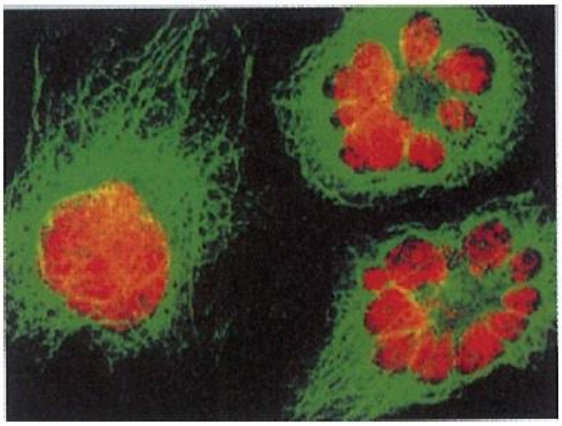
Cell Staining and probing

Introduction

Cell staining and probing is performed for different purposes (cell vizualisation, tracking, structures study,…), targetting various cell components or activities, using chromogenes or fluorescent probes (great for quantitative and multiplex assays).

The most commonly stained cell structures are cell membranes/proteins (i.e. with CFSE), cytosol (i.e. with Calcein and BCECF, notably promoted by esterases activity – using their AM derivatives), mitochondria (I.e. Rh123, MitoRed), and nucleic materials (DNA nucleus i.e. with DAPI).
Staining of cells and tissues is also performed to study the morphology of cells (using i.e. dextrans; especially for specific cells like neurones) or the becoming of cells (tracking), and various intracellular events (ion signaling, phagocytosis, adhesion, apoptosis,.. See cell biology assay section).



Cells staining applies for microscopy observation, colony forming assays, cytometry,…They are widely used as more or less **specific stains in anapathology** (tissue staining), and as **counterstains** (when other detections are performed) in IHC/IF and IF-Cytometry techniques (fixed cells hence dead cells in frozen cells or tissues, or paraffin embeded tissue sections). See 'Conterstaining section.
Yet,some stains are designed for **staining living cells** and used in IF microscopy or for other purpose/techniques (cell tracing), such as with CFSE stain (see 'Cell tracers' section), and RedDot stain (see 'Nucleus staining'). **Vital stains** stain cells that are kept alive (intravital stains), while **supravital stains** stain dead cells and are excluded form living cells (differential staining). See 'Vital stains' section.

FluoroQuest™ Antifading Kit I ; FluoroQuest™ Antifading Kit II)

1) Cell general staining if main structures (nucleus, cytoplasm, mitochondria)

■ Cell staining

CellStain and BacStain solutions

Following are convenient staining solutions for cytology, histology and other microscopy observations (IC/IF,…). They are chromogenic or fluorescent, stains more or less specifically certains tissues, cell structures, ….
See use protocols technical sheete, and more stains in sections corresponding to each application (mitochondria, nuclear staining,…).

-Cellstain- DAPI solution **BE8260, 1ml**
4',6-Diamidino-2-phenylindole, dihydrochloride, aqueous solution; CAS: 28718-90-3; MW: 350.25 (L)
2.9 mM DAPI buffer solution (1 mg DAPI/1 ml) (slightly yellow to yellow liquid)

-Cellstain- AO solution **RI6430-, 1ml** powder: A386-10, 1mg (L)
3,6-Bis(dimethylamino)acridine, hydrochloride, aqueous solution; CAS: 494-38-2 ; MW: 301.81
Orange or yellow solution 3.3 mM AO (1 mg AO/1 ml water)

-Cellstain- EB solution T31440, 1ml
Ethidium Bromide (M) See solution 0.625mg/ml #32790A

-Cellstain- PI solution **367740, 1ml** powder: A346-10, 1mg (L)
3,8-Diamino-5-[3-(diethylmethylammonio)propyl]-6-phenylphenanthridinium diiodide, aqueous solution, CAS: 25535-16-4(PI), MW: 668.39
Orange to red solution 1.5 mM PI (1 mg/1ml water (M)

-Cellstain- Calcein-AM solution **855425, 1ml**
3',6'-Di(O-acetyl)-4',5'-bis[N,N-bis(carboxymethyl)aminomethyl]fluorescein tetraacetoxymethyl ester, DMSO solution CAS: 148504-34-1 (Calcein-AM); MW: 994.86
Colorless liquid 1 mM Calcein-AM in DMSO (1.0 mg/1ml DMSO) (J)

-Cellstain- CytoRed solution **T30820, 1ml**
7-Isobutyloxycarbonyloxy-3H-phenoxazin-3-one; MW: 313.31 (J)
1 mM CytoRed DMSO solution (yellowish-orange)

-Cellstain- Hoechst33258 solution **BD6061, 1ml**
Bisbenzimide, 2'-(4-Hydroxyphenyl)-5-(4-methyl-1-piperazinyl)-2,5'-bi-1H-benzimidazole, trihydrochloride, solution; CAS: 23491-45-4; MW: 533.88 (L)
1 mg/ml aqueous solution (yellow solution)

-Cellstain- Hoechst33342 solution **BE8270, 1ml**
Bisbenzimide, 2'-(4-Ethoxyphenyl)-5-(4-methyl-1-piperazinyl)-2,5'-bi-1H-benzimidazole, trihydrochloride, solution; CAS: 23491-52-3 (free base); MW: 561.93 (L)
1 mg/ml aqueous solution (Yellow liquid)

