

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

## **Elabsience<sup>®</sup>Cell Ferrous Iron Colorimetric Assay Kit**

**Catalog No: E-BC-K881-M**

**Specification: 48T(16 samples)/96T(40 samples)**

**Measuring instrument: Microplate reader (590-600 nm)**

**Detection range: 0.4 -50  $\mu\text{mol/L}$**

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@elabsience.com](mailto:techsupport@elabsience.com)

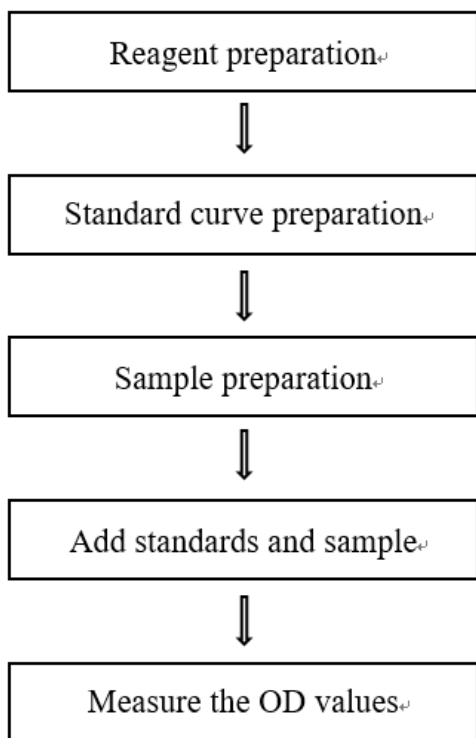
Website: [www.elabsience.com](http://www.elabsience.com)

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 ferrous ions ( $\text{Fe}^{2+}$ ) content in cell sample.

## Detection principle

Iron is one of the metal elements in organism and has important physiological functions. Ferrous ion is a key element in heme and hemoglobin and plays an important role in many biochemical reactions. Ferrous ions ( $\text{Fe}^{2+}$ ) in samples can bind with probe to form complexes, which has a maximum absorption peak at 593 nm. The concentration of ferrous ions can be calculated by measuring the OD value at 593 nm indirectly.

## Kit components & storage

| Item      | Component               | Size 1(48 T)    | Size 2(96 T)    | Storage                         |
|-----------|-------------------------|-----------------|-----------------|---------------------------------|
| Reagent 1 | Buffer Solution         | 45 mL × 1 vial  | 35 mL × 2 vials | 2-8°C, 12 months, shading light |
| Reagent 2 | Control Solution        | 5 mL × 1 vial   | 10 mL × 1 vial  | 2-8°C, 12 months, shading light |
| Reagent 3 | Chromogenic Solution    | 5 mL × 1 vial   | 10 mL × 1 vial  | 2-8°C, 12 months, shading light |
| Reagent 4 | 10 mmol/L Iron Standard | 2 mL × 1 vial   | 2 mL × 1 vial   | 2-8°C, 12 months, shading light |
| Reagent 5 | Standard Protectant     | Powder × 1 vial | Powder × 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:

Centrifuge, Incubator, Microplate reader (590-600 nm, optimum wavelength: 593 nm)

### Reagent preparation

① Equilibrate all reagents to room temperature before use.

② Preparation of standard protectant:

Dissolve one vial of standard protectant with 15 mL of buffer solution, mix well to dissolve. Store at 2-8 °C for 1 month.

③ Preparation of 100 µmol/L iron standard:

Dissolve 10 µL of 10 mmol/L iron standard with 990 µL of standard protectant, mix well to dissolve. The 100 µmol/L iron standard should be prepared on spot.

④ The preparation of standard curve:

Always prepare a fresh set of standards. Discard working standard dilutions after use.

Dilute 100 µmol/L iron standard with standard protectant to a serial concentration. The recommended dilution gradient is as follows: 0, 5, 10, 15, 20, 30, 40, 50 µmol/L. Reference is as follows:

| Item                                 | ①        | ②        | ③         | ④         | ⑤         | ⑥         | ⑦         | ⑧         |
|--------------------------------------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|
| <b>Concentration (µmol/L)</b>        | <b>0</b> | <b>5</b> | <b>10</b> | <b>15</b> | <b>20</b> | <b>30</b> | <b>40</b> | <b>50</b> |
| <b>100 µmol/L iron standard (µL)</b> | 0        | 25       | 50        | 75        | 100       | 150       | 200       | 250       |
| <b>Standard protectant (µL)</b>      | 500      | 475      | 450       | 425       | 400       | 350       | 300       | 250       |

## 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 Lyse  $1 \times 10^6$  cells with 200  $\mu$ L buffer solution. Place on the ice box and mix well every 5 min, lyse for 10 min.
- ④ Centrifuge at  $15000 \times g$  for 10 min, 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 |
|-------------|-----------------|
| HepG2 Cell  | 1               |
| molt-4 Cell | 1               |
| Jurkat Cell | 1               |
| HEL Cell    | 1               |

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

## The key points of the assay

- ① To avoid contamination, it is recommended to aliquot the chromogenic solution into smaller quantities before use.
- ② Prevent the formulation of bubbles when the reagent or sample is transferred into the microplate.
- ③ Select fresh cell samples for detection.

