Ready-to-use DRAQ7 Dead Cell DNA Dye (0.3 mM)

Cat. No.: D266297 | Pack size: 100 µL; 1 mL | Storage: Store at 2-8°C,Protected from light

Product Information

Item	Description
Synonyms	Ready-to-use DRAQ7 Dead Cell DNA Dye
Specifications & Purity	BioReagent,ready-to-use,Biological Stain,for fluorescence analysis,for microscopy,sterile,0.3 mM
Stability And Storage	Store at 2-8°C long term (72 months). Store in the dark.
Storage Conditions	Store at 2-8°C,Protected from light
Shipped In	Wet ice This product requires cold chain shipping. Ground and other economy services are not available.

Product Description

DRAQ7 is a bright far-red lipophilic non-membrane-permeable anthraquinone DNA dye. Its core mechanism of action is to achieve targeted labeling by specifically binding to nuclear DNA of dead or permeabilized cells. It cannot penetrate the cell membrane of intact live cells, enabling accurate differentiation between membrane-intact live cells and membrane-damaged dead cells. Compared with PI and 7-AAD, the classic dead cell labeling dyes, DRAQ7 has the following performance advantages: it features a broad excitation wavelength range with emission in the far-red region, is not excited by ultraviolet light, and has no emission spectral overlap with PE and its analogs, which allows it to directly replace PI and 7-AAD and avoid the drawbacks of their spectral cross-interference; the staining process requires no RNase treatment to eliminate RNA interference or additional washing steps, greatly simplifying the experimental workflow; the dye is non-toxic in long-term cell culture, ensuring the viability of experimental samples and the feasibility of subsequent research.

With its unique labeling characteristics and spectral advantages, DRAQ7 has become an essential tool for studies on cell apoptosis, cell viability and membrane integrity. Due to its lack of long-term toxicity, DRAQ7 can also serve as an endpoint detection indicator for experiments such as drug

screening and cell culture, used to evaluate cell health under different treatment conditions and provide reliable cell viability data for research on drug toxicity, the effects of environmental factors and other related fields. Its low-interference and high-compatibility properties effectively break through the application limitations of traditional dyes and promote the precision and efficiency of cell death-related research. For in vitro research use only. Not for clinical diagnosis or treatment.

Note: Equipotent to Thermo Fisher DRAQ7™ Dye (D15106).Note: DRAQ5 and DRAQ7 in this document are trademarks and registered trademarks of Biostatus Limited.

Applications

Nucleic acid detection of dead cells, cell apoptosis analysis, dead cell discrimination, multicolor co-staining analysis, etc.

Product Features

1. Rapid staining: Fast staining in as little as 10 minutes at room temperature, significantly shortening experimental time;

2. No washing required: No post-staining washing steps, offering ease of use and saving time and operational procedures;

3. User-friendly: Supplied as an easy-to-use water-soluble formulation, ready for use after dilution on demand;

4. Suitable for multicolor combination: No UV excitation and no emission spectral overlap with PE; no single-stain tube is needed for compensation adjustment when combined with PE for apoptosis detection;

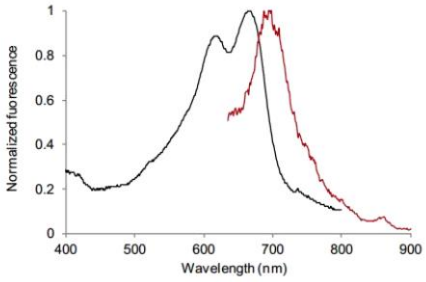
5. Ultra-stable: Stable at room temperature with high thermal and photostability.

Product Specifications

1. Ex: 599/644 nm;

2. Em: 678/697 nm;

3. Spectra:



Product Components

Component	100 T	1000 T
Ready-to-use DRAQ7 Dead Cell DNA Dye (0.3 mM in Water)	100 µL	1 mL

Note: The specifications are calculated based on a 1:100 dilution of DRAQ7 stock solution (working concentration: 3 µM) and a single usage volume of 100 µL for 96-well plate detection after dilution.

