

## **Hepatic lipase (HL) Activity Assay Kit**

**Note:** Take two or three different samples for prediction before test.

**Operation Equipment:** Spectrophotometer

**Cat No:** NA0699

**Size:**50T/24S

### **Components:**

Reagent I: 100 mL×1. Storage at 4°C.

Reagent II: 3 mL×1. Storage at 4°C.

Reagent III: Powder×1. Storage at 4°C. Before use, add 30 mL of distilled water, fully dissolve.

Reagent IV: Powder×2. Storage at -20°C. Before use, add 2 mL of distilled water to the one, fully dissolve.

The dissolved reagent can be stored at -20°C after repacking. Avoid repeated freeze-thaw cycles;

Standard: Powder×1. Before use, 6.94 mL of **acetone** is added to prepare a 10 μmol/mL α-naphthol standard solution, which was fully dissolved before use.

### **Product Description:**

Hepatic lipase (HL) is a lipolytic enzyme synthesized in liver parenchymal cells. It is present on the surface of the liver sinusoidal endothelial cells and the surface of the hepatocyte microvilli in the sinusoidal space, and can hydrolyze various lipoproteins. The triglycerides (TG) and phospholipids (PL) in the medium change the size and density of various lipoprotein particles. When the HL and its activity in the plasma increasing, it can lead to low density lipoprotein (LDL) levels in the plasma, increase and accelerate the occurrence and development of atherosclerosis.

HL hydrolyzes α-naphthyl acetate to produce α-naphthol, which can form a purple-red azo compound with fast blue B salt. It has a characteristic absorption peak at 595 nm, and its color depth is positively correlated with liver esterase activity within a certain range.

### **Reagents and Equipment Required but Not Provided:**

Spectrophotometer, water bath, balance, centrifuge, adjustable transferpettor, 1 mL glass cuvette, mortar/homogenizer, ultrasonic crusher, ice and distilled water.

### **Procedure:**

#### **I. Enzyme extraction**

##### 1. Tissue

According to the tissue mass (g): the volume of Reagent I (mL) is 1:5~10 to extract. It is recommended to add 1 mL of Reagent I to 0.1 g of tissue, and fully homogenize on ice bath. Centrifuge at 10000g for 10 minutes at 4°C to remove insoluble materials, and take the supernatant on ice before testing.

##### 2. Bacteria or cells

According to the bacteria or cells ( $10^4$ ): the volume of Reagent I (mL) is 500~1000:1. It is recommended to add 1 mL of Reagent I to 5 million of bacteria or cells. Use ultrasonication to splitting bacteria and cells (placed on ice, ultrasonic power 300W, working time 3s, interval 7s, total time 3 min). Centrifuge at 10000g for 10 minutes at 4°C to remove insoluble materials and take the supernatant on ice before testing.

3. Culture medium or other liquid: Detect directly.

## II. Detection

1) Preheat spectrophotometer for 30 minutes, adjust the wavelength to 595 nm, set zero with distilled water.

2) Preheat reagent III at 30°C for more than 20 minutes.

3) Standard: Dilute the 10 $\mu$ mol/mL standard solution to 1.25, 0.625, 0.3125, 0.15625, 0.078 $\mu$ mol/mL with reagent I.

4) Add the following reagents in 1.5 mL EP tubes:

	Contrast tube (C)	Test tube (T)	Standard tube (S)	Blank tube (B)
Sample ( $\mu$ L)	100	100	-	-
Standard solution ( $\mu$ L)	-	-	100	-
Reagent I ( $\mu$ L)	450	400	400	500
Reagent II ( $\mu$ L)	-	50	50	50
Mix and react for 10min at 30°C			-	-
Reagent III ( $\mu$ L)	400	400	400	400
Reagent IV ( $\mu$ L)	50	50	50	50
Mix thoroughly and detect the absorbance at 595 nm, record as $A_C$ , $A_T$ , $A_S$ and $A_B$ respectively. $\Delta A_T=(A_T-A_C)$ , $\Delta A_S=(A_S-A_B)$ . A contrast tube is required for each test tube, and the standard curve need only be tested once or twice.				

