PRODUCT INFORMATION & MANUAL

Succinate Dehydrogenase/SDH Activity Assay Kit (Colorimetric)

NBP3-25801

For research use only.

Not for diagnostic or therapeutic procedures.

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Succinate Dehydrogenase/SDH Activity Assay Kit (Colorimetric)

Catalog No: NBP3-25801

Method: Colorimetric method

Specification: 96T (Can detect 94 samples without duplication)

Instrument: Microplate reader

Sensitivity: 0.83 U/L

Detection range: 0.83-65.42 U/L

Average intra-assay CV (%): 2

Average inter-assay CV (%): 4

Average recovery rate (%): 105

- This kit is for research use only.
- Instructions should be followed strictly, changes of operation may result in unreliable results.
- Please kindly provide us the lot number (on the outside of the box) of the kit for more efficient service.

General information

▲Intended use

This kit can measure succinate dehydrogenase(SDH) activity in animal tissue and cell samples.

▲Detection principle

Succinate dehydrogenase(SDH) is an enzyme complex bound to the inner membrane of mitochondria, which is one of the hubs connecting respiratory electron transport and oxidative phosphorylation. SDH lack will cause nerve diseases such as metabolic disorders, tumor formation.

SDH catalyzes the dehydrogenation of succinate to fumarate, with electron transport materials transferring electrons to 2, 6-dichlorophenol indiophenol (DCPIP). Then, the reduced DCPIP is reduced to the oxidized DCPIP, which has a characteristic absorption peak at 600 nm. Therefore, the activity of SDH can be quantified by measure the change OD value at 600 nm.

▲Kit components & storage

Item	Component	Specification	Storage
Reagent 1	Buffer Solution A	50 mL × 2 vials	-20℃ , 12 months
Reagent 2	Buffer Solution B	30 mL × 1 vial	-20℃ , 12 months
Reagent 3	Inhibitor	0.8 mL × 2 vials	-20℃ , 12 months, shading light
Reagent 4	Substrate A	1.2 mL×2 vials	-20℃ , 12 months, shading light
Reagent 5	Substrate B	1.2 mL×2 vials	-20℃ , 12 months, shading light
Reagent 6	Substrate C	1.2 mL×1 vial	-20℃ , 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.			

▲Materials prepared by users

Instruments

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

Reagents:

Normal saline (0.9% NaCl), PBS (0.01 M, pH 7.4).

⚠Safety data

Some of the reagents in the kit contain dangerous substances. It should be avoided to touch the skin and clothing. Wash immediately with plenty of water if touching it carelessly. All the samples and waste material should be treated according to the relevant rules of laboratory's biosafety.

⚠Precautions

Before the experiment, please read the instructions carefully, and wear gloves and work clothes.

▲The key points of the assay

1. The supernatant of sample homogenate should be determined on the same day.
2. Store some reagents with shading light according to the manual.
3. It is recommended that the number of samples for an experiment be controlled within 8 samples.

Pre-assay preparation

▲ Reagent preparation

1. Bring all reagents to room temperature before use.
2. Preparation of working solution:

   Mix the reagent 1, reagent 4, reagent 5 and reagent 6 at the ratio of 14:2:2:1 fully. Prepare the fresh needed amount before use and the prepared solution should be store with shading light and used within 1 day.

▲ Sample preparation

1. Tissue sample:

Accurately 0.1 g weigh the tissue, rinsed with normal saline (0.9% NaCl) at 2-8°C, then add 0.9 mL reagent 1 and 10 μL reagent 3 to homogenize the sample. Then centrifuge at 600 g for 5 min at 4°C, retaine the supernatant and discard the precipitate. Then centrifuge at 15000 g for 10 min at 4°C, the precipitation is the extracted mitochondria. The precipitate was mixed with 200 μL of reagent 2 and 2 μL of reagent 3, sonicated for 5 min at 4°C, centrifuged at 15000 g at 4°C for 10 min. Then take the supernatant for detection. Meanwhile, determine the protein concentration of supernatant.

2. Cell sample:

Collect the cells and wash the cells with PBS (0.01 M, pH 7.4) for 1~2 times. Centrifuge at 1000 g for 10 min and then discard the supernatant and keep the cell sediment. Mix 2×10^6 cells with 400 μL of reagent 1 and 4 μL of reagent 3 fully and homogenize. Then centrifuge at 600 g for 5 min at 4°C, retaine the supernatant and discard the precipitate. Then centrifuge at 15000 g for 10 min at 4°C, the precipitation is the extracted mitochondria. The precipitate was mixed with 200 μL of reagent 2 and 2 μL of reagent 3, sonicated for 5 min at 4°C, centrifuged at 15000 g at 4°C for 10 min. Then take the supernatant for detection. Meanwhile, determine the protein concentration of supernatant.

