Glutamate Dehydrogenase

Microplate Assay Kit

User Manual

Catalog # CAK1066

(Version 1.3D)

Detection and Quantification of Glutamate Dehydrogenase (GDH) Activity in Tissue extracts, Cell lysate Samples.

For research use only. Not for diagnostic or therapeutic procedures.

I. INTRODUCTION

Glutamate Dehydrogenase (GDH) is a mitochondrial enzyme that catalyzes the reversible oxidative deamination of glutamate to a-ketoglutarate and serves as a key link between anabolic and catabolic pathways. In mammals, GDH is subject to allosteric regulation and has high activity in liver, kidney, brain, and pancreas. GDH activity in serum can be used to differentiate between liver diseases due to liver inflammation, which do not show elevated serum GDH activity, and diseases that result in hepatocyte necrosis, which results in elevated serum GDH.

The assay is initiated with the enzymatic catalysis of NH_4^+, α ketoglutaric acid and NADH by GDH. NADH can be measured at a colorimetric readout at 340 nm.

II. KIT COMPONENTS

Component	Volume	Storage
96-Well Microplate	1 plate	
Assay Buffer	30 ml x 4	4 °C
Substrate Dilution	20 ml x 1	4 °C
Substrate	Powder x 1	-20 °C
Standard	Powder x 1	-20 °C
Positive Control	Powder x 1	-20 °C
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Note:

Substrate: add 19 ml Substrate Dilution into Substrate before use, mix.

Standard: add 1 ml distilled water to dissolve before use; then add 0.2 ml into 0.8 ml distilled water, the concentration will be 400 µmol/L.

Positive Control: add 1 ml distilled water to dissolve before use, then add 0.5 ml into 0.5 ml distilled water, mix.

III. MATERIALS REQUIRED BUT NOT PROVIDED

1. Microplate reader to read absorbance at 340 nm
2. Distilled water
3. Pipettor, multi-channel pipettor
4. Pipette tips
5. Mortar
6. Centrifuge
7. Timer
8. Ice

IV. SAMPLE PREPARATION

1. For cell and bacteria samples

Collect cell or bacteria into centrifuge tube, discard the supernatant after centrifugation, add 1 ml Assay buffer for 5×10^6 cell or bacteria, sonicate (with power 20%, sonicate 3s, interval 10s, repeat 30 times); centrifuged at 8000g 4 °C for 10 minutes, take the supernatant into a new centrifuge tube and keep it on ice for detection.

2. For tissue samples

Weigh out 0.1 g tissue, homogenize with 1 ml Assay buffer on ice, centrifuged at 8000g 4 °C for 10 minutes, take the supernatant into a new centrifuge tube and keep it on ice for detection.

3. For serum, plasma and other biological fluids samples

Detect directly.

V. ASSAY PROCEDURE

Warm all reagents to room temperature before use.

Add following reagents into the microplate:

Reagent	Sample	Standard	Blank	Positive Control
Standard	--	200 µl	--	--
Distilled water	--	--	200 µl	--
Sample	10 µl	--	--	--
Positive Control	--	--	--	10 µl
Substrate	190 µl	--	--	190 µl
Mix, measured at 340 nm and record the absorbance of 10th second and 130th second.				

Note:

1) Perform 2-fold serial dilutions of the top standards to make the standard curve.

2) For unknown samples, we recommend doing a pilot experiment & testing several doses to ensure the readings are within the standard curve range. If the enzyme activity is lower, please add more sample into the reaction system; or increase the reaction time; if the enzyme activity is higher, please dilute the sample, or decrease the reaction time.

3) Reagents must be added step by step, can not be mixed and added together.

VI. CALCULATION

Unit Definition: One unit of GDH activity is defined as the enzyme that decomposes 1 μmol of NADH per minute.

