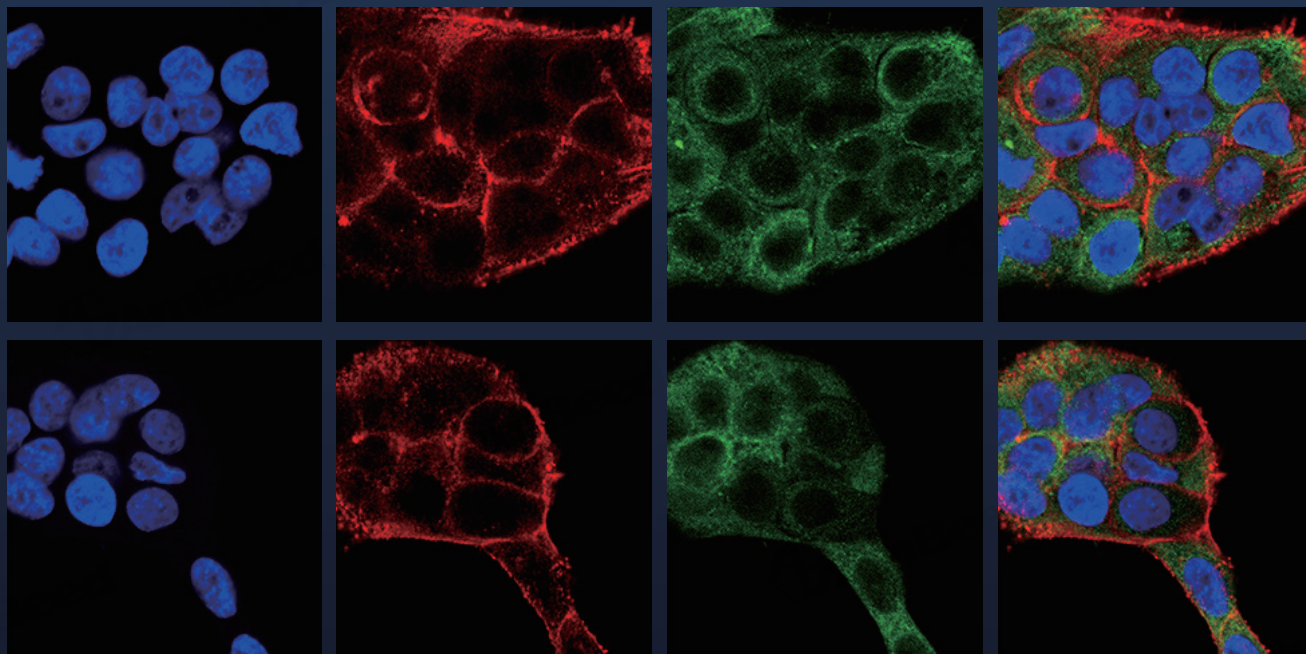


Organelle Dyes

Nucleus Dyes | Membrane Dyes | Cytoplasm Dyes

Endoplasmic Reticulum Dyes | Lysosome Dyes | Mitochondria Dyes

Lipid Droplet Dyes



Nucleus Dyes



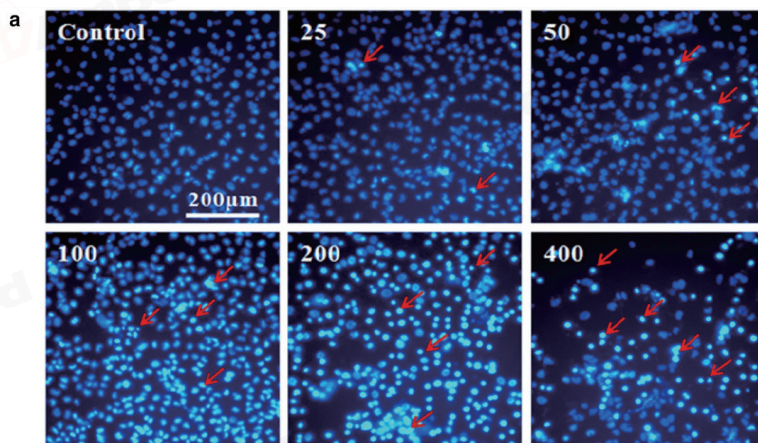
The nucleus is a membrane-bound organelle essential for cellular metabolism, growth, and differentiation. It comprises the nuclear envelope, nucleolus, and nuclear lamina and serves as the primary site for gene expression. AmBeed provides nuclear dyes suitable for staining nuclei in live cells, fixed cells, and tissues, as well as for chromosome banding analysis. The most commonly used nuclear dyes include Hoechst dyes, DAPI, and Propidium Iodide (PI).

