(FOR RESEARCH USE ONLY. DO NOT USE IT IN CLINICAL DIAGNOSIS!)

Aldehyde Dehydrogenase (ALDH) Assay Kit

Catalog No.: BC00171

Size: 50T

Please read the instructions carefully before use. If you have any questions or need further help during experiment, please don't hesitate to contact us through the following methods:

✉ Email (Sale) order@enkilife.com

✉ Email (Techsupport) techsupport@enkilife.com

☎ Tel: 0086-27-87002838

Website: www.enkilife.com

Shelf life: Please refer to the label on the outer package.

Techsupport: In order to provide you with better service, please inform us the lot number on the label of the outer package.

Basic Information

Product Name	Aldehyde Dehydrogenase (ALDH) Assay Kit
Detection Method	Colorimetric
Sample Type	Tissues, cells, liquid samples
Assay Type	Quantitative
Detection Instrument	Ultraviolet spectrophotometer (340 nm)

Product Introduction

Aldehyde dehydrogenase (ALDH) is a type of dehydrogenase widely distributed in animals, plants and microorganisms. Its primary function is to oxidize acetaldehyde into acetic acid, playing a core role in alcohol metabolism.

In humans and numerous animals, mitochondrial aldehyde dehydrogenase can transform toxic alcohols, making it a research hotspot in cellular detoxification studies. Meanwhile, aldehyde dehydrogenase has extensive research and application prospects in molecular biology and the detection of related diseases.

Principle

In the presence of coenzyme I, aldehyde dehydrogenase catalyzes the conversion of acetaldehyde and NAD^+ to acetic acid and NADH, accompanied by an increase in absorbance at 340 nm. The activity of aldehyde dehydrogenase can be calculated by measuring the change in absorbance at 340 nm.

Components

No.	Components	Size	Notes
Reagent 1	Liquid	60 mL×1	Store at 4°C
Reagent 2	Liquid	3 mL×1	Store at 4 °C away from light
Reagent 3	Extraction Solution	60 mL×1	Store at 4°C

Storage

The kit has a validity period of 3 months.

Preparation

UV spectrophotometer with 340 nm wavelength, 1 cm path length quartz cuvettes with slit, centrifuge, 37°C constant temperature water bath or air incubator, adjustable pipettes, mortar, distilled water and analytical balance.

- **Sample handling**

1. Cultured cells: Use a ratio of cell count (10^4 cells) to Extraction Solution volume (mL) of 500-1000:1 (recommended: add 1 mL Extraction Solution to 5 million cells). Lyse cells by sonication on ice with 300 W power: 3 s sonication followed by a 7 s interval, for a total sonication duration of 3 min. Centrifuge the lysate at 10,000 g and 4°C for 10 min, collect the supernatant and keep it on ice for testing.
2. Tissue samples: Homogenize tissue on ice at a tissue mass (g) to Extraction Solution volume (mL) ratio of 1:5-10 (recommended: add 1 mL Extraction Solution to 0.1 g tissue). Centrifuge the homogenate at 10,000 g and 4°C for 20 min, collect the supernatant and keep it on ice for testing.
3. Liquid samples: Test directly without pretreatment.

Operation process

1. Preheat the spectrophotometer for more than 30 min and set the wavelength to 340 nm, then zero the instrument with distilled water.
2. Preparation of Working Solution: Mix Reagent 1 and Reagent 2 at a volume ratio of 20:1. Prepare only the amount needed and mix thoroughly.

	Assay tube
Test sample (mL)	0.1
Working Solution (mL)	0.9
Mix thoroughly, record absorbance A1 at 340 nm, incubate at 37 °C for 5 min, then record absorbance A2 at 340 nm. Calculate $\Delta A = A2 - A1$.	

Calculation

1. Calculated by protein concentration

Unit definition: The amount of enzyme per mg of tissue protein per minute catalyzed reduction of 1nmol NAD^+ is defined as 1 enzyme activity unit.

$$\text{ALDH Activity (U/mg)} = \frac{\Delta A \times V_{Total}}{\varepsilon \times d \times V_{sample} \times Cpr \times T} = \frac{322 \times \Delta A}{Cpr}$$

2. Calculated by fresh sample weight

Unit definition: The amount of enzyme per g of tissue per minute to catalytically reduce 1nmol NAD^+ is defined as 1 enzyme activity unit.

$$\text{ALDH Activity (U/g)} = \frac{\Delta A \times V_{Total} \times V_{Extract}}{\varepsilon \times d \times V_{sample} \times W \times T} = \frac{322 \times \Delta A}{W}$$

3. Calculated by the number of cells

Unit definition: The amount of enzyme per minute catalyzed by 10,000 cells reducing 1nmol NAD^+ per minute is defined as 1 enzyme activity unit.

$$\text{ALDH Activity (U/10}^4\text{)} = \frac{\Delta A \times V_{Total} \times V_{Extract}}{\varepsilon \times d \times V_{sample} \times \text{number of cells} \times T} = \frac{322 \times \Delta A}{\text{number of cells}}$$

4. Calculated by liquid volume

Unit definition: The amount of enzyme per mL sample per minute to catalytically reduce 1nmol NAD^+ is defined as 1 enzyme activity unit.

$$\text{ALDH Activity (U/mL)} = \frac{\Delta A \times V_{Total}}{\varepsilon \times d \times V_{sample} \times T} = 322 \times \Delta A$$

Annotation:

T: Reaction time, 5 min

V_{Total}: Total volume of reaction system, 1 mL

ε: Molar extinction coefficient of NADH, 6.22×10^{-3} L·μmol^{-1}·cm^{-1}

d: Cuvette optical path length, 1 cm

V_{sample}: Volume of sample added, 0.1 mL

W: Sample mass, g

$V_{Extract}$: Volume of extraction solution added, 1 mL

Cpr: Protein concentration of sample, mg/mL

Precautions

1. It is recommended to use disposable laboratory test tubes for operation.
2. This product is intended for scientific research use only by professionals and must not be used for clinical diagnosis or treatment, in food or drugs, or stored in ordinary residences.