-Cellstain- MitoRed solution **T32840, 50µgx8vials**
9-[2-(4'-Methylcoumarin-7'-oxycarbonyl)phenyl]-3,6-bis(diethylamino)xanthylium chloride;MW: 637.17 (L)
Red purple to purplish-brown solid

-Cellstain-Double Staining Kit (Calcein & PI) / Live & Dead cells **486301, Kit**
To simultaneously stain and observe live and dead cells by microscopy. λex.535 nm, λem.617 nm. Contains 200 and 300µL of rgt A and B to stain ~250 slides. Technical sheet

-BacStain- CFDA solution	**FO8001, 100 tests**
-BacStain- DAPI solution	**BE8261, 100 tests**
-BacStain- AO solution	**RI6431, 100 tests**
-BacStain- EB solution	**T31441, 100 tests**
-BacStain- PI solution	**367741, 100 tests**
-Bacstain- CTC Rapid Staining Kit (for Flow cytometry)	**FO8010, 100test**
-Bacstain- CTC Rapid Staining Kit (for Microscopy)	**FO8011, 100tests**

Also available:

-Cellstain- CFSE - powder: 294038-A375
5- or 6-(N-Succinimidyloxycarbonyl)-fluorescein 3',6' diacetate; CAS:150347-59-4; MW: 557.46 (M)

-Cellstain- FDA - powder: T31520-F209
Fluorescein diacetate; CAS: 596-09-8; MW: 416.38 (M)

-Cellstain- Rh123 - powder: 47372-R233
Rhodamine 123, 2-(6-Amino-3-imino-3H-xanthen-9-yl)benzoic acid methyl ester, hydrochloride; CAS:62669-70-9; CAS: 62669-70-9; MW: 380.82(L)
Red to reddish-brown powder or solid

-Cellstain- Trypan Blue - powder: T33190-H342
3,3'-{[3,3'-Dimethyl-(1,1'-biphenyl)-4,4'-diyl]bis(azo)}-bis(5-amino-4-hydroxy-2,7-naphthalenedisulfonic acid), tetrasodium salt; CAS:72-57-1; MW: 960.81 (Z)
Blackish brown crystalline powder

-Cellstain- BCECF - powder: 45440Z-B262
3'-O-Acetyl-2',7'-bis(carboxyethyl)-4 or 5-carboxyfluorescein, diacetoxymethyl ester; CAS:117464-70-7; MW: 688.59 (M)
orange or orange-brown crystals, >90%(HPLC)

Misceaneous Cell staining

Trypan Blue **T33190, 5g**
MW: 960.82; CAS: 72-57-1 (Z)

Trypan Blue Solution **BX1370, 100ml**
0.4% solution

Eosin Y **12504C, 1g**

Eosin Y counter stain **FP-QX7825, 15 ml ; FP-QX7826, 100 ml ; FP-QX7827, 250 ml ; FP-QX7828,500 ml**
fluorescent red dye used to stain cytoplasm, collagen and muscle fiber. Slides stained with hematoxylin and eosin can only be mounted with organic mounting mediums.

Red Counterstain C **Q69260, 50 ml**
provides an alternative for a red counterstain

Red Aqueous Counterstain **WU1520, 15ml ; WU1521, 50ml**
formulated for staining of protein when NBT/BCIP is used in IHC or *in Situ* hybridization.

Stain-All Stain - Protein, DNA, & RNA **JQ6530, 25mg** **Q70481, 100mg**
Stains RNA iln Purple, DNA in Blue, and Proteins in Red on PAGE Gels

See also Cell Stains for DNA materials (section countertains such a PI/, DAPI, Hoechst, Pyronins, Acridins & Methyl Green, NuclearFastRed, DMAO, Hematoxylin, AAD7,…), as well as for cytosol (Trypan, Eosin,…) and other cell structures (Mitochrondria with NAO,…; Cytoskeletton with Phalloidin,…) or cell tracking (CFDA, Calcein,…).

Specific Cell stains for anapathology / diseases

●HistoStain Kits

A.F.B. Stain Kit (T. bacilllus)	**BP2890, 100 Test**
Alcian Blue PH 1.0 Stain Kit (Mucosubstances)	**BP2891 , 100 Tests**
Alcian Blue PH 2.5 Stain Kit (Mucosubstances)	**BP2892 , 100 Tests**
Alcian Blue-P.A.S Stain Kit	**BP3945 , 100 Tests**
Bielschowskys Modified Stain Kit	**BP3947 , 100 Tests**
BILE Stain Kit	**BP3952 , 100 Tests**
Bodian Stain Kit	**BP3948 , 100 Tests**
Brown & Brenn Modified Stain Kit	**BP3946 , 100 Tests**
C.E.M. Stain Kit (Eosinophil)	**BP2893, 100 Tests**
Colloidal Iron Stain Kit (Mucosubstances)	**BP2894, 100 Tests**

● Alzheimer"s Disease Research

FBS Solution **CG2370, 100µl**
1-Fluoro-2,5-bis(3-carboxy-4-hydroxystyryl)benzene, 1% w/v DMSO solution; MW: 420.39, C24H17FO6 (L)
Pale yellow to yellowish brown liquid; Absorbance: 0.6-0.85 (around 370nm). Technical sheet
High affinity with β-sheet structure for high detection sensitivity of Amyloidosis

■ Living cell staining: Cell tracers: Cell cytosol markers

Labeling a specific cell population in vitro is a common approach to trace cells in tissues and organisms for survival or redistribution studies. A long term staining is expected, such as with CFSE, or CMTMR. Short term cell follow up can be achieved with the very popular Calcein, or many other dyes. All these are cell cytoplasme or membrane stains described in this section. However some other dyes may be used as cell marker, see next sections '**Staining of cells membranes**' and '**Staining of cells nuclei**'.