1. According to the protein concentration of sample

$$GDH\ (U/mg) = (C_{Standard} \times V_{Standard}) \times (OD_{Sample(10S)} - OD_{Sample(130S)}) / (OD_{Standard} - OD_{Blank}) / (V_{Sample} \times C_{Protein}) / T$$

$$= 4 \times (OD_{Sample(10S)} - OD_{Sample(130S)}) / (OD_{Standard} - OD_{Blank}) / C_{Protein}$$

2. According to the weight of sample

$$GDH\ (U/g) = (C_{Standard} \times V_{Standard}) \times (OD_{Sample(10S)} - OD_{Sample(130S)}) / (OD_{Standard} - OD_{Blank}) / (V_{Sample} \times W / V_{Assay}) / T$$

$$= 4 \times (OD_{Sample(10S)} - OD_{Sample(130S)}) / (OD_{Standard} - OD_{Blank}) / W$$

3. According to the quantity of cells or bacteria

$$GDH\ (U/10^4) = (C_{Standard} \times V_{Standard}) \times (OD_{Sample(10S)} - OD_{Sample(130S)}) / (OD_{Standard} - OD_{Blank}) / (V_{Sample} \times N / V_{Assay}) / T$$

$$= 4 \times (OD_{Sample(10S)} - OD_{Sample(130S)}) / (OD_{Standard} - OD_{Blank}) / N$$

4. According to the volume of serum or plasma

$$GDH\ (U/ml) = (C_{Standard} \times V_{Standard}) \times (OD_{Sample(10S)} - OD_{Sample(130S)}) / (OD_{Standard} - OD_{Blank}) / V_{Sample} / T$$

$$= 4 \times (OD_{Sample(10S)} - OD_{Sample(130S)}) / (OD_{Standard} - OD_{Blank})$$

$C_{Standard}$: the standard concentration, 400 μmol/L = 0.4 μmol/ml;

$V_{Standard}$: the volume of standard, 200 μl = 0.2 ml;

$C_{Protein}$: the protein concentration, mg/ml;

W: the weight of sample, g;

N: the quantity of cell or bacteria, N × 10^4;

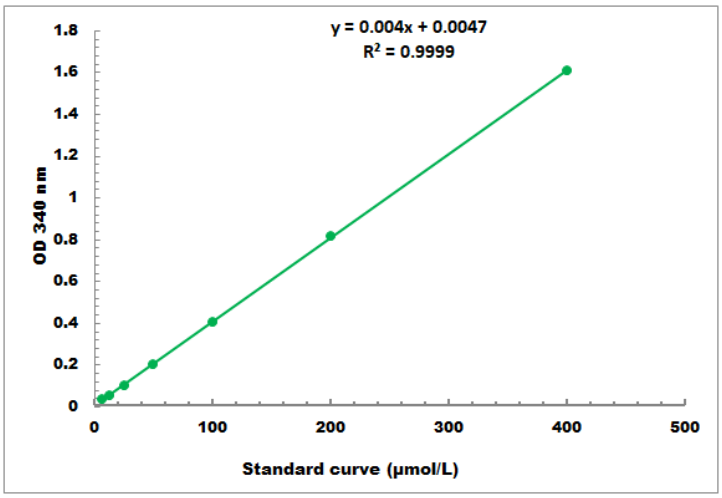
V_{Sample}: the volume of sample, 0.01 ml;

V_{Assay}: the volume of Assay buffer, 1 ml;

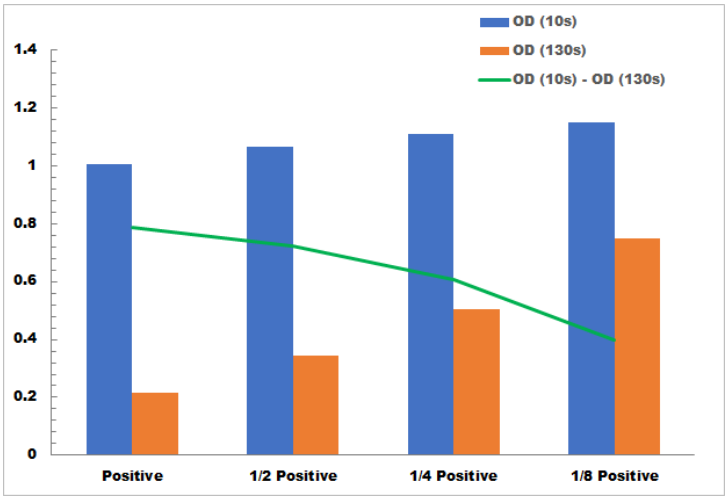
T: the reaction time, 2 minutes.

VII. TYPICAL DATA

The standard curve is for demonstration only. A standard curve must be run with each assay.



Detection Range: 4 μmol/L - 400 μmol/L



Positive Control reaction in 96-well plate assay with decreasing the concentration

VIII. TECHNICAL SUPPORT

For troubleshooting, information or assistance, please go online to www.cohesionbio.com or contact us at techsupport@cohesionbio.com

IX. NOTES