Product Name/Color	Cat. No.	CAS	Excitation (Ex)	Emission(Em)	Description
Hoechst 33342 (Blue)	A186328	23491-52-3	346 nm	460 nm	Hoechst 33342, Hoechst 33258, and Hoechst 34580 belong to the Hoechst series of fluorescent dyes. The Hoechst series is specifically designed for live-cell nuclear labeling. These dyes can penetrate the cell membrane, making them suitable for staining both live and fixed cells. Hoechst 33258 binds to the minor groove of DNA at A/T-rich sequences in live cells and is widely used for apoptosis detection. After staining, observations can be made using fluorescence microscopy or flow cytometry. The overall difference between Hoechst 33258 and Hoechst 33342 is minimal, but Hoechst 33342 has lower cytotoxicity.
Hoechst 33342 trihydrochloride (Blue)	A416033	875756-97-1	340 nm/355 nm	510 nm/465 nm	
Hoechst 33258 (Blue)	A196245	23491-44-3	338 nm/355 nm	505 nm/465 nm	
Hoechst 33258 trihydrochloride (Blue)	A346521	23491-45-4	346 nm	460 nm	
Hoechst 33258 analog 2 (Blue)	A849408	23491-54-5	365 nm	451 nm	
Hoechst 33258 analog 3 (Blue)	A617630	23554-98-5	356 nm	461 nm	
Hoechst 33258 analog 5 (Blue)	A475328	23491-55-6	365 nm	451 nm	
Hoechst 34580 (Blue)	A314846	23555-00-2	357 nm	490 nm±10 nm	Ethidium bromide is the most commonly used nucleic acid stain in polyacrylamide gel electrophoresis and agarose gel electrophoresis.
HOE-S 785026 (Blue)	A624636	132869-83-1	356 nm	451 nm	
Ethidium bromide (orange red)	A752777	1239-45-8	518 nm	605 nm	
DAPI dihydrochloride (Blue)	A352479	28718-90-3	359 nm	461 nm	DAPI dihydrochloride is a type of DAPI fluorescent dye. DAPI binds strongly to DNA, producing fluorescence over 20 times stronger when bound to double-stranded DNA, whereas it does not enhance fluorescence when bound to single-stranded DNA.
Propidium Iodide (Red)	A795950	25535-16-4	535 nm	615 nm	Propidium Iodide (PI) is a commonly used nuclear (DNA) staining reagent. It cannot pass through the intact membranes of normal or early apoptotic cells but can penetrate damaged cell membranes to stain the nucleus. PI can be used to distinguish between viable and dead cells as well as between early and late apoptotic cells.

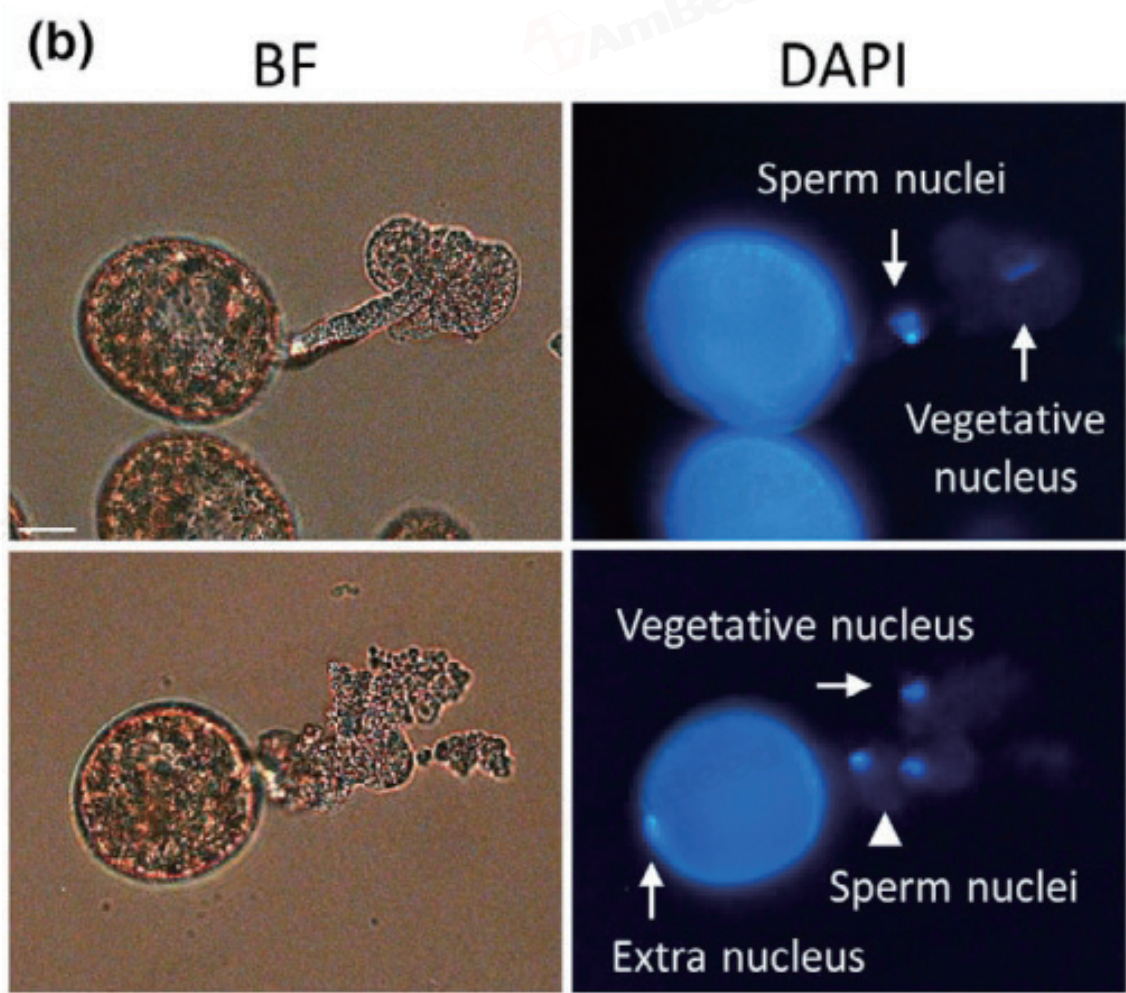
Experimental Example

Hoechst 33342 staining of HK-2 cells, detecting nuclear changes. Apoptotic bodies or chromatin condensation are marked with red arrows

Environmental Sciences Europe, 2020, 32(2).

