Product Information & Manual

Total Cholesterol Assay Kit (Colorimetric)

NBP3-25838

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Novus kits are guaranteed for 6 months from date of receipt.

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

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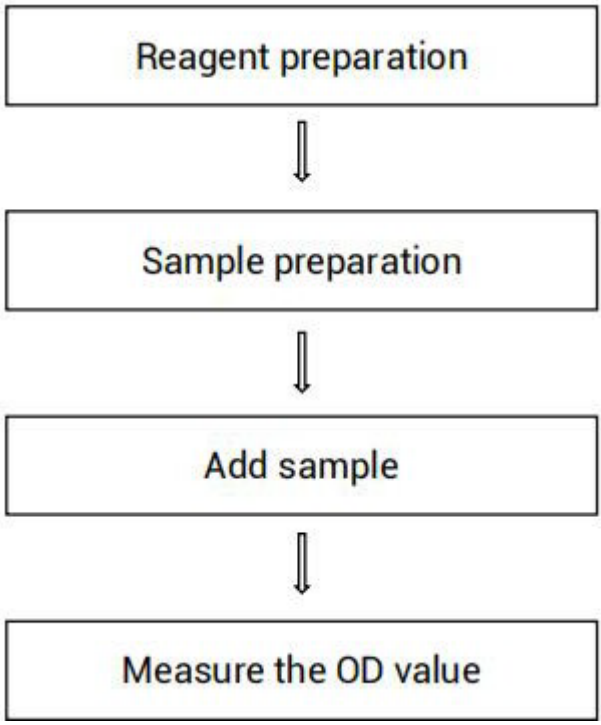
Assay summary

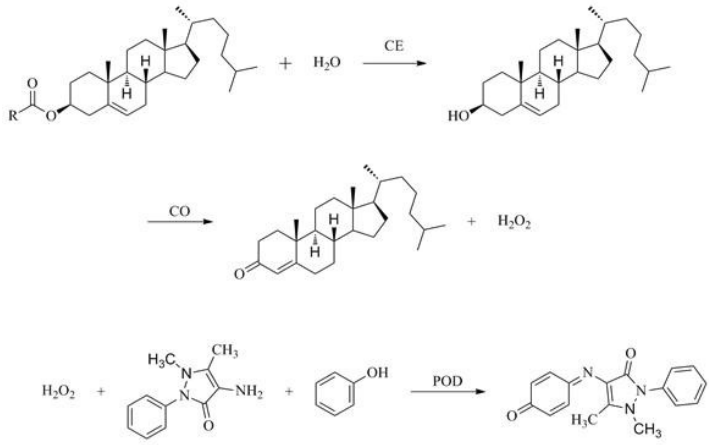


Intended use

This kit applies the COD-PAP method and it can be used for in vitro determination of total cholesterol (TC) content in serum, plasma, animal tissue samples.

Detection principle

Total cholesterol includes free cholesterol and cholesterol esters. Cholesterol ester can be hydrolyzed by cholesterol esterase to produce cholesterol and free fatty acid. Cholesterol is oxidized by cholesterol oxidase to produce △ 4-cholestenone and hydrogen peroxide. In the presence of 4-aminoamylpyridine and phenol, hydrogen peroxide catalyze peroxidase to form red quinone compounds of benzoquinone imine phenizone. The color depth of the generated quinone is directly proportional to the cholesterol content. The absorbance values of the standard tube and the sample tube are measured respectively, and the cholesterol content in the sample can be calculated.



Kit components & storage

Item	Component	Size 1 (50 Assays)	Size 2 (100 Assays)	Storage
Reagent 1	Enzyme Working Solution	60 mL × 1 vial	60 mL × 2 vials	2-8°C, 12 months, shading light
Reagent 2	5.17 mM Cholesterol Standard	0.25 mL × 1 vial	0.5 mL × 1 vial	2-8°C, 12 months

Note: The reagents must be stored strictly according to the preservation conditions in the above table. The reagents in different kits cannot be mixed with each other. For a small volume of reagents, please centrifuge before use, so as not to obtain sufficient amount of reagents.

Materials prepared by users

Instruments:

Spectrophotometer (510 nm), Micropipettor, Incubator, Centrifuge

Reagents:

Double distilled water, Normal saline (0.9% NaCl), PBS (0.01 M, pH 7.4), Anhydrous ethanol.

Reagent preparation

Equilibrate all the reagents to room temperature before use.

Sample preparation

① Sample preparation

Serum and plasma: detect directly. If not detected on the same day, the serum or plasma can be stored at -80°C for a month.

Tissue sample:

① Harvest the amount of tissue needed for each assay (initial recommendation 20 mg).

② Wash tissue in cold PBS (0.01 M, pH 7.4).

③ Homogenize 20 mg tissue in 180 μL anhydrous ethanol with a dounce homogenizer at 4°C.

④ Centrifuge at 10000×g for 10 min to remove insoluble material. Collect supernatant and keep it on ice for detection.

② Dilution of sample

The recommended dilution factor for different samples is as follows (for reference only):

Sample type	Dilution factor
Human serum	1
Mouse serum	1
Rat plasma	1
10% Mouse liver tissue homogenate	1
10% Mouse kidney tissue homogenate	1
10% Mouse heart tissue homogenate	1

Note: The diluent is normal saline (0.9% NaCl) or PBS (0.01 M, pH 7.4); The
diluent of animal tissue is anhydrous ethanol; For the dilution of other sample types, please do pretest to confirm the dilution factor.

The key points of the assay

① Protect the reagent from contamination of glucose, cholesterol, etc.

② Since the volume of standard and sample is 10 μL, it is necessary to adhere to the wall of the EP tubes when adding the liquid to reduce the error.

② When measuring low content samples , the volume of sample should be increased to 20 μL, and the volume of blank well and standard well should be increased at the same time.

Operating steps

① Blank tube: add 10 μL of double distilled water to 2 mL EP tube.
Standard tube: add 10 μL of 5.17 mM cholesterol standard to 2 mL EP tube.
Sample tube: add 10 μL of sample to 2 mL EP tube.

② Add 1000 μL of enzyme working solution to each tube and mix fully.

③ Incubate at 37°C for 10 min. Set the spectrophotometer to zero with double distilled water and measure the OD values of each tube at 510 nm with 0.5 cm diameter cuvette.

Calculation

The sample:

1. **Serum (plasma) sample and other liquid samples:**

$$\text{TC content (mmol/L)} = \frac{\Delta A_1}{\Delta A_2} \times c \times f$$

2. **Tissue sample:**

$$\text{TC content (mmol/kg wet weight)} = \frac{\Delta A_1}{\Delta A_2} \times c \times f \div \frac{m}{V}$$

[Note]

ΔA_1: OD_{sample}-OD_{blank}

ΔA_2: $OD_{standard}$-OD_{blank}

c: the concentration of standard, 5.17 mmol/L.

f: Dilution factor of sample before tested.

m: the weight of tissue sample, g.

V: the volume of the homogenate of tissue samples, mL.

Appendix I Performance Characteristics

1. **Parameter:**

Intra-assay Precision

Three human serum samples were assayed in replicates of 20 to determine precision within an assay. (CV = Coefficient of Variation)

Parameters	Sample 1	Sample 2	Sample 3
Mean (mmol/L)	1.50	9.70	19.50
%CV	1.3	1.0	1.0

Inter-assay Precision

Three human serum samples were assayed 20 times in duplicate by three operators to determine precision between assays.

Parameters	Sample 1	Sample 2	Sample 3
Mean (mmol/L)	1.50	9.70	19.50
%CV	2.5	2.8	3.1

Recovery

Take three samples of high concentration, middle concentration and low concentration to test the samples of each concentration for 6 times parallelly to get the average recovery rate of 100%.

	Sample 1	Sample 2	Sample 3
Expected Conc. (mmol/L)	3.6	11.7	23.5
Observed Conc. (mmol/L)	3.8	11.5	24.2
Recovery rate (%)	105	98	103

Sensitivity

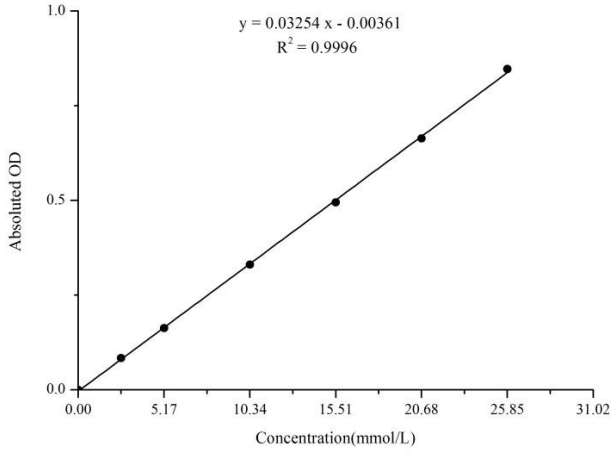
The analytical sensitivity of the assay is 0.09 mmol/L. This was determined by adding two standard deviations to the mean O.D. obtained when the zero standard was assayed 20 times, and calculating the corresponding concentration.