Staining of cells cytoplasm is achieved using many colored or fluorescent stains that can be loaded passively- or not - in cells. Most interesting are stains that cross membranes of viable cells only, but dead cell stains (see vital stains section) are also useful and used in combination.
Viable cell stains use mostly groups such as **DiAcetate (DA)** and **AcetoxyMethyl esters (AM)** that neutralize electric charges of the dye, prompting membrane permeability, and also decrease the fluorescence of reagent in cell medium. Once internatized in cytoplasm, these groups are clived by intracellular esterases of viable cells, releasing a highly fluorescent compound. The fluorescence can be sensitive to the pH (of cytoplasme, like with the popular BCECF-AM probe). The retention by cells is favored by **polyanions** such s found in Calcein. Other cell stains can **react with amines** (CFSE) for a lasting cell staining (use for 'cell tracing'), like with SE esterd (i.e. CFSE) or aminated probes that can be fixed by glutaraldehyde. The CMTMR cell stain **conjugate with thiols**. Green fluorescent stains are very popular, but stains are available with other **colors**: orange (CMTMR), far red (DDAO), blue (CMHC)

Staining of cells membranes is achieved using amine reactives dyes, such as Fluoresceins (FITC, FDA-SE) or superior alternatives (FluoProbes488-NHS). More specific markers and polar probes that can be useful to stain cells are described elsewhere.
.Staining of cells nuclei is achieved using:

- **Diacetate** derivatives are quite non fluorescent and passively diffuse into cells, then become brightly green fluorescent once they are hydrolyzed by intracellular esterases.
- **Polyanionic** derivates, with calcein as leading dye, are far less sensitive to pH than other fluorescein derivates. This favored their wide usage, especially for short term labelings in studies of cell structure, function, and many other applications.
- **Chemical fixation** of the tracer is achieved, either on amino-bearing dyes (with glutaraldehyde), or using amino reactive derivatives as CFSE. This leads to a long-term cell labeling, that is stable to formaldehyde or glutaraldehyde fixations in IHF techniques.
- Several alternatives were proposed to reduce fluorescence quenching of fluorescein based tracers (CFDA), including acidification of the extracellular medium, addition of tryptan blue or an anti-fluorescein antibody.

CFDA/CFSE, Green Cell Tracker

CFDA-SE (also known as **CFSE**) is the most popularized long term cell tracer in tissues and organisms for survival or redistribution purposes,i.e. during division / embryogenesis studies, migration or moving / cancerogenesis, cell transplantation… This colorless dye passively diffuses into cells where its acetate group is cleaved by intracellulare esterases, and binds to amine groups as a highly fluorescent intracellular label (same spectra that CDCF #FP-46629). It is compatible with subsequent fixation with formaldehyde or glutaraldehyde. CFSE is a better alternative to reduce fluorescence quenching observed with Fluorescein-based tracers, including acidification of the extracellular medium, addition of tryptan blue or an anti-fluorescein antibody. Its amide linkage is also more stable than the thiourea linkage formed by isothiacyanate fluorescent dyes.
CFDA-SE is available as the 2 pure isomers for specific applications. Technical sheet

CFDA-SE (CFSE, Green Cell Tracker) **FP-52493A 25 mg**
5-(and-6)-carboxyfluorescein diacetate succinimidyl ester "mixed isomers"; MW : 557.47; Soluble in DMF, DMSO; (J)
λexc./λem. (after hydrolysis, pH 7.0) : 495/519 nm; pKa : 6.4

5-CFDA-SE (5-CFSE) **FP-AM496A 10 mg**
5-carboxyfluorescein Diacetate Succinimidyl ester . The pure isomer 5 of CFDA-SE FP-52493; (J)

6-CFDA-SE (6- CFSE) **FP-AM497A 10 mg**
6-carboxyfluorescein Diacetate Succinimidyl ester. The pure isomer 6 of CFDA-SE FP-52493A.; (J)
CAS:[150347-59-4]; MW : 557.47; Soluble in DMF, DMSO; (J)
λexc./λem. (after hydrolysis, pH 7.0) : 495/519 nm pKa : 6.4

Main use is labeling cells in-vitro, allowing further tracing of cell becoming (during division / embryogenesis studies, during migration or moving / cancerogenesis, cell transplantation…). It is also used for labeling amine containing probes (antibodies, aminoallyl nucleic acids…). The amide linkage formed by the coupling reaction of CFDA-SE is much more stable than the thiourea linkage formed by the coupling of an amine with a isothiocyanate.
CFDA-SE is colorless and passively diffuses into cells. After its acetate groups are cleaved by intracellular esterases, it becomes a highly fluorescent amine-reactive fluorophore, labeling covalently intracellular proteins, that keeps the fluorophore inside cells. The fluorescence is compatible with subsequent fixation with formaldehyde or glutaraldehyde.

CDCFDA-SE

Dichloro substitution of CFDA lowers pKa below CFDA's one, thus making it more useful to follow probes in acidic organelles (vacuoles, endosomes…). It gives after hydrolysis the same fluorescence than CFSE #FP52493A and CDCF #FP-46629.

CDCFDA-SE **FP-52495A, 25 mg**
5-(and-6)-carboxy-2',7'-dichlolorofluorescein diacetate succinimidyl ester; MW : 626 .36; Soluble in DMF, MeCN; (J)
λexc./λem. (free) : <300 nm/none λexc./λem. (after hydrolysis, pH 7.0) : 495/519 nm; pKa : 6.4
Technical sheet

ViaFluor® SE Cell Proliferation Dyes

ViaFluor® SE superior alternative to CFSE for Cell Proliferation Assays

CFSE continue to be a popular dye to monitor cell proliferation by flow cytometry. It however has several drawbacks including leakage from the cell, cell toxicity, and bleed-through into the PE and PE-TexasRed® channels.

Reasons to switch from CFSE to ViaFluor® 488

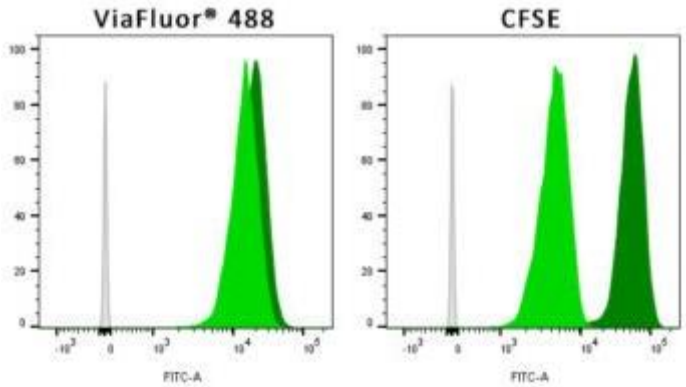
- Less toxic, doesn't inhibit T cell activation
- Better proliferation peaks
- More fixable, less dye leakage
- Same (FITC) detection channel, keep your panel design!
- Less bleed-through into other channels (ie, PE)

Product	Ex/Em (nm)	Catalog No. / Flow detection channel
ViaFluor® 405 Cell Proliferation Kit	408/452	**30068** / Pacific Blue®
ViaFluor® 488 Cell Proliferation Kit	493/532	**30086** / FITC
ViaFluor® CFSE Cell Proliferation Kit	495/519	**30050** / FITC

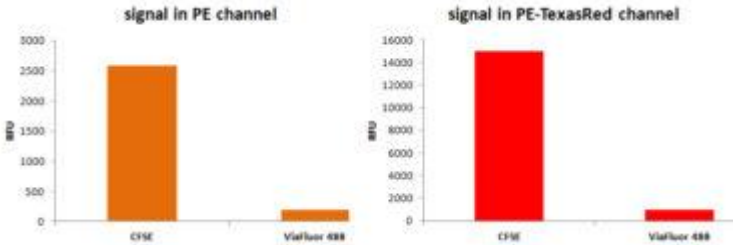
Features:

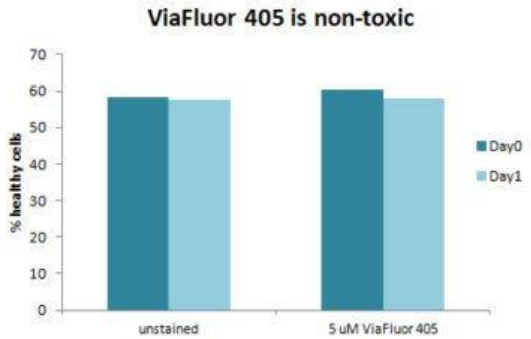
Track cell division by dye dilution using flow cytometry
Ten dye vials plus anhydrous DMSO for reconstitution
ViaFluor® 488 is a unique, improved green dye to replace CFSE
Available with violet or green fluorescence
ViaFluor® 405 works as well as CellTrace™ Violet

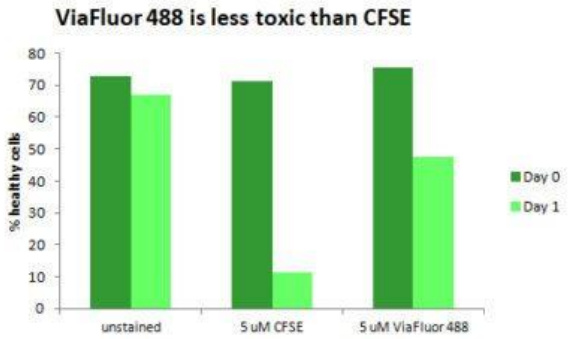
ViaFluor® 488 improved fixability: does not lose signal after fixation or incubati

