Dyes and Stains

Propidium Iodide

Cell viability dye (DNA-labeling dye)

Catalog # 75002

10 mg

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Product Description

Propidium Iodide (PI) is a red-fluorescent cell viability dye which is excluded from live cells with intact membranes but penetrates dead or damaged cells to bind to DNA and RNA by intercalating between the bases. It is widely used as a counterstain to differentiate and exclude non-viable cells in flow cytometric analyses and can be excited using blue (488 nm), green (532 nm) or yellow-green (561 nm) laser lines, with detection in the FL2 or FL3 channels. PI is used in DNA fluorescence imaging applications to discriminate early and late stages of apoptosis, to study cell-mediated cytotoxicity, and for chromosome analysis. It is also commonly used in quantitative DNA assays.

Chemical Name:	3,8-diamino-5-[3-(diethylmethylammonio)propyl]-6-phenylphenanthridinium diiodide
Alternative Names:	3,8-Diamino-5-{3-[diethyl(methyl)ammonio]propyl}-6-phenylphenanthridinium diiodide; PI; Propidium diiodide
CAS Number:	25535-16-4
Chemical Formula:	$C_{27}H_{34}N_4 \cdot 2I$
Molecular Weight:	668.4 g/mol
Excitation Wavelength:	488 - 535 nm (DNA or RNA complex)
Emission Wavelength:	617 nm (DNA or RNA complex)

Properties

Storage:	Store at -20°C.
Shelf Life:	Product stable until expiry date (EXP) on label. Protect product from prolonged exposure to light.
Format/Formulation:	A crystalline solid

Applications

Verified:	FC
Reported:	FC, FISH, Fluorescence microscopy, Fluorometry
Special Applications:	This product has been verified for viability assessments of cells isolated with EasySep™ and RosetteSep™ kits.

Abbreviations: CellSep: Cell separation; ChIP: Chromatin immunoprecipitation; FA: Functional assay; FC: Flow cytometry; ICC: Immunocytochemistry; IF: Immunofluorescence microscopy; IHC: Immunohistochemistry; IP: Immunoprecipitation; WB: Western blotting

Handling/Directions for Use

PREPARATION
A stock solution may be made by dissolving PI in the diluent of choice. PI is soluble in aqueous buffers and in organic solvents. Guidelines for the solubility of PI are as follows:
· Phosphate-buffered saline (PBS), pH 7.2 ≤ 2 mg/mL
· Ethanol ≤ 0.2 mg/mL
· DMSO ≤ 2.5 mg/mL
· Dimethyl formamide ≤ 3.3 mg/mL
NOTE: If making a stock soution using an organic solvent, further dilution into aqueous buffers or isotonic saline should be made prior to performing biological experiments. Ensure that the residual amount of organic solvent is insignificant, as organic solvents may have physiological effects at low concentrations.

Wherever possible, prepare and use the stock solutions on the same day. Protect stock solutions from prolonged exposure to light. If stock solutions must be made in advance, it is recommended that they are stored in aliquots in tightly sealed vials at -20°C, protected from prolonged exposure to light. Generally these will be stable for up to 1 month.

FLOW CYTOMETRY
1. Prepare a 1 mg/mL (1.5 mM) stock solution by dissolving solid PI in PBS.
2. Add to cells at a final concentration of ≤ 1 µg/mL.
3. Incubate for 5 - 10 min in the dark, then analyze immediately.

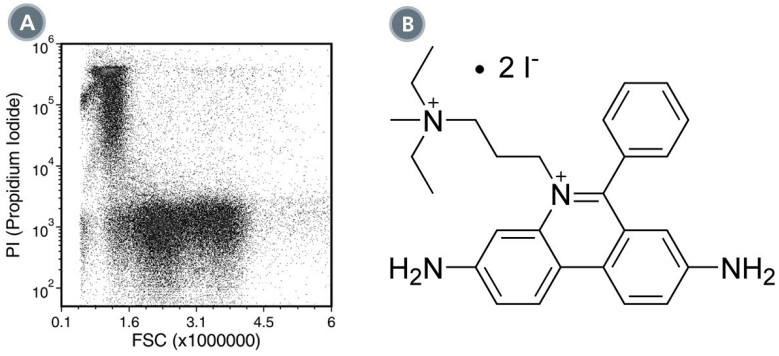
It is recommended that the dye be titrated for optimal performance for each application.

