspension is sonicated with an ultrasonic cell disrupter till the solution is clarified. The homogenates are then centrifuged for 5 min at 10000×g. Supernatants should be taken for assay testing immediately or stored at -20°C or -80°C for later use.

**Cell lysates:** For adherent cells, gently wash the cells with moderate amount of cool PBS and detach the cells with trypsin. Collect cells by centrifugation for 5 min at 1500×g(suspension cells can be collected by centrifugation directly). Discard the supernate and wash cells 3 times with cool PBS. Resuspend cells in cool PBS with concentration of  $5 \times 10^6$  cells/mL. Repeat the freeze-thaw process several times until the cells are fully lysed. Centrifuge for 15min at 2000×g at 2-8°C. Supernatants should be taken for assay testing immediately or stored at -20°C or -80°C for later use.

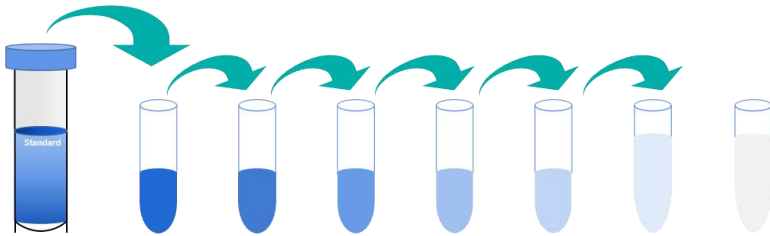
**Cell culture supernatant and other biological fluids:** Centrifuge samples for 15 min at 1500× g at 2-8°C. Supernatants should be taken for assay testing immediately or stored at -20°C or -80°C for later use.

### Note for sample

1. Samples should be used within 6 days when stored at 2-8°C, otherwise samples must be stored at -20°C ( $\leq 1$ month) or -80°C ( $\leq 2$ months). Avoid repeated freeze-thaw cycles.
2. Please predict the concentration before assaying. If the sample concentration is not within the range of the standard curve, users must determine the optimal sample dilutions for their particular experiments.
3. If the samples are not indicated in the manual, a preliminary experiment to determine the validity of the kit is necessary.
4. If a lysis buffer is used to prepare tissue homogenates or cell culture supernatant, there is a possibility to cause a deviation due to the introduced chemical substance.
5. Some recombinant protein may not be detected due to a mismatching with the coated antibody or detection antibody.
6. Please do not use hemolyzed samples for ELISA as it will affect the test results.
7. Fresh samples without long time storage is recommended for the test. Otherwise, protein degradation and denaturalization may occur in those samples and finally lead to wrong result.

## Reagent Preparation

1. Allow all reagents to return to room temperature (18-25°C) before use.
2. **Wash Buffer:** Dilute 20 mL of Concentrated Wash Buffer with 480 mL of deionized or distilled water to prepare 500 mL of Wash Buffer.
3. **Standard working solution:** First, centrifuge the standard at 1000×g for 1 min, add 1mL of standard sample dilution, let it stand for 10min and then mix gently, that is 150µg/mL of standard working solution.  
Second, take 7 EP tubes, add 500µL of Standard & Sample Diluent to each tube. Pipette 500µL of the 150µg/mL working solution to the first tube and mix up to produce a 75µg/mL working solution. Pipette 500µL of the solution from the former tube into the latter one according to the picture shown below. Mix each tube thoroughly before the next transfer. Set up 7 points of diluted standard such as  
150µg/mL, 75µg/mL, 37.5µg/mL, 18.75µg/mL, 9.38µg/mL, 4.69µg/mL, 2.34µg/mL  
and the last EP tubes with Standard & Sample Diluent is the blank as 0µg/mL



|       |       |       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|-------|-------|
| 150   | 75    | 37.5  | 18.75 | 9.38  | 4.69  | 2.34  | 0     |
| μg/mL | μg/mL | μg/mL | μg/mL | μg/mL | μg/mL | μg/mL | μg/mL |

- 4. Biotinylated Detection Ab working solution:** Calculate the required amount before the experiment (100 μL/well). In preparation, slightly more than calculated should be prepared. Centrifuge the stock tube before use, dilute the 100× Concentrated Detection Reagent A to 1× working solution with Assay Diluent A.
- 5. HRP Conjugate working solution:** Calculate the required amount before the experiment (100 μL/well). In preparation, slightly more than calculated should be prepared. Centrifuge the stock tube before use, dilute the 100× Concentrated Detection Reagent B to 1× working solution with Assay Diluent B.



