



Glucokinase (Human) ELISA Kit

06/18

(Catalog # E4597-100, 100 assays, Store at 4°C)

I. Introduction:

Glucokinase (GCK) is expressed in specific types of tissues: liver, pancreas, small intestine and brain. Glucokinase functions as a glucose sensor, triggering shifts in carbohydrate metabolism or cell function in response to the levels of glucose in blood, such as nutritional and hormonal molecular pathways. Unlike other Hexokinases, Glucokinase has a relatively low affinity for glucose and it is not inhibited by physiological concentrations of glucose 6-phosphate. Mutations in the gene encoding GCK can cause both hyperglycemia and hypoglycemia. Due to the major role of Glucokinase in controlling blood glucose homeostasis, Glucokinase is currently considered as a strong candidate target for the treatment of Hyperglycemia, a condition encountered in Type 2 Diabetic patients. BioVision's Glucokinase ELISA kit is a sandwich ELISA assay for the quantitative measurement of Glucokinase in Human serum, plasma and cell culture supernatants. The density of color is proportional to the amount of Glucokinase captured from the samples.

II. Application:

This ELISA kit is used for *in vitro* quantitative determination of Glucokinase in human samples.

Detection Range: 0.781 - 50 ng/ml

Sensitivity: < 0.469 ng/ml

Assay Precision: Intra-Assay: CV < 8%; Inter-Assay: CV < 10% (CV (%) = SD/mean X 100)

No significant cross-reactivity or interference between Glucokinase and analogues was observed.

III. Sample Type:

Human serum, plasma, tissue homogenates and other biological fluids.

IV. Kit Contents:

| Components | E4597-100 | Part No. |
|---|---------------|--------------|
| Micro ELISA Plate | 8 X 12 strips | E4597-100-1 |
| Lyophilized Standard | 2 vials | E4597-100-2 |
| Sample / Standard dilution buffer | 20 ml | E4597-100-3 |
| Biotin- detection antibody (Concentrated) | 120 µl | E4597-100-4 |
| Antibody dilution buffer | 10 ml | E4597-100-5 |
| HRP-Streptavidin Conjugate (SABC) (Avoid light) | 120 µl | E4597-100-6 |
| SABC dilution buffer | 10 ml | E4597-100-7 |
| TMB substrate (Avoid light) | 10 ml | E4597-100-8 |
| Stop Solution | 10 ml | E4597-100-9 |
| Wash buffer (25X) | 30 ml | E4597-100-10 |
| Plate sealers | 5 | E4597-100-11 |

V. User Supplied Reagents and Equipment:

- Microplate reader capable of measuring absorbance at 450 nm
- 37°C incubator
- Precision pipettes with disposable tips
- Clean eppendorf tubes for preparing standards or sample dilutions
- Absorbent paper

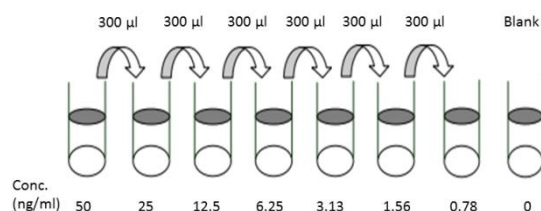
VI. Storage and Handling:

The entire kit may be stored at 4°C for up to 6 months from the date of shipment.

VII. Reagent and Sample Preparation:

Note: Prepare reagents within 30 minutes before the experiment. Before using the kit, spin tubes and bring down all components to the bottom of tubes.

- 1. Biotin- detection antibody working solution:** Calculate the total volume of the working solution: 0.1 ml / well x quantity of wells with additional 0.1 - 0.2 ml of the total volume. Dilute the Biotin- detection antibody with Antibody dilution buffer at 1:100 and mix thoroughly.
- 2. HRP-Streptavidin Conjugate (SABC):** Calculate the total volume of the working solution: 0.1 ml / well x quantity of wells with additional 0.1 - 0.2 ml of the total volume. Dilute the SABC with SABC dilution buffer at 1:100 and mix thoroughly.
- 3. Wash Buffer:** Dilute 30 mL of Concentrated Wash Buffer into 750 mL of Wash Buffer with deionized or distilled water. Put unused solution back at 4°C. If crystals have formed in the concentrate, warm it with 40°C water bath and mix it gently until the crystals have completely dissolved. The solution should be cooled to room temperature before use.
- 4. Standard Preparation:**
 - Reconstitute the lyophilized Glucokinase standard by adding 1 ml of Standard/Sample Dilution Buffer to make the 50 ng/ml standard stock solution. Use within 2 hours after reconstituting.
 - Allow solution to sit at room temperature for 10 minutes, then gently vortex



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to mix completely.

- Prepare 0.6 ml of 25 ng/ml top standard by adding 0.3 ml of the above stock solution in 0.3 ml of Standard/Sample Dilution Buffer. Perform 2-fold serial dilutions of the top standards to make the standard curve within the range of this assay.
- Suggested standard points are: 50, 25, 12.5, 6.25, 3.13, 1.56, 0.78, 0 ng/ml

5. Sample Preparation:

Note: Samples to be used within 5 days may be stored at 4°C, otherwise samples must be stored at -20°C (≤1 month) or -80°C (≤2 months) to avoid loss of bioactivity and contamination. Avoid multiple freeze-thaw cycles.