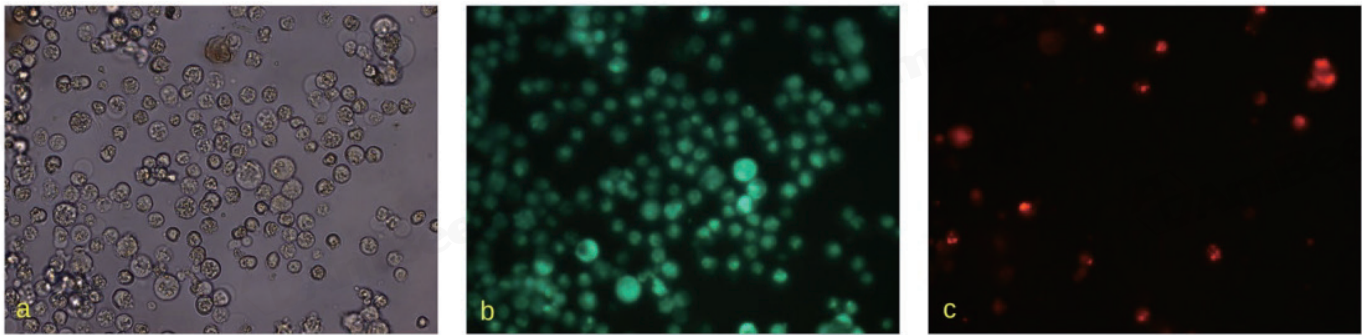


Experimental Example



DAPI staining followed by observation of pollen tube germination and nuclear migration under bright-field conditions

New Phytologist, 2024.



Fluorescence images of Caco-2 cells stained with DioC6 (Fig. b) and Propidium Iodide (Fig. c)

Scientific Data, 2023, 10, 160.

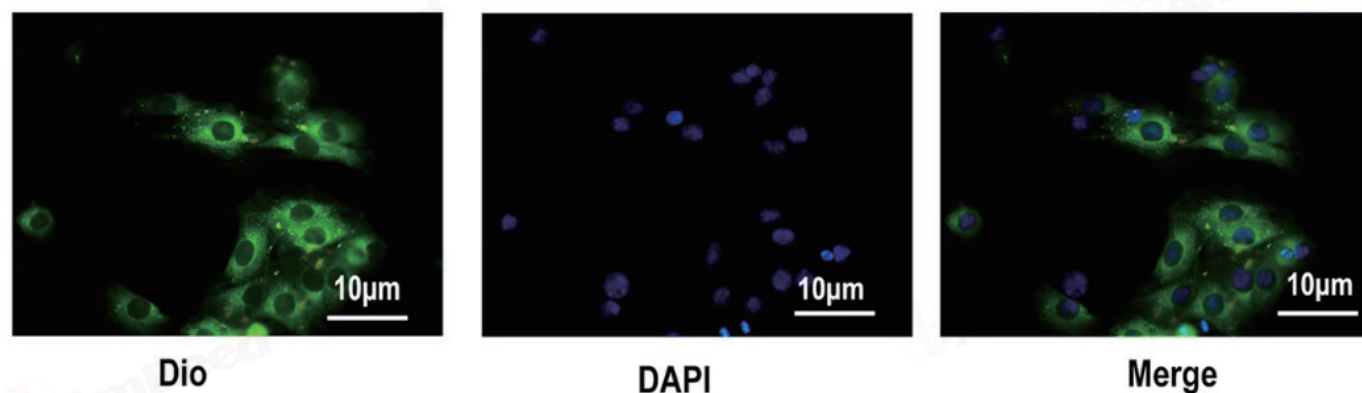
Membrane Dyes



The cell membrane serves as the boundary of the cell, separating the interior of the cell from the external environment. It is primarily composed of proteins and lipids and is involved in several important physiological activities, such as material transport, signal transduction, apoptosis, and autophagy. Typically, lipophilic dyes can be used as membrane dyes, but they quickly internalize, leaving only a narrow window for imaging.

Product Name/Color	Cat. No.	CAS	Excitation (Ex)	Emission(Em)	Description
DiO (Green)	A367653	34215-57-1	483 nm	501 nm	DiO is a green fluorescent dye widely used as a lipophilic tracer. Once added to cells, it undergoes lateral diffusion in the cell membrane.
DiR (Dark Red)	A320307	100068-60-8	748 nm	780 nm	DiR is a lipophilic near-infrared fluorescent cyanine dye widely used for labeling cytoplasmic membranes. The two 18-carbon chains of this dye can be embedded in the cell membrane, achieving specific and stable staining of cells and almost no transfer of the dye between cells.
Merocyanin 540 (Yellow)	A1174838	62796-23-0	540 nm	580 nm	Merocyanin 540 is a fluorescent membrane-marking dye that selectively labels the membranes of a variety of electrically excitable cells while leaving the membranes of non-electrically excitable cells unstained.
ANTS (Green)	A354786	5398-34-5	350 nm	515 nm	ANTS is a polyanionic fluorescent dye that is typically used in combination with the cationic quencher DPX (X1525) for membrane fusion or permeability assays. It can also be used as a neuronal tracer.
Laurdan (Blue)	A140750	74515-25-6	440 nm	490 nm	Laurdan is a fluorescent probe used for studying membrane structure and dynamic processes such as fluidity. It exhibits photo-sensitivity to the phospholipids it binds to in the cell membrane.
Dansyl chloride (Blue)/(Blue-green)	A2668058	605-65-2	337 nm	492 nm	Dansyl chloride is a fluorescent reagent for amino acids and peptides. It reacts with aliphatic amines, aromatic amines, and primary amines to form stable blue or blue-green fluorescent sulfonamide derivatives.
Prodan (Green/Yellow-green)	A261947	70504-01-7	361 nm	498 nm	Prodan is a lipophilic environmentally sensitive membrane probe that can be used to design and synthesize novel fluorescent nucleosides. Fluorescent nucleosides sensitively change the Stokes shift value according to the orientation polarizability of the solvent.

Experimental Example



DiO-labeled CPCs-Ex and evaluated the in vitro uptake of CPCs-Ex by H9C2 cells

Cell Death Dis, 2019, 10(10), 691.

Cytoplasm Dyes



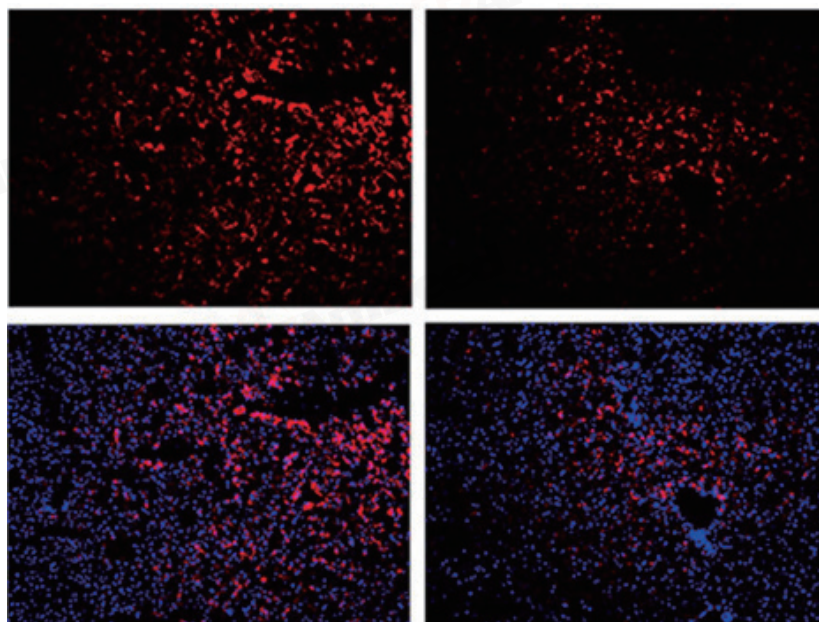
The cytoplasm is the region within the cell membrane but outside the nucleus, and it contains organelles, the cytosol, and the cytoskeleton. The cytoplasm is the main site for metabolic processes. Cytoplasm dyes are used to label and track specific structures inside the cell and typically have good membrane permeability, allowing them to enter living cells.

Product Name/Color	Cat. No.	CAS	Excitation (Ex)	Emission(Em)	Description
Dihydroethidium (Blue)/(Red)	A286650	104821-25-2	370 nm	420 nm	Dihydroethidium (DHE) is a fluorescent indicator used to detect peroxides. It can cross the cell membrane and bind to intracellular proteins, emitting blue fluorescence. After dehydrogenation, it binds to RNA or DNA, producing red fluorescence.
6-CFDA (Green)	A383451	3348-03-6	492 nm	517 nm	6-CFDA is a common aliphatic fluorescein derivative used to differentiate between live and apoptotic cells. CFDA freely diffuses into cells and is hydrolyzed by non-specific intracellular esterases to generate carboxyfluorescein (CF).
CFDA-SE (Green)	A1148024	150347-59-4	485 nm	515 nm	CFDA-SE is a membrane-permeable fluorescent dye used as an amine-reactive marker for long-term cell tracking. Upon deacetylation, it forms a green fluorescent conjugate. CFDA-SE is also used for tracking lymphocyte migration and proliferation.
5-Carboxyfluorescein diacetate N-succinimidyl ester (Green)	A319961	150206-05-6	492 nm	517 nm	5-Carboxyfluorescein diacetate N-succinimidyl ester can penetrate the cell membrane and covalently bind to intracellular molecules for long-term cell labeling. It is also used in studies of cell proliferation, migration, and in vivo cell tracking.
7-Hydroxy-4-methylcoumarin-3-acetic acid (Blue)	A711116	5852-10-8	344 nm	454 nm	7-Hydroxy-4-methylcoumarin-3-acetic acid is a highly amine-reactive blue fluorophore with pH-dependent and environment-sensitive fluorescence properties. It is used for labeling peptides, nucleotides, and carbohydrates.