Precautions

1. DRAQ7 is a far-red fluorescent dye, invisible to the naked eye, and requires observation with a CCD camera or laser confocal microscope.

2. Due to the broad excitation and emission wavelength range of DRAQ7, it is not recommended to use DRAQ7 in combination with other far-red fluorescent dyes excitable by 488 nm or 633 nm laser.

3. Sodium azide interferes with the staining effect of DRAQ7; therefore, all media or buffers such as PBS used in experiments must be sodium azide-free.

4. Fluorescent dyes are prone to quenching; please avoid light exposure as much as possible to slow down quenching.

5. Centrifuge the product briefly before use before performing subsequent operations.

6. This product is for research use only and must not be stored in ordinary residential premises.

7. For your safety and health, follow the general laboratory safety regulations of your institution.

Instructions for Use

I. Pre-Experiment Preparation

1. Reagent Preparation

(1) Take the reagent out of storage conditions (e.g., 4°C) and equilibrate to room temperature (15-25°C).

(2) Prepare cell culture medium and buffer (e.g., PBS).

2. Control Setting

(1) Negative control: Live cells, normally cultured in fresh complete medium, used to calibrate the fluorescence baseline of "DRAQ7$^-$ live cells".

(2) Positive control: Dead cells, incubated in sterile distilled water at 55-60°C for 10 min (to induce complete cell death), used to calibrate "DRAQ7$^+$ dead cells".

3. Instrument Preparation

(1) Fluorescent microscope: Equipped with a 633 nm or 647 nm light source.

(2) Flow cytometer: Capable of excitation at 633 nm wavelength.

II. Operational Procedures

Protocol 1: Fluorescent Microscopy Detection (for Suspension Cells)

1. Cell Collection and Washing

(1) Collect the suspension cell suspension to be tested into a centrifuge tube.

(2) Centrifuge at 1000 rpm for 5 min at room temperature, and carefully aspirate and discard the supernatant.

2. Cell Resuspension and Counting

(1) Resuspend cells with PBS or cell culture medium and perform cell counting.

(2) Take 5×10^4-10^5 cells, centrifuge at low speed (1000 rpm) for 5 min, and remove PBS or cell culture medium.

3. Preparation of DRAQ7 Working Solution

Add DRAQ7 to the cell culture medium at a ratio of 1:100 (the dilution ratio of DRAQ7 in the medium can range from 1:15 to 1:200).

Note: The optimal staining concentration of DRAQ7 may vary with cell types. It is recommended to perform a pre-experiment for cell staining initially and set up a gradient of different DRAQ7 dilution ratios to determine the best dilution ratio.

4. Cell Staining

(1) Add the DRAQ7 staining working solution to the cell pellet, resuspend the cells, and incubate at room temperature (20~25°C) for 10 min;

(2) After incubation, centrifuge at low speed (1000 rpm) for 5 min and remove the staining working solution;

(3) Resuspend cells with cell culture medium.

Note: It is recommended to optimize the DRAQ7 incubation time around 10 minutes.

5. Fluorescent Microscopy Detection

(1) 96-well plate method: Add 100 µL of cell suspension to a 96-well plate, let it stand for a while until the cells settle to the bottom naturally, and observe under a fluorescent microscope.

(2) Slide method: Drop 20-30 µL of cell suspension onto a clean glass slide, gently cover with a coverslip to avoid air bubbles, and observe under a fluorescent microscope.

(3) Filter selection: Ex/Em: 645/666 nm.

Protocol 2: Fluorescent Microscopy Detection (for Adherent Cells)

1. Cell Preparation

Seed cells in a well plate one day in advance to achieve a cell confluency of 70%-85%.

2. Preparation of DRAQ7 Working Solution

Add DRAQ7 to the cell culture medium at a ratio of 1:100 (the dilution ratio of DRAQ7 in the medium can range from 1:15 to 1:200).