Notes and Tips

For flow cytometric analysis PI can be detected in the FL2 (DNA content) or FL3 (viability) channels. Use FL2 to analyze PI staining if it is being employed as a counterstain with fluorescein-conjugated Annexin V.

For microscopy analysis PI can be viewed using a rhodamine (red) filter. Cells will be stained with PI if the membrane has been permeated, e.g., as a result of natural cell death or detergent treatment.

Data/Structure



(A) Flow cytometry analysis of human peripheral blood mononuclear cells (PBMCs) labeled with Propidium Iodide.
(B) Chemical structure of Propidium Iodide.

References

1. Beggs KM et al. (2014) Molecular mechanisms of hepatocellular apoptosis induced by trovafloxacin-tumor necrosis factor-alpha interaction. Toxicol Sci 137(1): 91–101. (FC)
2. Jeong SM et al. (2014) SIRT4 protein suppresses tumor formation in genetic models of Myc-induced B cell lymphoma. J Biol Chem 289(7): 4135–44. (FC)
3. Kong S et al. (2014) DBC1 is a suppressor of B cell activation by negatively regulating alternative NF-κB transcriptional activity. J Immunol 193(11): 5515–24. (FC)
4. Sonnemann J et al. (2014) p53-dependent and p53-independent anticancer effects of different histone deacetylase inhibitors. Br J Cancer 110(3): 656–67. (FC)
5. Yun B et al. (2014) Serine hydrolase inhibitors block necrotic cell death by preventing calcium overload of the mitochondria and permeability transition pore formation. J Biol Chem 289(3): 1491–504. (ICC, IF)
6. Zhao W et al. (2013) The peroxisome-proliferator activated receptor-γ agonist pioglitazone modulates aberrant T cell responses in systemic lupus erythematosus. Clin Immunol 149(1): 119–32. (FC)
7. Riccardi C & Nicoletti I. (2006) Analysis of apoptosis by propidium iodide staining and flow cytometry. Nat Protoc 1(3): 1458–61. (FC)
8. Sakimoto I et al. (2006) Alpha-sulfoquinovosylmonoacylglycerol is a novel potent radiosensitizer targeting tumor angiogenesis. Cancer Res 66(4): 2287–95. (FC)
9. Kral T et al. (2005) Propidium iodide and PicoGreen as dyes for the DNA fluorescence correlation spectroscopy measurements. J Fluoresc 15(2): 179–83. (Fluorometry)
10. Lecoeur H. (2002) Nuclear apoptosis detection by flow cytometry: influence of endogenous endonucleases. Exp Cell Res 277(1): 1–14. (FC)
11. Coder DM. (2001) Assessment of cell viability. Curr Protoc Cytom Chapter 9: Unit 9.2. (FC)
12. Douglas RS et al. (1995) A simplified method for the coordinate examination of apoptosis and surface phenotype of murine lymphocytes. J Immunol Methods 188(2): 219–28. (FC)
13. Martin SJ et al. (1995) Early redistribution of plasma membrane phosphatidylserine is a general feature of apoptosis regardless of the initiating stimulus: inhibition by overexpression of Bcl-2 and Abl. J Exp Med 182(5): 1545–56. (FC)
14. Crompton T et al. (1992) Propidium iodide staining correlates with the extent of DNA degradation in isolated nuclei. Biochem Biophys Res Commun 183(2): 532–37. (FC)
15. De Caestecker MP et al. (1992) The detection of intracytoplasmic interleukin-1 alpha, interleukin-1 beta and tumour necrosis factor alpha expression in human monocytes using two colour immunofluorescence flow cytometry. J Immunol Methods 154(1): 11–20. (FC)

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