Experimental Example

Dihydroethidium((Red)) detection of ROS generation in liver tissue

Cell Death and Disease, 2020, 11, 256.



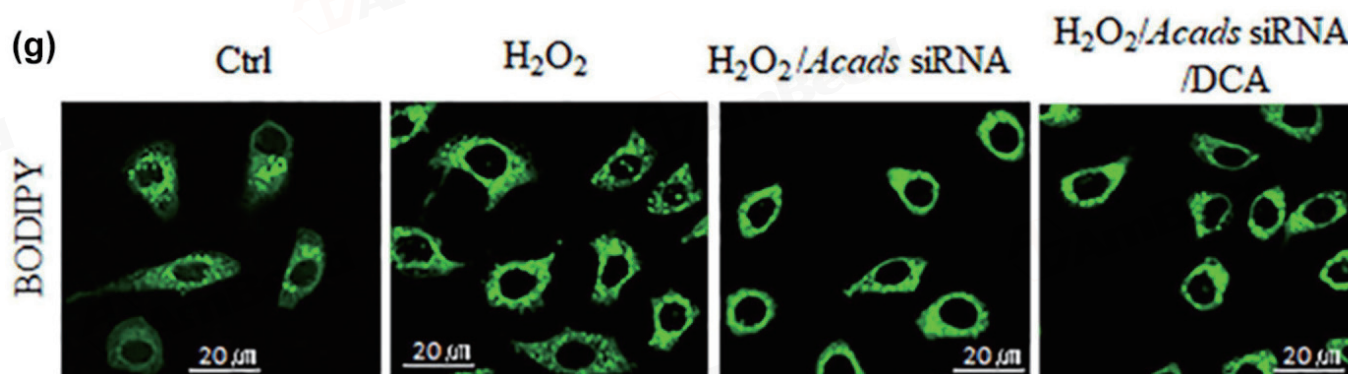
Lipid Droplet Dyes



Lipid droplets are the primary storage sites for neutral fats. Under normal conditions, lipid droplets are found only in adipocytes, with other cells containing little or no lipid droplets. However, in pathological conditions, other cells may exhibit lipid droplets or a significant increase in lipid droplets. Lipid staining can highlight lipid droplets. For example, in organs such as the kidneys, liver, and heart undergoing fatty degeneration, vacuoles of various sizes appear in the cytoplasm, and lipid staining can differentiate fatty degeneration from water degeneration or glycogen storage.

Product Name/Color	Cat. No.	CAS	Excitation (Ex)	Emission (Em)	Description
Nile Red (Red)	A819053	7385-67-3	559 nm	635 nm	Nile Red is a lipophilic dye that can be used to detect intracellular lipid droplets via fluorescence microscopy and flow cytometry. It exhibits strong fluorescence in lipid-rich environments, whereas it shows almost no fluorescence in water and other polar solvents.
BODIPY 493/503 (Green)	A411914	121207-31-6	493 nm	503 nm	BODIPY dyes are lipophilic fluorescent dyes with high quantum yields. They are relatively insensitive to environmental polarity and pH, making them stable under different physiological conditions. BODIPY lipid droplet dyes are used for staining live and fixed cells, penetrating the cell membrane efficiently and localizing to neutral lipids for specific staining.
BODIPY 505/515 (Green)	A1180253	21658-70-8	505 nm	515 nm	

Experimental Example



Green lipid dye BODIPY 493/503 staining of lipid droplets in immune fluorescence images

Aging Cell, 2024: e14256.