## Assay Protocol

1. Add the **Standard working solution** to the first two columns: Each concentration of the solution is added in duplicate, to one well each, side by side (50 $\mu$ L for each well). Add the samples to the other wells (50  $\mu$ L for each well).
2. Add 50 $\mu$ L of **Detection Reagent A working solution** to each well. Cover with the plate sealer. Incubate for 60 min at 37°C.
3. Discard the liquid from each well, add 350 $\mu$ L of **wash buffer** to each well. Soak for 30sec and decant the solution from each well and pat it dry against clean absorbent paper. Repeat this wash step 3 times in total.
4. Add 100 $\mu$ L of **Detection Reagent B working solution** to each well. Cover with the plate sealer. Incubate for 30 min at 37°C.
5. Turn on the enzyme marker for preheating.
6. Discard the liquid from each well, repeat the washing process of step 3 for 5 times.
7. Add 90 $\mu$ L of **TMB Reagent** to each well. Cover with a new plate sealer. Incubate for 10-20 min at 37°C. Protect the plate from light.
8. Add 50  $\mu$ L of **Stop Solution** to each well.
9. The absorbance OD value of each well is measured at 450nm.

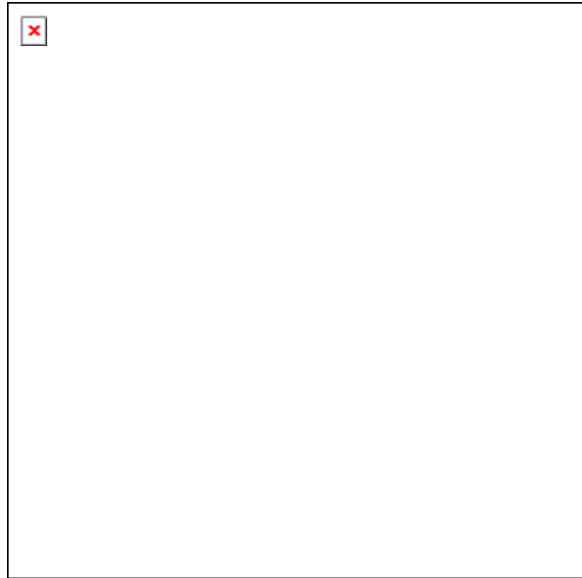
### Example Data

The OD values of the standard curve may vary according to the conditions of the actual assay performance (e.g. operator, pipetting technique, washing technique or temperature effects), so plotting log of the data to establish a standard curve for each test is strongly recommended. Typical standard curve is provided below for reference only.

| Concentration<br>( $\mu\text{g/mL}$ ) | OD450nm         |                 | Mean OD |
|---------------------------------------|-----------------|-----------------|---------|
|                                       | OD <sub>1</sub> | OD <sub>2</sub> |         |
| 150                                   | 0.255           | 0.256           | 0.256   |
| 75                                    | 0.377           | 0.379           | 0.378   |
| 37.5                                  | 0.555           | 0.557           | 0.556   |
| 18.75                                 | 0.839           | 0.846           | 0.843   |
| 9.38                                  | 1.148           | 1.154           | 1.151   |
| 4.69                                  | 1.516           | 1.523           | 1.52    |
| 2.34                                  | 1.789           | 1.799           | 1.794   |
| 0                                     | 2.537           | 2.548           | 2.543   |

### Calculation of Results

Average the duplicate readings for each standard and samples. Plot a four parameter logistic curve on log-log axis, with standard concentration on the x-axis and OD values on the y-axis. If the OD of the sample under the lowest limit of the standard curve, you should re-test it with an appropriate dilution. The actual concentration is the calculated concentration multiplied by the dilution factor.



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### Sensitivity

The minimum detectable dose of 1,5-AG is typically less than 0.6  $\mu\text{g/mL}$ . The sensitivity of this assay, or Limit of Detection (LOD) was defined as the lowest protein concentration that could be differentiated from zero. It was determined by adding three standard deviations to the mean OD value of twenty zero standard replicates and calculating the corresponding concentration.