▲Dilution of sample

It is recommended to take 2~3 samples with expected large difference to do pre-experiment before formal experiment and dilute the sample according to the result of the pre-experiment and the detection range (0.83-65.42 U/L).

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

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

Note: The diluent is reagent 2.

Assay protocol

▲Plate set up

	1	2	3	4	5	6	7	8	9	10	11	12
A	A	A	S15	S23	S31	S39	S47	S55	S63	S71	S79	S87
B	S1	S8	S16	S24	S32	S40	S48	S56	S64	S72	S80	S88
C	S2	S9	S17	S25	S33	S41	S49	S57	S65	S73	S81	S89
D	S3	S10	S18	S26	S34	S42	S50	S58	S66	S74	S82	S90
E	S4	S11	S19	S27	S35	S43	S51	S59	S67	S75	S83	S91
F	S5	S12	S20	S28	S36	S44	S52	S60	S68	S76	S84	S92
G	S6	S13	S21	S29	S37	S45	S53	S61	S69	S77	S85	S93
H	S7	S14	S22	S30	S38	S46	S54	S62	S70	S78	S86	S94

Note: A, blank wells; S1-S94, sample wells.

▲Detailed operation steps

(1) Blank well: Add 20 μL of reagent 2 to the corresponding wells.

Sample well: Add 20 μL of sample to the corresponding wells.

(2) Add 190 μL of working solution to each well.

(3) Mix fully with microplate reader for 5 s and measure the OD value of each well at 600 nm with microplate reader, recorded as A_1. Stand at room temperature for 3 min, measure the OD value of each well at 600 nm with microplate reader, recorded as A_2, $\Delta A = A_1 - A_2$.

Note: It is recommended that the number of samples for an experiment be controlled within 8 samples.

▲Summary operation table

	Blank well	Sample well
Regent 2 (μL)	20	
Sample (μL)		20
Working solution (μL)	190	190
Mix fully and measure the OD value of each well, recorded as A_1. Stand at room temperature for 3 min, measure the OD value of each well, recorded as A_2, $\Delta A = A_1 - A_2$.		

Note: It is recommended that the number of samples for an experiment be controlled within 8 samples.

▲Calculation

Tissue and Cell sample:

Definition: The amount of SDH in 1 g tissue or cell protein per 1 minute that hydrolyze the substrate to produce 1 μmol product at room temperature is defined as 1 unit.

$$\text{SDH activity (U/gprot)} = (\Delta A_{sample} - \Delta A_{blank}) \times V_{total} \times f \div (V_{sample} \times 21.8^{*} \times T \times C_{pr}) \times 1000^{*}$$

Note:

ΔA_{blank}: The change OD value of blank($A_1 - A_2$).

ΔA_{sample}: The change OD value of sample($A_1 - A_2$).

f: Dilution factor of sample before test.

V_{total}: The total volume of the reaction system, 0.21 mL.

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

21.8*: Molar absorption coefficient.

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

T: The time of reaction, 3 min.

1000*: 1 mmol/L=1000 μmol/L.

Appendix I Data

▲Example analysis

For mouse kidney tissue, take 20 μL of 10% mouse kidney tissue homogenate, and carry the assay according to the operation table.

The results are as follows:

the OD value of the blank A_1 is 1.358, the OD value of the blank A_2 is 1.355, the OD value of the sample A_1 is 1.000, the OD value of the sample A_2 is 0.382, the concentration of protein in sample is 11.20 gprot/L, and the calculation result is:

SDH activity (U/gprot) = ((1.000 - 0.382) - (1.358 - 1.355)) × 0.21 ÷ (0.02 × 21.8 × 3 × 11.20) × 1000 = 8.82 U/gprot

Detect 10% mouse liver tissue homogenate (the concentration of protein is 12.51 gprot/L), 10% mouse kidney tissue homogenate (the concentration of protein is 11.20 gprot/L), 10% mouse heart tissue homogenate (the concentration of protein is 3.10 gprot/L) and molt-4 cell (the concentration of protein is 0.79 gprot/L) according to the protocol, the result is as follows: