

# Cell Meter™ Fixed Cell and Tissue TUNEL Apoptosis Assay Kit \*Deep Red Fluorescence\*

Catalog number: 22855  
Unit size: 25 Tests

Component	Storage	Amount
Component A: TdT enzyme	Freeze (< -15 °C), Minimize light exposure	1 vial (12.5 µL)
Component B: TF5-dUTP	Freeze (< -15 °C), Minimize light exposure	1 vial (12.5 µL)
Component C: CoCl <sub>2</sub> solution	Freeze (< -15 °C), Minimize light exposure	1 vial (125 µL)
Component D: TdT Reaction Buffer	Freeze (< -15 °C), Minimize light exposure	1 vial (1.2 mL)

## OVERVIEW

Cell Meter™ TUNEL apoptosis assay kit provides a robust tool for conveniently detecting apoptosis caused by DNA fragmentation. The assay is non-radioactive and rapid. The TUNEL assay uses the terminal deoxynucleotidyl transferase (TdT) to catalyze the incorporation of TF5-dUTP at the free 3'-hydroxyl ends of the fragmented DNAs. The resulted TF5-labeled DNAs are analyzed by fluorescence microscopy (Cy5 filter set) or flow cytometry with 633 or 640 nm laser with 660/20 nm filter (APC channel). Its red emission can be conveniently multiplexed with GFP labelled targets. Direct incorporation of fluorescent TF5-labeled nucleotides significantly reduces the number of test steps. The kit is optimized to detect apoptosis in fixed cells and formalin-fixed, paraffin-embedded tissue sections.

## AT A GLANCE

### Protocol summary

1. Treat samples as desired
2. Fix cells with 4% formaldehyde solution for 30 minutes on ice
3. Permeabilize cells with 70% ice-cold ethanol for 60 minutes on ice
4. Add TdT staining solution to samples and incubate for 60 minutes at 37 °C
5. Monitor the fluorescence intensity using fluorescence microscopy with Cy5 filter set

### Important

Bring all the kit components at room temperature before starting the experiment.

## KEY PARAMETERS

### Flow cytometer

Excitation	633/640 nm laser
Emission	660/20 nm filter
Instrument specification(s)	APC channel

### Fluorescence microscope

Excitation	Cy5 filter set
Emission	Cy5 filter set
Recommended plate	Black wall/clear bottom

## PREPARATION OF WORKING SOLUTION

### TdT staining solution

For one test, Mix the following to make a total volume of 51 µL;  
45 µL TdT Reaction Buffer (Component D)  
5 µL CoCl<sub>2</sub> (Component C)  
0.5 µL TF5-dUTP (Component B)  
0.5 µL TdT enzyme (Component A).

**Note** TdT staining solution should be used promptly.

## SAMPLE EXPERIMENTAL PROTOCOL

### Protocol for cells staining

The following protocol can be used as a guideline and should be optimized according to the needs.

1. Treat your samples as desired.
2. Wash the samples with buffer of your choice such as PBS containing Ca<sup>+2</sup> and Mg<sup>+2</sup>.
3. Fix the samples by adding 100 µL of 4% paraformaldehyde in PBS and incubate the samples for 30 minutes on ice.
4. Remove fixation solution and wash samples with PBS.
5. Add 100 µL of 70% of ice cold ethanol to samples and incubate the samples for 60 minutes on ice.

**Note** Samples can be stored at -20 °C at this step for several days before use.

6. Remove alcohol and wash cells with PBS.

**Note** For a positive control, incubate fixed samples with 2-5 µg/mL of DNase in PBS containing Ca<sup>+2</sup> and Mg<sup>+2</sup> for 60 minutes at 37 °C. Remove the DNase and wash cells thoroughly and continue with the rest of the protocol

7. Add 50 µL of TdT staining solution to the samples and incubate for 60 to 120 minutes at 37 °C.
8. Remove TdT working solution and wash samples with PBS.
9. Resuspend the samples in PBS and monitor the fluorescence intensity with flow cytometer using 660/20 nm filter (APC channel) or fluorescence microscope with Cy5 filter set.

### Protocol for tissue staining

The following protocol can be used as a guideline and should be optimized according to the needs.

### Deparaffinization and rehydration protocol

1. Deparaffinize tissue sections (attached to the microscopic slides) by immersing slides in fresh xylene in a Coplin jar for 5 minutes at room temperature. Repeat one more time. (Total 2 washes)
2. Wash the samples by immersing the slides in 100% ethanol for 5 minutes at room temperature in a Coplin jar.
3. Rehydrate the samples by immersing the slides through various concentrations of alcohol subsequently (100, 95, 85, 70, 50%) for 5 minutes each at room temperature
4. Wash the samples by immersing the slides in 0.85% NaCl for 5 minutes at room temperature.
5. Wash the samples by immersing the slides in PBS for 5 minutes at room temperature. Repeat one more wash. (Total 2 washes)

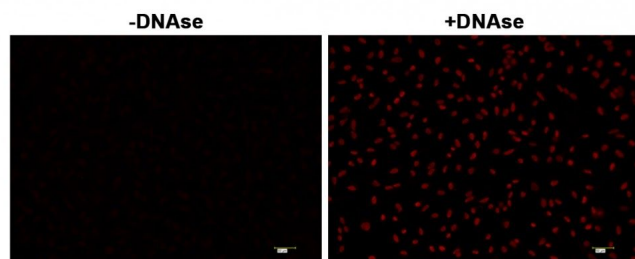
### Fixation protocol

1. Fix the tissue sections by immersing slides in 4% paraformaldehyde solution in PBS for 15-20 minutes at room temperature.
2. Wash the samples by immersing the slides in PBS for 5 minutes at room temperature. Repeat one more wash. (Total 2 washes)
3. Remove the liquid and place the slides on a flat surface. Treat tissue sections with 100  $\mu$ L of 20  $\mu$ g/mL Proteinase K solution. Add enough to cover the entire tissue surface. Incubate slides for 10 minutes at room temperature.
4. Wash the samples by immersing the slides in PBS for 5 minutes at room temperature.
5. Fix the tissue sections by immersing slides in 4% paraformaldehyde solution in PBS for 15-20 minutes at room temperature.
6. Wash the samples by immersing the slides in PBS for 5 minutes at room temperature. Repeat one more wash. (Total 2 washes)

#### Staining protocol

1. Optional: For a positive control, incubate fixed samples with 2-5  $\mu$ g/mL of DNase in PBS containing  $\text{Ca}^{+2}$  and  $\text{Mg}^{+2}$  for 60 minutes at 37 °C. Remove the DNase and wash cells thoroughly with PBS and continue with the rest of the protocol.
2. Add 50  $\mu$ L of TdT staining solution to the samples and incubate for 60 to 120 minutes at 37 °C.
3. Remove TdT working solution and wash samples with PBS.
4. Add mounting medium with DAPI (AAT Bioquest Cat# 20005) and monitor the fluorescence intensity fluorescence microscope with Cy5 filter set.

#### EXAMPLE DATA ANALYSIS AND FIGURES



**Figure 1. Fluorescence images of TUNEL assay with HeLa cells.**

HeLa cells were fixed and treated with or without DNase for 60 mins at 37 °C. The cells were then stained with Cell Meter™ Fixed Cell and Tissue TUNEL Apoptosis Assay Kit (Cat#22855). DNA strand breaks showed intense fluorescent staining in DNase treated cells. The signal was acquired with fluorescence microscope using a Cy5 filter set.

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