

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

**Catalog No: E-BC-K835-M**

**Specification: 48T(46 samples)/96T(94 samples)**

**Measuring instrument: Microplate reader (590-610 nm)**

**Detection range: 0.54-17.66 U/L**

## **Elabscience<sup>®</sup> Cell Mitochondrial Complex II**

### **Activity Assay Kit**

This manual must be read attentively and completely before using this product.  
If you have any problem, please contact our Technical Service Center for help:

Toll-free: 1-888-852-8623

Tell: 1-832-243-6086

Fax: 1-832-243-6017

Email: [techsupport@elabscience.com](mailto:techsupport@elabscience.com)

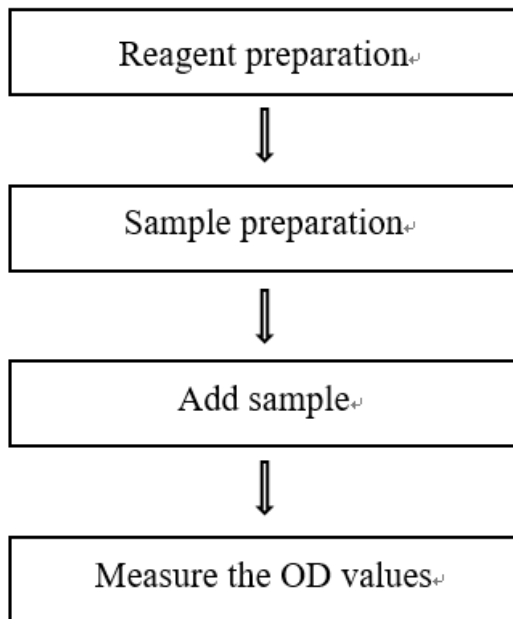
Website: [www.elabscience.com](http://www.elabscience.com)

Please kindly provide us the lot number (on the outside of the box) of the kit for more efficient service.

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## Assay summary



## Intended use

This kit can measure mitochondrial complex II activity in animal cell samples.

## Detection principle

Mitochondrial complex II, also known as succinate-coenzyme Q reductase, is widely found in the mitochondria of animals, plants, microorganisms and cultured cells. It catalyzes the oxidation of succinic acid in the TCA cycle to fumaric acid, which converts the ubiquinone to a reduced form through the basic unit structures of the complex such as iron-sulfur proteins. Coenzyme Q, the catalytic product of mitochondrial complex II, can further reduce 2, 6-dichloroindoxol, which has a characteristic absorption peak at 600 nm. Therefore, the activity of mitochondrial complex II can be quantified by measure the change OD value at 600 nm.

## Kit components & storage

| Item      | Component           | Size 1(48 T)    | Size 2(96 T)     | Storage                          |
|-----------|---------------------|-----------------|------------------|----------------------------------|
| Reagent 1 | Extraction Solution | 25 mL × 1 vial  | 50 mL × 1 vial   | 2-8 °C, 12 months                |
| Reagent 2 | Inhibitor           | 0.8 mL × 1 vial | 0.8 mL × 2 vials | 2-8 °C, 12 months, shading light |
| Reagent 3 | Buffer Solution     | 10 mL × 1 vial  | 20 mL × 1 vial   | 2-8 °C, 12 months                |
| Reagent 4 | Substrate A         | 0.8 mL × 1 vial | 1.6 mL × 1 vial  | 2-8 °C, 12 months, shading light |
| Reagent 5 | Substrate B         | 1.5 mL × 1 vial | 1.5 mL × 2 vials | 2-8 °C, 12 months, shading light |
| Reagent 6 | Substrate C         | 0.6 mL × 1 vial | 1.2 mL × 1 vial  | 2-8 °C, 12 months, shading light |
|           | Microplate          | 96 wells        |                  | No requirement                   |
|           | Plate Sealer        | 2 pieces        |                  |                                  |

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:**

Microplate reader (590-610 nm, optimum wavelength: 600 nm), Centrifuge

### **Reagents:**

PBS(0.01 M, pH 7.4)

## **Reagent preparation**

- ① Equilibrate all the reagents to room temperature before use.
- ② The preparation of reaction working solution:

Before testing, please prepare sufficient reaction working solution according to the test wells. For example, prepare 190  $\mu\text{L}$  of reaction working solution (mix well 150  $\mu\text{L}$  of buffer solution, 10  $\mu\text{L}$  of substrate A, 20  $\mu\text{L}$  of substrate B and 10  $\mu\text{L}$  of substrate C). The reaction working solution should be prepared on spot.

## Sample preparation

### ① Sample preparation

#### Cell (adherent or suspension) samples:

- ① Harvest the number of cells needed for each assay (initial recommendation  $1 \times 10^6$  cells).
- ② Wash cells with PBS (0.01 M, pH 7.4).
- ③ Homogenize  $1 \times 10^6$  cells in 200  $\mu$ L extraction solution and 4  $\mu$ L inhibitor with a ultrasonic cell disruptor (4  $^{\circ}$ C, 200W, 5 s/time, interval for 10 s, repeat 15 times).
- ④ Centrifuge at  $10000 \times g$  for 3 min at 4  $^{\circ}$ C to remove to remove insoluble material. Collect supernatant and keep it on ice for detection.
- ⑤ Meanwhile, determine the protein concentration of supernatant (E-BC-K318-M).

### ② Dilution of sample

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

| Sample type                    | Dilution factor |
|--------------------------------|-----------------|
| HL-60 cell( $1 \times 10^6$ )  | 1               |
| Hela cell( $1 \times 10^6$ )   | 1               |
| CHO cell( $4 \times 10^6$ )    | 1               |
| Jurkat cell( $1 \times 10^6$ ) | 1               |
| K562 cell( $1 \times 10^6$ )   | 1               |
| 293T cell( $1 \times 10^6$ )   | 1               |

Note: The diluent is extraction solution. For the dilution of other sample types, please do pretest to confirm the dilution factor.

## The key points of the assay

- ① When adding the reaction working solution, adhere to the wall and add slowly to avoid bubbles.
- ② Use fresh samples for detection, processed samples should be tested the same day.
- ③ It is recommended that the number of samples for an experiment be controlled within 10 samples.

## Operating steps

- ① Blank well: Add 20  $\mu\text{L}$  of extraction solution to each well.  
Sample well: Add 20  $\mu\text{L}$  of sample to each well.
- ② Add 150  $\mu\text{L}$  of reaction working solution to each well.
- ③ Mix fully with microplate reader for 3 s and measure the OD value of each well at 600 nm with microplate reader, recorded as  $A_1$ .
- ④ Incubate at 37  $^{\circ}\text{C}$  for 5 min, measure the OD value of each well at 600 nm with microplate reader, recorded as  $A_2$ ,  $\Delta A = A_1 - A_2$ .

## Calculation

### The sample:

**Definition:** The amount of mitochondrial complex II in 1 g cell mitochondria protein per 1 minute that hydrolyze the substrate to produce 1  $\mu\text{mol}$  product at room temperature is defined as 1 unit.

$$\text{mitochondrial complex II activity} = \frac{(\Delta A_{\text{sample}} - \Delta A_{\text{Blank}}) \times V_{\text{total}} \times f}{(V_{\text{sample}} \times 21.8^* \times T \times C_{\text{pr}})} \times 1000^*$$

(U/gprot)

### [Note]

$\Delta A_{\text{sample}}$ : The change OD value of sample ( $A_1 - A_2$ ).

$\Delta A_{\text{blank}}$ : The change OD value of blank ( $A_1 - A_2$ ).

f: Dilution factor of sample before test.

$V_{\text{total}}$ : The volume of the reaction system, 0.17 mL.

$V_{\text{sample}}$ : The volume of the sample, 0.02 mL.

21.8\*: Molar absorption coefficient.

$C_{\text{pr}}$ : The concentration of protein in sample, gprot/L.

T: The time of reaction, 5 min.

1000\*: 1 mmol/L=1000  $\mu\text{mol/L}$ .



## Appendix I Performance Characteristics

### 1. Parameter:

#### Intra-assay Precision

Three CHO cell 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 (U/L) | 0.50     | 8.50     | 16.80    |
| %CV        | 5.0      | 3.8      | 2.0      |

#### Inter-assay Precision

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

| Parameters | Sample 1 | Sample 2 | Sample 3 |
|------------|----------|----------|----------|
| Mean (U/L) | 0.50     | 8.50     | 16.80    |
| %CV        | 6.0      | 5.7      | 3.0      |

#### 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 102%.

|                      | Sample 1 | Sample 2 | Sample 3 |
|----------------------|----------|----------|----------|
| Expected Conc. (U/L) | 0.9      | 7.8      | 15.3     |
| Observed Conc. (U/L) | 0.9      | 7.9      | 16.1     |
| Recovery rate (%)    | 97       | 101      | 105      |

#### Sensitivity

The analytical sensitivity of the assay is 0.54 U/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.

## Appendix II Example Analysis

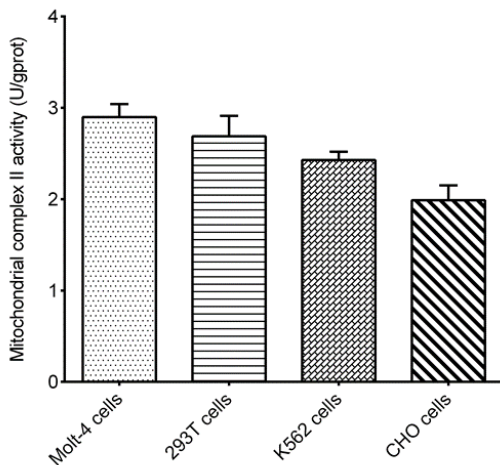
### Example analysis:

Take 20  $\mu$ L of Molt-4 cells for detection, and carry the assay according to the operation steps. The results are as follows:

the OD value of the blank A<sub>1</sub> is 0.760, the OD value of the blank A<sub>2</sub> is 0.756, the OD value of the sample A<sub>1</sub> is 0.794, the OD value of the sample A<sub>2</sub> is 0.767, the concentration of protein in sample is 0.627 gprot/L, and the calculation result is:

$$\begin{aligned} \text{mitochondrial complex II activity (U/gprot)} &= \frac{(0.794 - 0.767) - (0.760 - 0.756) \times 0.17}{0.02 \times 21.8 \times 5 \times 0.627} \times 1000 \\ &= 2.861 \text{ U/gprot} \end{aligned}$$

Detect Molt-4 cells ( $1 \times 10^6$ , the concentration of protein is 0.627 gprot/L), 293T cells ( $1 \times 10^6$ , the concentration of protein is 1.044 gprot/L), K562 cells ( $1 \times 10^6$ , the concentration of protein is 1.300 gprot/L) and CHO cells ( $4 \times 10^6$ , the concentration of protein is 5.510 gprot/L) according to the protocol, the result is as follows:



## 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. Elabscience 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.