Note: The optimal staining concentration of DRAQ7 may vary with cell types. It is recommended to perform a pre-experiment for cell staining initially and set up a gradient of different DRAQ7 dilution ratios to determine the best dilution ratio.

3. Cell Staining

(1) Aspirate and discard the old medium in the microplate;

(2) Add the diluted DRAQ7 to the cells (recommended volume of staining working solution: 100 µL/well for 96-well plate, 150 µL/well for 48-well plate, 250 µL/well for 24-well plate, 500 µL/well for 12-well plate, 1 mL/well for 6-well plate), and incubate at room temperature (20~25°C) for 10 min.

Note: It is recommended to optimize the DRAQ7 incubation time around 10 minutes.

4. Fluorescent Microscopy Detection

Place the culture plate directly under the microscope for detection with filter setting of Ex/Em: 645/666 nm.

Protocol 3: Flow Cytometry Detection (for Both Suspension and Adherent Cells)

1. Cell Collection and Single-Cell Suspension Preparation

(1) Suspension cells: Follow Step 1 and Step 2 in Protocol 1.

(2) Adherent cells: Take cells cultured in a 6-well plate as an example.

a. Aspirate the cell culture medium into a suitable centrifuge tube for later use. Rinse the adherent cells with a small amount of PBS once, transfer the rinsed PBS to the centrifuge tube containing the medium, and centrifuge at 1000 rpm for 5 min at room temperature.

b. Add an appropriate amount of trypsin digestion solution (just covering the cells), place at room temperature and observe under a microscope; once the cells become rounded and the intercellular spaces increase, gently pipette to detach the cells completely.

Note: The dosage of trypsin, digestion time and digestion temperature shall be determined according to the laboratory's established protocols.

c. Key step: Add the cell culture medium reserved in step a to terminate digestion.

d. Transfer the cell suspension to a centrifuge tube, centrifuge at 1000 rpm for 5 min at room temperature, and aspirate and discard the supernatant.

e. Collect the cells from step a and step d.

f. Resuspend cells with PBS or cell culture medium and perform cell counting.

g. Take 5×10^4-10^5 cells, centrifuge at 1000 rpm for 5 min at room temperature, and aspirate and discard the supernatant.

2. Preparation of DRAQ7 Staining Working Solution

Add DRAQ7 to the cell culture medium at a ratio of 1:100 (the dilution ratio of DRAQ7 in the medium can range from 1:15 to 1:200).

Note: The optimal staining concentration of DRAQ7 may vary with cell types. It is recommended to perform a pre-experiment for cell staining initially and set up a gradient of different DRAQ7 dilution ratios to determine the best dilution ratio.

3. Cell Staining

Resuspend the cells with 1 mL of DRAQ7 staining working solution and incubate at room temperature (20~25°C) for 10 min.

Note: It is recommended to optimize the DRAQ7 incubation time around 10 minutes.

4. Flow Cytometry Detection

Select 633 nm wavelength for excitation and detect the fluorescent signal at 660 nm.

III. Result Interpretation

1. Qualitative Analysis (Microscopy)

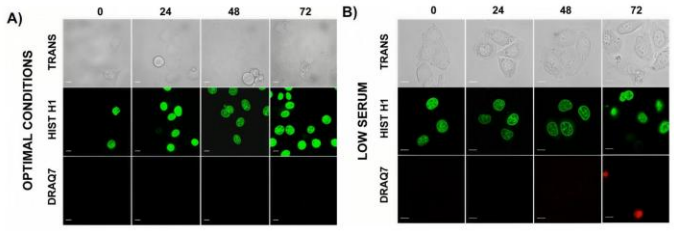


Figure 1. Fluorescent micrographs of Hela cell DNA stained with DRAQ7 dye

(1) Dead cells: Bright far-red (red) fluorescence appears in the nuclear region with concentrated, well- defined signals and clear nuclear boundaries;

(2) Live cells: No nuclear fluorescence, and no DRAQ7 far-red (red) fluorescent signal is detected in the nuclear region of live cells (the dye cannot enter due to intact cell membranes).