## II. Calculation:

### 1. Standard curve

The concentration of standard solution as x-axis,  $\Delta A_S$  as y-axis, obtain the equation  $y=kx+b$ . Take  $\Delta A_T$  to the equation to acquire x ( $\mu$ mol/mL) value.

### 2. Calculation

1) Tissue protein concentration

Unit definition: One unit of enzyme activity is defined as the amount of enzyme that catalyzes the hydrolysis of  $\alpha$ -naphthyl acetate to generate 1  $\mu$ mol of  $\alpha$ -naphthol every mg of protein in the reaction system per minute at 40°C.

$$\text{HL Activity (U/mg prot)} = x \times V_s \div (V_s \times C_{pr}) \div T = 0.1x \div C_{pr}$$

2) Tissue weight

Unit definition: One unit of enzyme activity is defined as the amount enzyme that catalyzes the hydrolysis of  $\alpha$ -naphthyl acetate to generate 1  $\mu$ mol of  $\alpha$ -naphthol every gram of tissue in the reaction system per minute at 40°C.

$$\text{HL Activity (U/g weight)} = x \times V_s \div (W \times V_s \div V_e) \div T = 0.0333x \div W$$

3) Liquid

Unit definition: One unit of enzyme activity is defined as the amount of enzyme that catalyzes the hydrolysis of  $\alpha$ -naphthyl acetate to generate 1  $\mu\text{mol}$  of  $\alpha$ -naphthol every milliliter of liquid sample in the reaction system per minute at 40°C.

$$\text{HL Activity (U/mL)} = x \times V_s \div V_s \div T = 0.1x$$

#### 4) Bacteria or cultured cells

Unit definition: One unit of enzyme activity is defined as the amount of enzyme that catalyzes the hydrolysis of  $\alpha$ -naphthyl acetate to generate 1  $\mu\text{mol}$  of  $\alpha$ -naphthol every  $10^4$  cells or bacteria in the reaction system per minute at 40°C.

$$\text{HL Activity (U/10}^4 \text{ cell)} = x \times V_e \div \text{cell amount} \div T = 0.1x \div \text{cell amount}$$

$V_s$ : Sample volume (mL), 0.1 mL;

$V_e$ : Extract solution volume, 1 mL;

$C_{pr}$ : Supernatant sample protein concentration (mg/mL);

$T$ : Reaction time (min), 10 minutes;

$W$ : Sample weight, g;

Cell amount: 10 thousand as unit.

#### Note:

1. If the sample is animal liver, it is recommended to dilute the sample with reagent I more than 25 times before testing, and multiply the dilution factor in the calculation formula.
2. If the sample is serum or plasma from obese animals, it is recommended to dilute the sample with reagent I more than 5 times before testing, and multiply the dilution factor in the calculation formula.
3. When  $\Delta A$  is greater than 0.8, it is recommended to measure the sample after diluting it with the reagent, and multiply it by the dilution factor in the calculation formula.

#### Experimental example:

1. 0.1g rat liver was taken for sample processing, and the supernatant is diluted 24 times, then the operation is carried out according to the operation steps. measured and calculated by 96 well plate:  $\Delta A = A_T - A_B = 0.713 - 0.001 = 0.712$ , and the standard curve:  $y = 0.6381x - 0.0005$ , calculate  $x = 1.1166$

$$\text{HL activity (U/g mass)} = x \times V_s \div (W \times V_s \div V_{ST}) \div T \times 48 = 53.597 \text{ U/g mass.}$$

2. After the turkey serum was diluted 6 times, the operation was carried out according to the operation steps. measured and calculated by 96 well plate:  $\Delta A = A_T - A_B = 0.572 - 0.003 = 0.569$ , and the standard curve:  $y = 0.6381x - 0.0005$ , calculate  $x = 892$

$$\text{HL activity (U/g mass)} = x \times V_s \div (W \times V_s \div V_{ST}) \div T \times 12 = 1.071 \text{ U/g mass}$$

#### Related Products:

NA0701/NA0460 Lipase(LPS) Activity Assay Kit

NA0819/NA0577 Triglyceride(TG) Content Assay Kit

NA0696/NA0455 Lipoproteinlipase(LPL) Activity Assay Kit

NA0842/NA0600 Plant Lipoxygenase(LOX) Activity Assay Kit

NA0822/NA0580 Free fatty Acids(FFA) Content Assay Kit