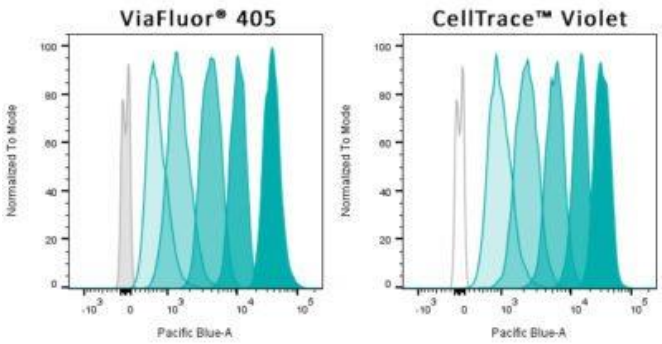


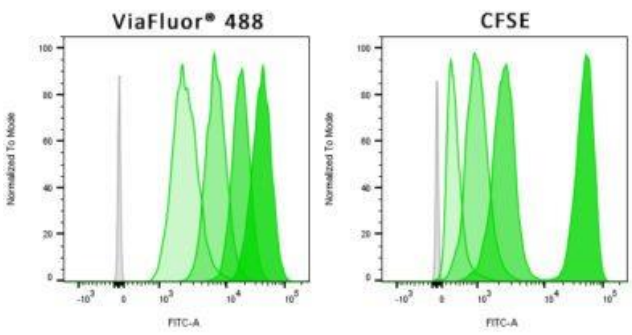
***ViaFluor® 488 has less bleed-through compared to CFSE*:**









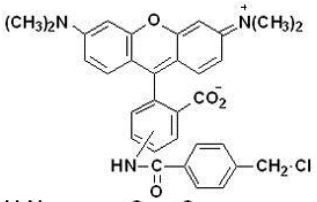


CMTMR/CMFDA/CMAC Cell Tracking dyes

These fluorescent dyes freely enters in living cells, where they react mildly with thiol-containing intracellular components and becomes highly fluorescent in cytoplasm at all physiological pH levels (low pKa).
In peculiar, the popular CMTMR localizes essentially in cytoplasm. Fluorescent cells remain viable for at least 24 hours after loading, and it has been shown to be present in several cell generations up to two weeks. It also can be fixed in situ with glutaraldehyde. CMTMR is widely used for long term cell tracing by cytometry, but also in 2 colors imaging microscopy analysis thanks to its stable fluorescence. Technical sheet

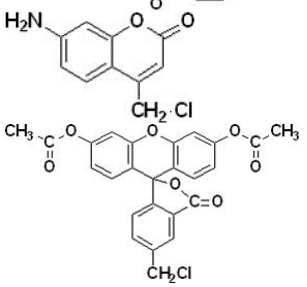
CMTMR, Orange Cell Tracking dye **FP-12662A, 1 mg**
(((4-chloromethyl)benzoyl) amino)tetramethylrhodamine; Celltracker Orange, CellHunt Orange
CAS: 323192-14-9; MW : 554.05 (M)
λexc./λem. (MeOH) : 541/565 nm ; EC : 91 000 Mol-1cm-1.Soluble in DMSO. Technical sheet

CMTMR amine derivative, fixable **FP- , 1 mg**



CMAC, Blue Cell Tracking dye **FP-63323A,, 5 mg**
7-amino-4-chloromethylcoumarin, Celltracker Blue, CellHunt Blue; CAS: 147963-22-2; MW : 209.63 (M)
Soluble in DMSO, DMF, Methanol (M)
λexc./λem. (MeOH) : 353 / 466 nm ; EC : 16 000 $Mol^{-1}cm^{-1}$.

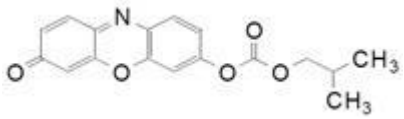
CMFDA, Green Cell Tracking dye **FP-38855A, 1 mg**
5-chloromethylfluorescein diacetate; Celltracker Green, CellHunt Green;CAS: 136832-63-8; MW: 464.86 (M)
λexc./λem. (hydrolized): 492 / 517 nm; EC: 29 000 $Mol^{-1}cm^{-1}$; Soluble in DMSO, DMF, Acetonitrile and Chloroform



See also Sensor dyes for Acidic pH FT-44201A (LysoSensor dyes; 500-ratiom. Green , 550-Green, 600-Red)

CytoRed, Red Cell Tracer

CytoRed is cell membrane permeable and accumulates inside of viable cells as resorufin. Incubation with esterase at pH 8,0 results in a 80-90 nm shift of emission maxima. CytoRed has a much wider spectrum than BCECF or Calcein, so filters for fluorescein and rhodamine can also be used, whil being 2 times more sensitive in viability assay.



CytoRed solution **T30820, 1ml**
7-Isobutyloxycarbonyloxy-3H-phenoxazin-3-one; CAS: 251292-24-7; MW: 313.31 (J)
λex./λem.: 560/590nm. Technical sheet

VFSE, Red Cell Tracking dye

This new tracer is an alternative to CFSE (CFDA-SE) with red emission. It is non-fluorescent until it enters easily (only viable) cells where it is clived and binds to amines (proteins). It excitation/emission wavelenght (398/545nm) are compatible with double labeling with green fluorochromes such as FITC of GFP transfected cells.

VFSE 550 ZE7750 inquire
MW : 451.86 ; Soluble in DMSO; (M)
λexc./λem. (MeOH) : 398/545 nm . Technical sheet

DDAO-SE, Far Red Cell Tracking dye

DDAO has pH-dependent red fluorescence with excitation close the He-Ne red laser 633nm

DDAO-SE FP-AK196A Inquire
MW : 505.34 ; Soluble in DMSO; (M)
λexc./λem. (MeOH) : 398/545 nm .