- **Serum:** Coagulate the serum for 2 hour at room temperature or overnight at 4°C. Centrifuge at approximately 1000xg for 20 min. Collect the supernatant and carry out the assay immediately. Blood collection tubes should be disposable, non-pyrogenic, and non-endotoxin.
- **Plasma:** Collect plasma using EDTA-Na₂ as an anticoagulant. Centrifuge samples for 15 minutes at 1000xg at 2 - 8°C within 30 minutes of collection. Collect the supernatant and carry out the assay immediately. Avoid hemolysis, high cholesterol samples.
- **Tissue homogenates:** Rinse the tissues with ice-cold PBS (0.01M, pH=7.4) to remove excess hemolysis blood thoroughly. Tissue pieces should be weighed and then minced to small pieces which will be homogenized in PBS (the volume depends on the weight of the tissue. 9 mL PBS would be appropriate for 1 g of tissue. Some protease inhibitor is recommended to add into the PBS.) with a glass homogenizer on ice. To further break the cells, sonicate the suspension with an ultrasonic cell disrupter or subject it to freeze-thaw cycles. The homogenates are then centrifuged for 5 minutes at 5000xg to retrieve the supernatant.
- **Cell culture supernatant:** Centrifuge supernatant for 20 minutes to remove insoluble impurity and cell debris at 1000xg at 2 - 8°C. Collect the clear supernatant and carry out the assay immediately or aliquot and store at -20°C.
- **Other biological fluids:** Centrifuge samples for 20 min at 1000xg at 4°C. Collect the supernatant and carry out the assay immediately.
- End user should estimate the concentration of the target protein in the test sample first, and select a proper dilution factor to make the diluted target protein concentration fall in the optimal detection range of the kit.

VIII. Assay Protocol:

Note: Bring all reagents and samples to room temperature 30 minutes prior to the assay. It is recommended that all standards and samples be run at least in duplicate. A standard curve must be run with each assay.

1. Prepare all reagents, samples and standards as instructed in section VII.
2. Wash plate 2 times with **1X Wash Solution** before adding standard, sample and control wells.
3. Add 100 µl of each **standards** or **samples** into appropriate wells. Cover well and incubate for 1.5 hours at 37°C.
4. Remove the cover and discard the plate content without washing or letting the wells completely dry.
5. Add 0.1 ml of **Biotin-detection antibody** work solution into the above wells. Seal the plate and incubate at 37°C for 60 min.
6. Discard the solution and wash 3 times with **1X Wash Solution**. Wash by filling each well with Wash Buffer (350 µl) using a multi-channel pipette or autowasher. Let it soak for 1-2 minutes, and then remove all residual wash-liquid from the wells by aspiration. After the last wash, remove any remaining Wash Buffer by aspirating or decanting. Clap the plate on absorbent filter papers or other absorbent materials.
7. Add 0.1 ml of **SABC working solution** into each well, cover the plate and incubate at 37°C for 30 min.
8. Discard the solution and wash 5 times with **1X Wash Solution** as step 6.
9. Add 90 µl of **TMB substrate** into each well, cover the plate and incubate at 37 °C in dark within 15-30 min. The shades of blue should be seen in the first 3-4 wells by the end of incubation.
10. Add 50 µl of **Stop Solution** to each well. Read result at 450 nm within 20 minutes.

IX. CALCULATION:

For calculation, **(the relative O.D.450) = (the O.D.450 of each well) – (the O.D.450 of Zero well)**. The standard curve can be plotted as the relative O.D.450 of each standard solution (Y) vs. the respective concentration of the standard solution (X). The Human Glucokinase concentration of the samples can be interpolated from the standard curve. If the samples measured were diluted, multiply the dilution factor to the concentrations from interpolation to obtain the concentration before dilution.

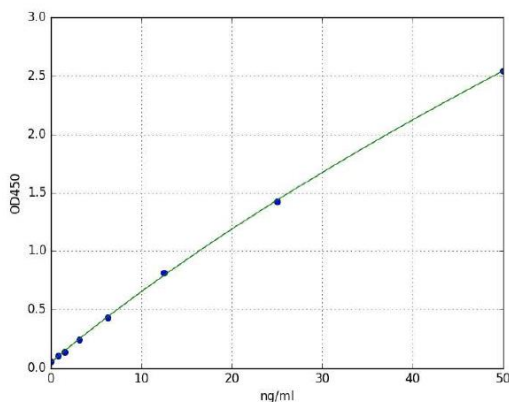


Figure: Typical Standard Curve: These standard curves are for demonstration only. A standard curve must be run with each assay.



X. RECOVERY:

| Matrix | Recovery range (%) | Average(%) |
|---------------------|--------------------|------------|
| serum(n=5) | 87-101 | 95 |
| EDTA plasma(n=5) | 86-99 | 92 |
| heparin plasma(n=5) | 86-103 | 94 |

XI. LINEARITY:

| Sample | 1:2 | 1:4 | 1:8 | 1:16 |
|---------------------|---------|---------|---------|---------|
| serum(n=5) | 88-102% | 85-104% | 87-104% | 90-104% |
| EDTA plasma(n=5) | 82-98% | 88-100% | 83-97% | 88-99% |
| heparin plasma(n=5) | 83-100% | 89-100% | 82-100% | 81-97% |

XII. RELATED PRODUCTS:

- PicoProbe™ Glucokinase Activity Assay Kit (Fluorometric) (K969)
- Glucokinase, human liver, recombinant (7776)
- Glucokinase, human pancreatic, recombinant (7777)
- Recombinant E. coli, Glucokinase (P1054)
- GCK (Glucokinase) Antibody (3154)