### Specificity

This assay has high sensitivity and excellent specificity for detection of 1,5-AG. No significant cross-reactivity or interference between 1,5-AG and analogues was observed. Limited by current skills and knowledge, it is impossible for us to complete the cross- reactivity detection between 1,5-AG and all the analogues, therefore, cross reaction may still exist.

## Precision

Mean coefficient of variation for Intra-Assay and Inter-Assay: 3 samples with low, middle and high level concentration were tested for repeat multiple times, respectively.

| Item          | Intra-Assay | Inter-Assay |
|---------------|-------------|-------------|
| Sample number | 3           | 3           |
| Replicate     | 9           | 18          |
| CV(%)         | 5           | 8           |

## Recovery

Three matrices listed below were spiked with certain level of 1,5-AG, The recovery rates of 1,5-AG were calculated by comparing the measured value to the expected amount of 1,5-AG in samples.

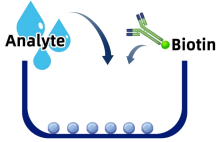
| Matrix type              | Recovery Range (%) | Average (%) |
|--------------------------|--------------------|-------------|
| Serum (n=5)              | 80-93              | 85          |
| EDTA plasma (n=5)        | 87-99              | 93          |
| Cell culture media (n=5) | 90-103             | 96          |

## Linearity

Three types of Sample were spiked with appropriate concentrations of 1,5-AG and diluted into a series of concentration gradients, then the linearity of the assay was demonstrated by the percentage of comparing calculated concentrations and expected values.

| Dilution Factor | Recovery Range (%) |                   |                          |
|-----------------|--------------------|-------------------|--------------------------|
|                 | Serum (n=5)        | EDTA plasma (n=5) | Cell culture media (n=5) |
| 1:2             | 87-97              | 80-85             | 89-103                   |
| 1:4             | 86-92              | 80-85             | 95-102                   |
| 1:8             | 89-103             | 87-96             | 96-104                   |
| 1:16            | 89-98              | 82-95             | 87-98                    |

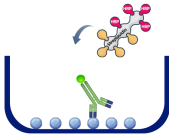
## Summary for Procedure



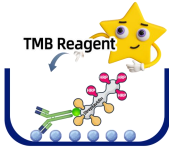
1、Add 50 $\mu$ L standard or sample to the wells, immediately add 50 $\mu$ L Biotinylated Detection Ab working solution to each well. Incubate for 30 min at 37 $^{\circ}$ C



2、Aspirate and wash the plate for 3 times.



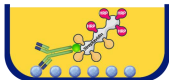
3、Add 100 $\mu$ L HRP conjugate working solution. Incubate for 30 min at 37 $^{\circ}$ C. Aspirate and wash the plate for 3 times



4、Add 100 $\mu$ L Substrate Reagent. Incubate for 15 min at 37 $^{\circ}$ C



5、Add 50 $\mu$ L Stop Solution



6、Read the plate at 450nm immediately. Calculation of the results

## Troubleshooting

| Problem                      | Possible Causes                        | Subsequent Actions  |
|------------------------------|--|---|
| Poor standard curve          | Improper standard dilution             | Ensure that standards are dissolved and diluted in the recommended manner |
|                              | Inaccurate pipetting                   | Periodically calibrate pipettes and check the pipette tips                |
|                              | Evaporate the reaction solution        | Seal the enzyme plate with plate sealer                                   |
|                              | Incomplete plate washing               | Adequate washing times and the amount of washing solution added           |
|                              | Foreign matter in the bottom of wells  | Clean the bottom of the plate before reading                              |
| Weak or no color development | Insufficient reaction of reagents      | Ensure incubation time and incubate at the recommended temperature        |
|                              | Inadequate reagent volumes             | Check the pipette and Follow the steps strictly to operate                |
|                              | Improper dilution                      | Check the reagent dilution process  |
|                              | Inactivation of enzyme conjugate       | Mix conjugate and substrate, check by color development                   |
| Low OD value                 | Incorrect setting of microplate reader | Check the wavelength of reader  |
|                              | No stop solution added                 | Add appropriate amount of stop solution                                   |
|                              | Waiting too long time to read          | Read the plate in time  |
| High background              | Contaminated chromogenic solution      | Replace chromogenic solution  |
|                              | Coloring time is too long              | Control the coloring time   |
|                              | Wrong dilution of reaction reagent     | Use the recommended dilution  |
|                              | Inadequate washing of the plate        | Adequate washing times and the amount of washing solution added           |