DDAO (reference standard) **FP-M1367A, 10mg**
7-hydroxy-9H-(1,3-dichloro-9,9-dimethylacridin-2-one);MW : 308.17 ; Soluble in DMSO; (M)
λexc./λem. (MeOH) : 398/545 nm . Technical sheet

Calcein, short term Green Cell Tracer

Calcein dye is a polyanionic derivate of fluorescein that exhibits fluorescence that is essentially independent of pH between 6.5 and 12. It is well retained in cells. These features have made it a popular and versatile dye for various applications, including cell volume changes in neurons and other cells, endocytosis, Gap junctional communication, membrane integrity and permeability, angiography, liposomes… It is worthy to notice that calcein is strongly quenched by several ions, including Fe3+, Co2+, Cu2+ and Mn2+ at physiological pH (not by Ca2+ or Mg2+ ions). Ions levels should thus be monitored. Technical sheet

Calcein **FP-466251 100 mg**
MW : 622.54 ; Soluble in DMSO, DMF or pH >6 water. Membrane impermeant. λexc./λem. (pH 8) : 494/517 nm ; EC : 75 000 M-1cm-1
Can be introduced into cells by microinjection.

Calcein-AM **FP-895514 1 mg** **FP-895515 20 x 50 µg**
MW : 994.88 (M)
Soluble in DMSO. Enters readily cell membranes. Intracellular esterases converts it into calcein. λexc./λem. (hydrolyzed) : see Calcein FP-46625

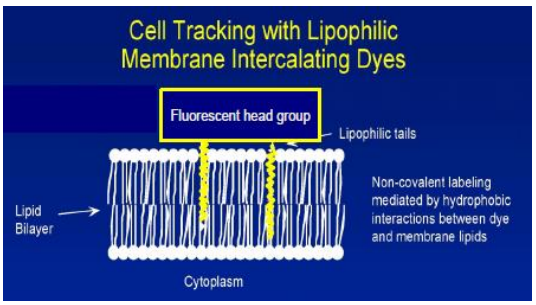
Calcein-AM, 1 mg/ml solution **FP-855422 1 ml @ 1mg/ml**
This solution in dry DMSO is more convenient (time saving : no solubilization) and increase reproducibility of screening assays.
Calcein, AM, 1 mg/ml in DMSO **FP-855422, 1 ml**
Calcein, AM, 4 mM in DMSO **FP-FI9820, 100 µl**

Calcein Orange -AM **FP-ZE7840, 1 mg**
MW: 880 (M); λexc./λem.: 525 / 550nm

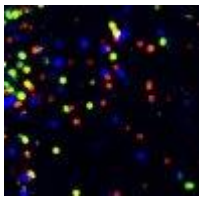
See also Viability kit #876981 (uses Calcein-AM), and Cytotoxicity assay #BF4710 (uses Calcein-AM combined with EthD-III)

CellVue® irreversible labeling of plasma membranes of live cells

Fluorescent probes for irreversible labeling of the lipid regions of plasma membranes, providing stable labeling of live cells.



- **Versatile** – use with any cell type or bioparticle with a membrane
- Provides **stable** labeling with minimal transfer from cell to cell
- Provides **rapid, uniform** membrane labeling
- **Combine** with fluorescent antibodies or markers of cell function
- Suitable for cell tracking and proliferation studies
- **Several colors (UV to NIR)** for multi-parameter studies (use with existing fluorochromes for more colors)
- Greater signal to noise with Far-Red and NIR versions (reduced background autof
- Compatible with flow cytometers, confocal and in vivo imaging equipment
- Convenient, easy-to-use kit format



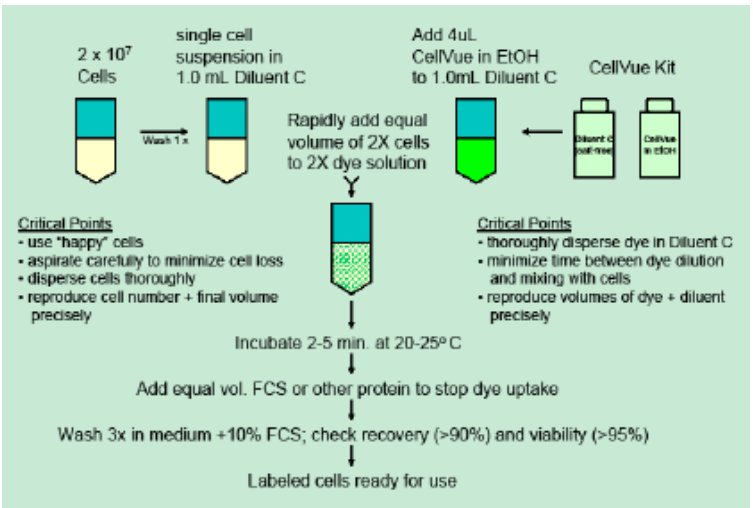
The CellVue® cell linker kits use proprietary membrane labeling technology to stably incorporate a fluorescent dye with long aliphatic tails into the lipid regions of the cell membrane, see Figure 1. The labeling vehicle provided with the kit (Diluent C) is an iso-osmotic aqueous solution which contains no physiologic salts or buffers, detergents, or organic solvents and is designed to maintain cell viability while maximizing dye solubility and staining efficiency. The pattern of staining is dependent upon the cell type being labeled and the membranes of the cells.
Video on how to use CellVue.