## Operating steps

- ① Standard well: Take 80  $\mu\text{L}$  of standard solution with different concentrations to the corresponding wells.  
Sample well: Take 80  $\mu\text{L}$  of sample to the corresponding wells.  
Control well: Take 80  $\mu\text{L}$  of sample to the corresponding wells.
- ② Add 80  $\mu\text{L}$  of control solution to Control well.
- ③ Add 80  $\mu\text{L}$  of chromogenic solution to sample well and standard well.
- ④ Mix fully and incubate at 37°C for 10 min.
- ⑤ Measure the OD value of each well with microplate reader at 593 nm

## Calculation

### The standard curve:

1. Average the duplicate reading for each standard.
2. Subtract the mean OD value of the blank (Standard #①) from all standard readings. This is the absolved OD value.
3. Plot the standard curve by using absolved OD value of standard and correspondent concentration as y-axis and x-axis respectively. Create the standard curve ( $y = ax + b$ ) with graph software (or EXCEL).

### The sample:

#### Cell sample:

$$\text{Fe}^{2+} \text{ content (nmol/10}^6\text{)} = \frac{\Delta A - b}{a} \div \frac{N}{V} \times f$$

#### [Note]

$\Delta A$ : Absolute OD ( $\text{OD}_{\text{Sample}} - \text{OD}_{\text{Control}}$ ).

N: The number of cell sample/ $10^6$ .

V: The volume of buffer solution in the preparation step of cell, mL.

f: Dilution factor of sample before test.

## Appendix I Performance Characteristics

### 1. Parameter:

#### Intra-assay Precision

Three HepG2 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 ( $\mu\text{mol/L}$ ) | 2.80     | 162.00   | 46.00    |
| %CV                        | 1.5      | 1.3      | 1.1      |

#### Inter-assay Precision

Three HepG2 cell samples were assayed 20 times in duplicate by three operators to determine precision between assays.

| Parameters                 | Sample 1 | Sample 2 | Sample 3 |
|----------------------------|----------|----------|----------|
| Mean ( $\mu\text{mol/L}$ ) | 2.80     | 162.00   | 46.00    |
| %CV                        | 1.2      | 1.6      | 1.7      |

#### 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 99%.

|                                      | Standard 1 | Standard 2 | Standard 3 |
|--------------------------------------|------------|------------|------------|
| Expected Conc. ( $\mu\text{mol/L}$ ) | 6.8        | 17.5       | 36.5       |
| Observed Conc. ( $\mu\text{mol/L}$ ) | 6.9        | 17.2       | 35.4       |
| Recovery rate (%)                    | 102        | 98         | 97         |

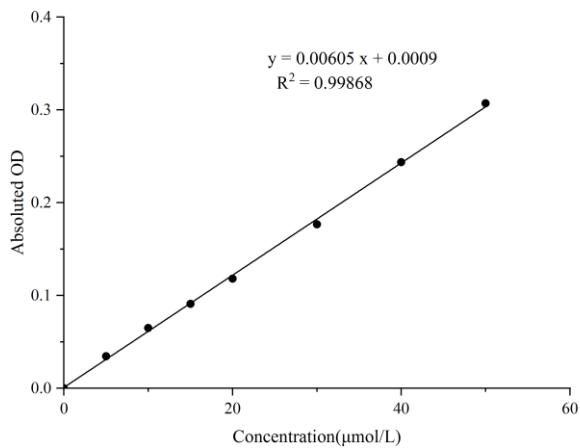
#### Sensitivity

The analytical sensitivity of the assay is  $0.4 \mu\text{mol/L}$ . 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:

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<br>(μmol/L) | 0     | 5     | 10    | 15    | 20    | 30    | 40    | 50    |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Average OD                | 0.045 | 0.079 | 0.110 | 0.136 | 0.163 | 0.221 | 0.288 | 0.352 |
| Absoluted OD              | 0.000 | 0.035 | 0.065 | 0.091 | 0.118 | 0.177 | 0.244 | 0.307 |



## Appendix II Example Analysis

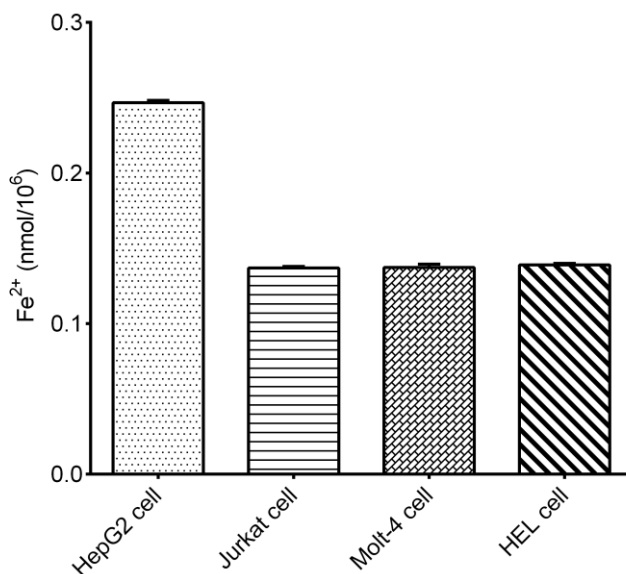
### Example analysis:

For HepG2 cell, add homogenization medium at a ratio of cell number ( $1 \times 10^6$ ): buffer solution (mL) = 1.5: 0.2, take 80  $\mu$ L of the supernatant, and carry the assay according to the operation table. The results are as follows:

Standard curve:  $y = 0.00605x + 0.0009$ , the average OD value of the sample is 0.055, the average OD value of the Control is 0.043, and the calculation result is:

$$\text{Fe}^{2+} \text{ content (nmol/} 10^6) = (0.055 - 0.043 - 0.0009) \div 0.00605 \div 1.5 \times 0.2 = 0.24 \text{ nmol/} 10^6$$

Detect HepG2 cell, Jurkat cell, Jurkat cell, Molt-4 and 293T cells 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.