Note: The image is cited from the reference Real-time cell viability assays using a new anthracycline derivative DRAQ7® (doi: 10.1002/cyto.a.22228).

2. Qualitative Analysis (Flow Cytometry)

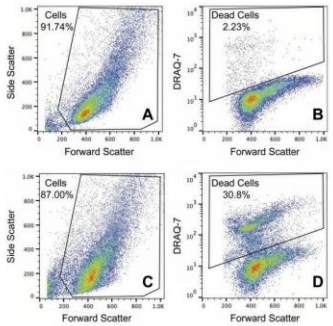


Figure 2. Flow cytometry plot of glioma cells stained with DRAQ7 dye

(1) Step 1: Determine the baseline of "DRAQ7$^-$ live cell population" and "DRAQ7$^+$ dead cell population" according to the signal values of negative and positive controls;

(2) Step 2: On the FSC-A/SSC-A scatter plot, gate the cell population to exclude debris and large aggregates;

(3) Live/dead cell gating

a. FSC-A/DRAQ7 scatter plot: Assist in confirming the correlation between cell size and DRAQ7 signal to exclude debris interference (X-axis: FSC-A (linear axis, reflecting cell size); Y-axis: DRAQ7 fluorescence intensity (bi-exponential axis)).

b. Set the live/dead threshold and gate the populationsThreshold setting: Based on the DRAQ7 signal of the negative control (live cells), find the 99th percentile of its fluorescence intensity (i.e., 99% of live cell signals are below this value), which is defined as the "live/dead threshold";

Live cell gate (DRAQ7$^-$): Gate the population with DRAQ7 fluorescence intensity below the threshold (corresponding to the main population of the negative control with weak signals);

Dead cell gate (DRAQ7$^+$): Gate the population with DRAQ7 fluorescence intensity above the threshold (corresponding to the main population of the positive control with strong signals).

Note: The image is cited from the reference DRAQ7 as an Alternative to MTT Assay for Measuring Viability of Glioma Cells Treated With Polyphenols (doi: 10.21873/anticanres.14553.).

Frequently Asked Questions (FAQs)

1. Q: Does the DRAQ7 stock solution contain DMSO?

A: This product is a water-based formulation and contains no DMSO.

2. Q: Why is there a difference in staining time between 37°C and room temperature?

A: Cell activity and molecular movement are more vigorous at 37°C than at room temperature, and DRAQ7 binds to the cell nucleus at a faster rate, so a shorter staining time may be required.

3. Q: What are the differences between DRAQ5 and DRAQ7 in use, and how to choose between them?

A: Choose DRAQ5 for DNA analysis of live cells, long-term monitoring of cell status, or deep tissue imaging; choose DRAQ7 for evaluating cell viability, detecting apoptosis, or distinguishing live/dead cell populations in samples. The differences between the two are as follows:

Comparison	DRAQ5	DRAQ7
Cell membrane permeability	Permeable	Non-permeable
Staining target	All cell nuclei of live and fixed cells	Only cell nuclei of dead, apoptotic or permeabilized cells
Binding mode	Stoichiometric binding to DNA, fluorescence intensity reflects DNA content	Specific binding to double- stranded DNA with rapid staining
Applicable scenarios	Live cell DNA content analysis, cell cycle research, long-term live cell imaging experiments, deep tissue/tumor tissue imaging	Cell viability assessment, cell apoptosis detection, in vitro toxicity testing of drugs/compounds, flow cytometry experiments for distinguishing live/dead cells

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Aladdin Scientific Corporation

14078 Meridian Parkway, Riverside, CA 92518, USA

Phone: 1-833-552-7181

Sales: sales@aladdinsci.com

Customer Service: custserv@aladdinsci.com

EU SALES, LOGISTICS & LOCALIZED SUPPORT

Aladdin Biochem Deutschland GmbH

Westring 2, 33142 Büren, Germany

Phone: +02951 9383958

Support: support.eu@aladdinsci.com

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