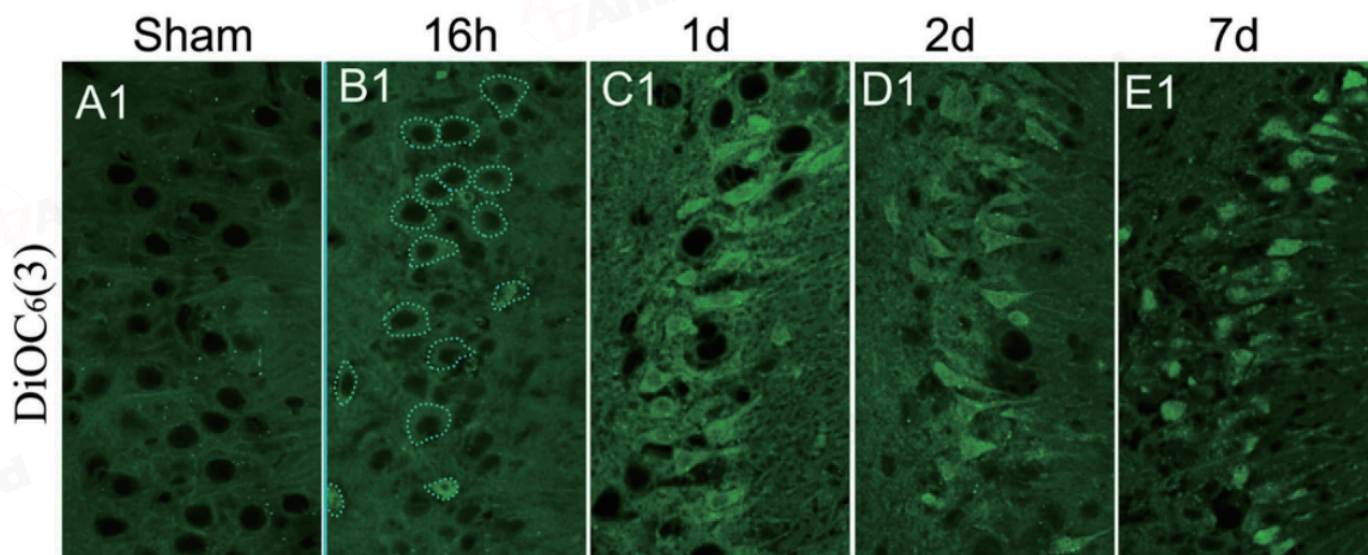


Endoplasmic Reticulum Dyes

The endoplasmic reticulum plays a central role in lipid synthesis, protein synthesis, protein chaperoning and folding, and calcium homeostasis. Most fluorescent dyes for endoplasmic reticulum staining are lipids or chemicals that can affect protein movement. The endoplasmic reticulum can be stained with lipophilic probes in both live and fixed cells. AmBeed provides endoplasmic reticulum dyes for imaging in live or fixed cells.

Product Name/Color	Cat. No.	CAS	Excitation (Ex)	Emission(Em)	Description
ER-Tracker Green (Green)	A1499639	730931-46-1	489 nm	520 nm	ER-Tracker Green is a BODIPY dye conjugated with glibenclamide. It is non-toxic to cells at low concentrations and has high specificity for the endoplasmic reticulum. As an environment-sensitive probe, it retains some fluorescence even after formaldehyde treatment and exhibits a long fluorescence lifetime and good extinction coefficients.
3,3'- Dihexyloxacarbocyanine iodide (Green)	A655011	53213-82-4	486 nm	515 nm	3,3'-Dihexyloxacarbocyanine iodide is a cyanine dye used for detecting changes in mitochondrial membrane potential.

Experimental Example



3,3'-Dihexyloxacarbocyanine iodide staining of the mouse CA3 region

Progress in Neurobiology, 2023, 226: 102461.

Mitochondria Dyes



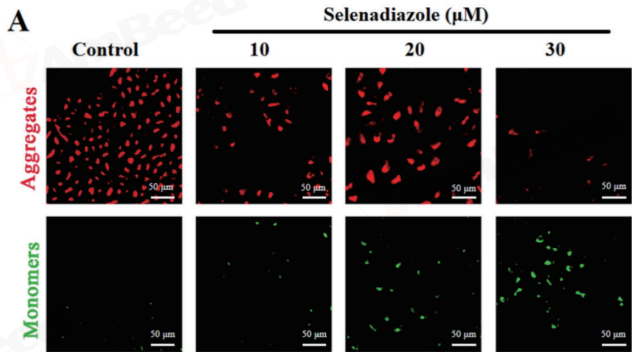
Mitochondria are important organelles responsible for energy production. Their activity changes and dysfunction are closely associated with cancer, aging, and neurodegenerative diseases. Therefore, understanding the state of mitochondria is crucial. Membrane potential differences caused by energy production are used as indicators, with specific fluorescent dyes used for staining. The accumulation and localization of these dyes on mitochondria depend on the mitochondrial membrane potential, with different fluorescence signals under different potentials.

Product Name/Color	Cat. No.	CAS	Excitation (Ex)	Emission(Em)	Description
Rhodamine 123 (Green)	A442351	62669-70-9	507 nm	529 nm	Rhodamine 123 (RH-123) is a rhodamine dye that acts as a membrane-permeable cationic fluorescent probe for measuring mitochondrial membrane potential. It rapidly crosses the cell membrane and is non-toxic to cells.
Rhodamine B (orange)	A951578	81-88-9	546 nm	610 nm	Rhodamine B is a cationic fluorescent dye used in fluorescence microscopy, flow cytometry, fluorescence correlation spectroscopy, and ELISA.
TMRE (Red)	A218540	115532-52-0	550 nm	576 nm	TMRE is a membrane-permeable cationic fluorescent probe with low cytotoxicity and high mitochondrial specificity. TMRE does not affect cell proliferation or viability and is widely used to detect mitochondrial activity in animal, plant, and microbial cells.
TMRM Perchlorate (Red)	A216412	115532-50-8	550 nm	576 nm	TMRM Perchlorate is a membrane-permeable cationic fluorescent probe with low cytotoxicity and high mitochondrial specificity.
2-Di-1-ASP (orange)	A203657	2156-29-8	485 nm	607 nm	2-Di-1-ASP (DASPI) is a styryl dye selective for G-quadruplex and double-stranded DNA. It is commonly used for mitochondrial staining and as a groove-binding fluorescent probe for G-quadruplex DNA.
4-Di-1-ASP (orange)	A316555	959-81-9	475 nm	606 nm	2-Di-1-ASP (DASPI) is a styryl dye selective for G-quadruplex and double-stranded DNA. It is commonly used for mitochondrial staining and as a groove-binding fluorescent probe for G-quadruplex DNA.
DiSC3(5) (Red)	A575945	53213-94-8	500 nm	705 nm	DiSC3(5) can be used as a fluorescent probe to detect changes in mitochondrial membrane potential or configuration.
JC-1 (Red)/(Green)	A659203	3520-43-2	585/514 nm	590/529 nm	JC-1 (CBIC2) is a cyanine dye that functions as a dual-emission, potential-sensitive probe for detecting mitochondrial membrane potential. JC-1 accumulates in mitochondria in a potential-dependent manner and can be used to measure membrane potential in cells, tissues, or purified mitochondria. In mitochondria with high membrane potential, JC-1 forms aggregates that emit strong red fluorescence (Ex = 585 nm, Em = 590 nm). When membrane potential is low, JC-1 remains in monomeric form, producing green fluorescence (Ex = 514 nm, Em = 529 nm). The red-to-green fluorescence ratio depends on membrane potential and is unaffected by mitochondrial size, shape, or density.
MKT-077 (Green)	A670986	147366-41-4	488 nm	543 nm	MKT-077 (FJ-776) is a highly water-soluble mitochondrial dye with low cytotoxicity.
3,3'-Dihexyloxacarbocyanine iodide (Green)	A655011	53213-82-4	486 nm	515 nm	3,3'-Dihexyloxacarbocyanine iodide is a cyanine dye used for detecting changes in mitochondrial membrane potential.