	MIDI	MINI
CELLVUE - BURGUNDY KIT FOR MEMBRANE LABELING KIT (683/707nm)	**C-1004-MIDI, 200 µL Kit**	**C-1004, 100 µL Kit**
CELLVUE - CLARET KIT FOR MEMBRANE LABELING KIT (655/675nm)		**CLARET-MINI, 1 Kit**
CELLVUE - LAVENDER KIT FOR MEMBRANE LABELING KIT (424/461nm)	**C-1005-MIDI, 1 Kit**	**C-1005-MINI, 1 Kit**
CELLVUE - MAROON KIT FOR MEMBRANE LABELING KIT (647/667nm)	**C-1001-MIDI, 1 Kit**	**C-1001-MINI, 1 Kit**
CELLVUE - PLUM KIT FOR MEMBRANE LABELING KIT (652/671nm)	**C-1003-MIDI, 1 Kit**	**C-1003, 1 Kit**
CELLVUE NIR780 KIT FOR MEMBRANE LABELING KIT (745/776nm)	**C-1006-MIDI, Kit**	**C-1006, 1 Kit**
CELLVUE NIR815 KIT FOR MEMBRANE LABELING KIT (786/814nm)		**C-1007, 1 Kit**
Green Fluorescent Cell Linker Kit for General Cell Membrane Labeling, CellVue Jade	**C-1009, 100 µL Kit**	
Green Fluorescent Cell Linker Kit for General Cell Membrane Labeling, CellVue Jade	**C-1009, 2 x 100 µL Kit**	
Green Fluorescent Cell Linker Kit for General Cell Membrane Labeling, CellVue Jade	**C-1009, 500 µL Kit**	

Mini Kit, Midi Kits/Maxi Kits contain 0.1ml / 0.2ml / 0.5ml of plus 10/60/60ml diluant #C-1008
The CellVue Fluorescent Cell Linker Kit contains a 1mM dye stock solution and cell labeling diluent.

CellVue® is a trademark of PTI Research

Far Red and Near Infrared Fluorescence benefits:
- Reduced autofluorescence background
- Greater signal to noise
- Greater ability to multiplex with visible probes due to minimal spectral overlap
- Excellent for use in combination with other



Others

See also labeled Dextrans section, and cytoplasmic membrane labeling section.

■ Dead cell staining:

##

Cell Explorer Fixable Dead Cell Staining Kit *Red Fluorescence Optimized For Flow Cytometry*	UVC610-22599, 200 Tests
MycoLight Green JJ98, live/dead bacteria DNA stain	24000, 100 ul

##

Live-or-Dye NucFix Red Staining Kit, red nuclei staining in dead cells (520/610nm)	32010 , 1 Ki
Live-or-Dye NucFix Red Staining Kit, red nuclei staining in dead cells (520/610nm)	32010-T , 1 Ki
Yeast Live-or-Dye Fixable Live/Dead Staining Kit	31064 , 1 Ki

##

Live:Dead/Cytotoxicity Assay Kit, Allows Fast And Easy Measurement Of Both Living & Dead cells	
" Blue/Green Staining,	M1811 , 1 Ki
" Blue/Red Staining	M1810 , 1 Ki
" Green/Blue Staining	M1812 , 1 Ki
Sophiagreen 421, Green Fluorescent Dna Stain For Dead Cells	M1716, 200 ul
Sophiagreen 471, Green Fluorescent Dna Stain For Dead Cells, 1mm Solution In DMSO	M1714, 200 ul

+

2) Cell Structures staining:

below sections are: Cell Cytoplasmic membrane staining | Nucleus staining / DNA&RNA staining | Mitochondria staining | CytoSkeletton staining | Organelles staining | other special cell staining

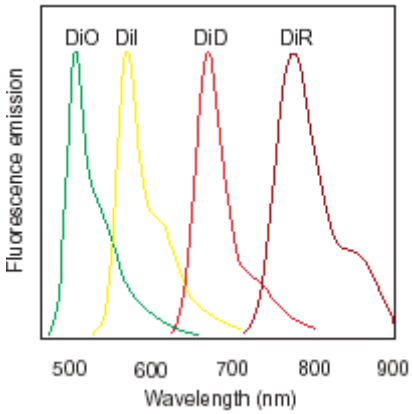
■ Cell Membrane staining

The labeling of cytoplasmic membranes can by labeled by DiI, DiO dyes and related carbocyanine dyes, or by cellbrite dyes.

FluoProbes Dialkylcarbocyanine series dyes: DiO / DiI / DiD / DIR / DiA / DiB

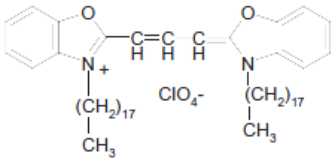
Carbocyanine dyes have hydrophilic/hydrophobic pattern (amphiphilicity), with strongest fluorescence when in membranes. This makes them suitable for many membrane studies (structure, morphology, dynamic, …), starting with the popular DiI (FP-46804) and DiO (FP-46805).

Several modifications are available, offering color detections from green (DiO) to IR (DiR), and several lengths or saturation degree of hydrophobic tails.
-Fluorescence, that is weak in water, is intense in lipidic environment thanks to high extinction coefficients, modest quantum yields, and short excited-state lifetimes (~1 nanosecond).
-Short chain carbocyanines, i.e DiOC6 (available with our FluoCDTM technology) are mainly dedicated to potential measurement.
-Longer alkyl tails (>C12, i.e. DiIC18(3)) are best for detection of particularly rigid gel phase. They are used for neuronal tracing long-term labeling of cells in culture and non-covalent labeling of lipoproteins.