2. Standard curve:

(It doesn't need to prepare the standard curve for this kit and the provided standard curve is for reference only)

As the OD value of the standard curve may vary according to the conditions of the actual assay performance (e.g. operator, pipetting technique or temperature effects), so the standard curve and data are provided as below for reference only :

Concentration (mmol/L)	0	2.58	5.17	10.34	15.51	20.68	25.85
OD value	0.008	0.090	0.172	0.335	0.503	0.671	0.855
	0.006	0.092	0.168	0.341	0.501	0.671	0.853
Average OD	0.007	0.091	0.170	0.338	0.502	0.671	0.854
Absoluted OD	0	0.084	0.163	0.331	0.495	0.664	0.847



Appendix Π Example Analysis

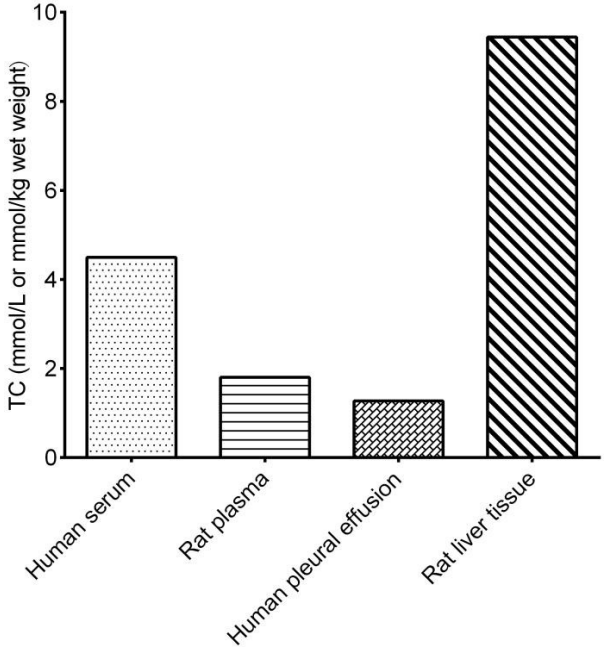
Example analysis :

Take 10 μL of human serum, carry the assay according to the operation steps. The results are as follows:

The average OD value of the sample is 0.186, the average OD value of the blank is 0.028, the average OD value of the standard is 0.210, and the calculation result is:

$$\text{TC content (mmol/L)} = \frac{0.186 - 0.028}{0.210 - 0.028} \times 5.17 = 4.49 \text{ (mmol/L)}$$

Detect human serum, rat plasma, human pleural effusion and rat liver tissue homogenate according to the protocol, the result is as follows：



Appendix III Publications

1. Yang H, Nie S, Zhou C, et al. Palliative effect of rotating magnetic field on glucocorticoid-induced osteonecrosis of the femoral head in rats by regulating osteoblast differentiation[J]. Biochemical and Biophysical Research Communications, 2024, 725: 150265.
2. Kabatas G S, Ertas B, Sen A, et al. Histological and biochemical effects of an ethanolic extract of Myrtus communis leaf on the pancreases of rats fed high fat diets[J]. Biotechnic & Histochemistry, 2024, 99(4): 204-215.
3. Yang Z, Lian J, Li J, et al. Intestinal Microbiomics and Liver Metabolomics Insights into the Ameliorative Effects of Selenium-Enriched Lactobacillus fermentum FZU3103 on Alcohol-Induced Liver Injury in Mice[J]. Journal of Agricultural and Food Chemistry, 2025.

Statement

1. This assay kit is for Research Use Only. We will not response for any arising problems or legal responsibilities causing by using the kit for clinical diagnosis or other purpose.
2. Please read the instructions carefully and adjust the instruments before the experiments. Please follow the instructions strictly during the experiments.
3. Protection methods must be taken by wearing lab coat and latex gloves.
4. If the concentration of substance is not within the detection range exactly, an extra dilution or concentration should be taken for the sample.
5. It is recommended to take a pre-test if your sample is not listed in the instruction book.
6. The experimental results are closely related to the situation of reagents, operations, environment and so on. Novus Biologicals will guarantee the quality of the kits only, and NOT be responsible for the sample consumption caused by using the assay kits. It is better to calculate the possible usage of sample and reserve sufficient samples before use.