Experimental Example

The effect of selenium disulfide on mitochondrial membrane potential: JC-1 aggregates and monomers in Hela cells under different doses of selenium disulfide.

ACS Omega, 2024, 9(19): 20919-20926.



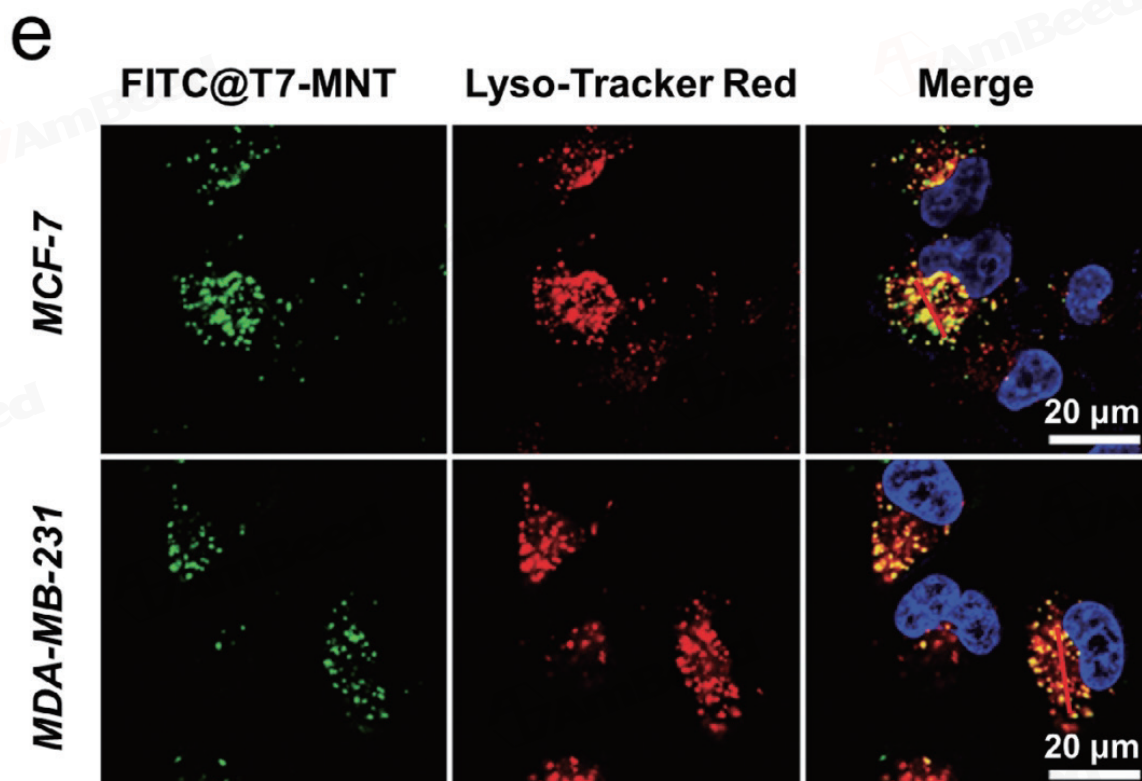
Lysosome Dyes



Lysosomes are important organelles in animal cells involved in various cellular processes, including the degradation of biomolecules, apoptosis, signal transduction, cellular metabolism, and membrane repair. Their internal pH is approximately 3.5–5. Lysosome markers help us efficiently identify and track lysosomes. LysoTracker markers are highly selective for acidic organelles, enabling specific staining of lysosomes.

Product Name/Color	Cat. No.	CAS	Excitation (Ex)	Emission(Em)	Description
LysoTracker Red (Red)	A1163847	231946-72-8	577 nm	599 nm	LysoTracker Red is a red fluorescent lysosomal probe that freely penetrates the cell membrane and labels live cells. It usually accumulates in spherical organelles and is highly selective for acidic organelles.

Experimental Example



LysoTracker Red staining of lysosomes in MCF-7 and MDA-MB-231 cells, confocal fluorescence images

Advanced Science, 2024, 11(9): 2302093.



AmBeed Committed to Providing You with High-Quality Products and Services

AmBeed is headquartered in Chicago, USA. We are dedicated to providing global scientists with high-quality bioactive small molecule compounds, including inhibitors, agonists, natural products, PROTACs, molecular glues, ADCs, ligands, and various drug screening libraries. These cover a wide range of specific compounds that can precisely target various points and their mutant forms, assisting you on the path to precision medicine!

| PRODUCTS

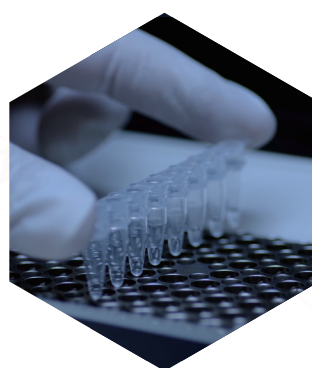
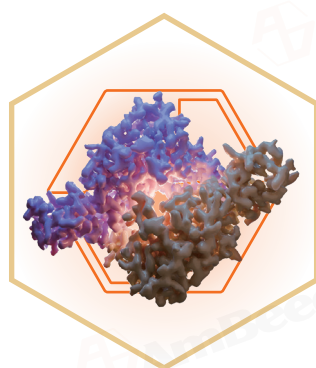
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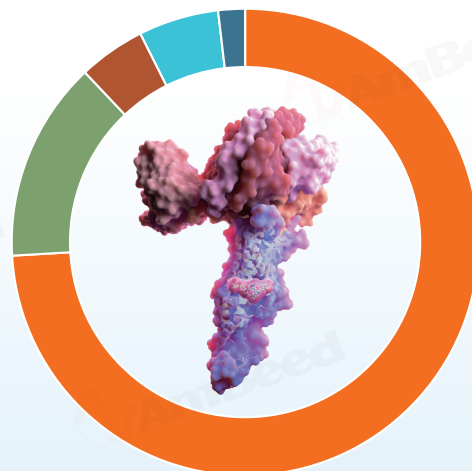
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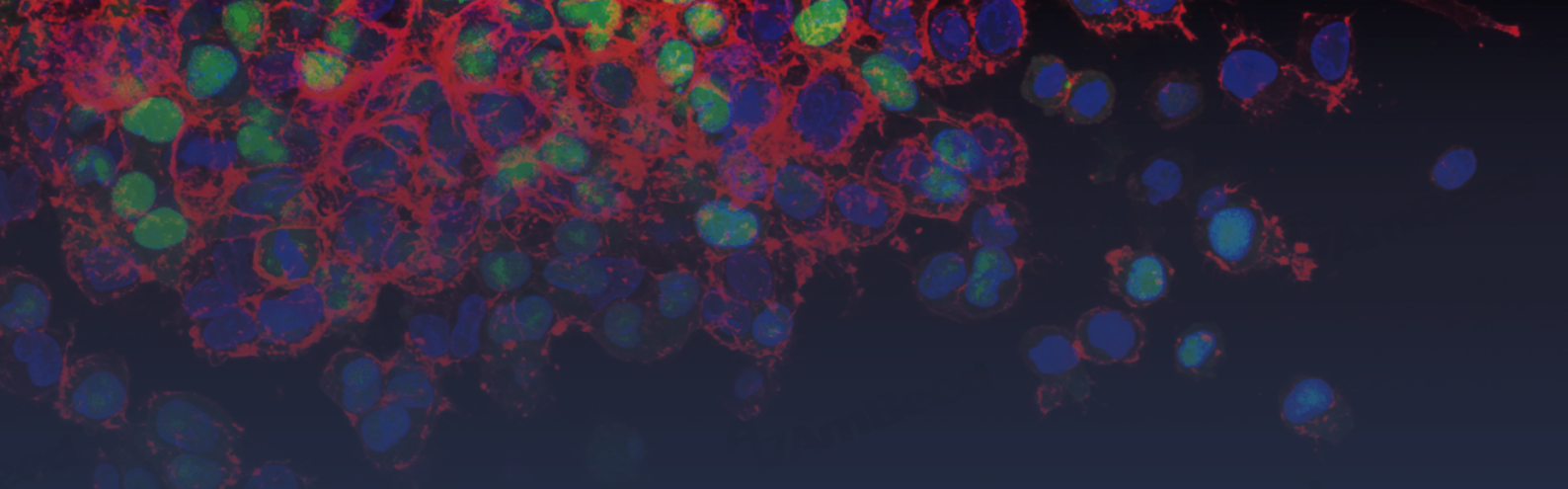
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Technical Support

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Various techniques and methodologies are available for studying cells, ranging from optical microscopy to electron microscopy and from cytochemical methods to immunocytochemical approaches. Cell staining is a commonly used method to investigate cellular biological characteristics.

Organelles play a crucial role in cellular functions, including gene expression, signal transduction, and apoptosis. Nearly all cellular activities require the independent or coordinated action of organelles. To gain a comprehensive understanding of cellular activities, researchers employ organelle-specific fluorescent dyes for detection, tracking, and visualization. The selection of appropriate organelle dyes is critical for fluorescence imaging in cell biology.

AmBeed provides fluorescent dyes designed for organelle labeling, offering advantages such as ease of use, high sensitivity, excellent stability, and strong fluorescence intensity. These dyes are suitable for live-cell imaging, fixed-cell imaging, ELISA, and flow cytometry, meeting various experimental demands and enhancing research efficiency.



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