They are used in living and fixed tissues and cells. These dyes insert into the membrane, and diffuse rapidly, staining the entire cell surface.They allow the synaptic terminals tracing in a single motor unit. DiI and DiO are also efficient postmortem neuronal tracers and used in neuroanatomy and visual science (Lukas 1998)
Technical sheet

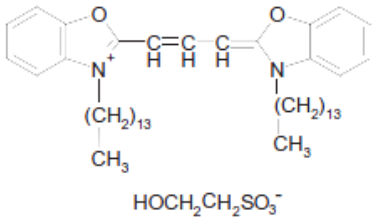
DiOC18(3) [DiO] FP-46805A 50 mg



3,3´ -dioctadecyloxacarbocyanine, perchlorate; CAS: 34215-57-1
C53H85ClN2O6 MW : 881.73; Store at 4°C
Soluble in DMSO or DMF
λexc./λem. : 484/501 nm ; EC : 152 000 $M^{-1}cm^{-1}$
One of the most classic dyes. Can be used with standard fluorescein and rhodamine optical filters.

DiOC6(3) **FP-46764A, 100 mg**
CAS: 53213-82-4 ; MW: 72.53 (L)
λexc./λem.: 484 / 501nm; EC: 154 000; Soluble in DMSO

DiOC14(3) **FP-AM329A 50 mg**

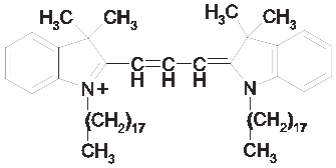


3,3´-ditetradecyloxacarbocyanine, hydroxyethanesulfonate; CAS: 53213-82-4
C47H74N2O6S MW : 795.19; Store at 4°C
Soluble in methanol, ethanol or DMSO
λexc./λem.: 490/515 nm
DiO analog with shorter alkyl tails, but more soluble in aqueous media. Staining is accomplished by simple incubation of cells in the buffer containing the dye. Because the staining is usually nontoxic and very stable, the dye is useful for long term cells tracing.

SP-DiOC18(3) **FP-40265A, 10 mg**
CAS: ; MW:1115.55 (L)
λexc./λem.: 498 / 514nm; EC: 175 000; Soluble in MetOH / EtOH / DMSO

5,5'-Ph2-DiOC18(3) **FP-M1610A, 10 mg**
CAS: 217199-21-8; MW: 969.91(L)
λexc./λem.: 496 / 512nm; Soluble in MetOH, DMF DMSO

DiIC18(3) [DiI] **FP-46804A, 50 mg**



1,1' -dioctadecyl-3,3,3',3'-tetramethylindocarbocyanine perchlorate
C59H97ClN2O4 MW : 933.88; Do not freeze
Soluble in DMSO or ethanol
λexc./λem.: 549/565 nm ; EC : 148 000 M-1cm-1
One of the most standard lipophilic dye for ER, Golgi studies. Can be used with standard fluorescein and rhodamine optical filters, and combined to DiO.
Applications : fate mapping and cell lineage studies(1) and for the determination of spatial organization and connectivity patterns of central nervous systems.
References : Afferent and efferent connections of the cerebellum of the chondrostean Acipenser baeri : a carbocyanine dye (DiI) tracing study. Huesa G, Anadon R, Yanez J. J Comp Neurol 460, 327-44 (2003). Honig, M.G. and Hume, R.I. Trends in Neurosci.9, 333(1989) ; McConnell, S.K., et al. Science 245, 978(1989). Ruiz, et al. in essential developmental biology : a practical approach Oxford : IRL Press at Oxford University Press, 81-95 (1993)2) International Journal for Parasitology 28, 363 (1998).

DiIC18(3) [DiI] solution **FP-AM328A, 0.5 ml**
A convenient formulation of DiI (FP46804A) in oil, with uniform dissolution.

DiIC1(3) **FP-46853A, 100 mg**
CAS: 25470-94-4; MW:484.42 (L)
λexc./λem.: 541 / 540nm; Soluble in DMSO, CHCl3, DMF

DiIC1(5) **FP-20920A, 100 mg**
CAS: 36536-22-8; MW: 432.25 (L)
λexc./λem.: 638/ 658nm; Soluble in DMSO, DMF, EtOH

DiIC1(7) **FP-C86280, 100 mg**
CAS: 16595-48-5; MW: 509.04 (L)
λexc./λem.: 740 / 766; Soluble in DMSO, EtOH, CHCl3

DiIC5(3) **FP-BT5040, 100 mg**
CAS: 53290-46-3; MW: 596.63 (L)
λexc./λem.: 552 / 576nm; Soluble in DMSO, EtOH, DMF

DiIC12(3) **FP-46736A, 100 mg**
CAS: 75664-01-6 ; MW: 765.56
λexc./λem.: 550 / 566nm; EC: 144 000; Soluble in DMSO, DMF, EtOH, CHCl3

DiIC16(3) **FP-46746A, 100 mg**
CAS: 78566-75-3; MW: 877.77(L)
λexc./λem.: 548 / 566nm; EC: 148 000; Soluble in DMSO, EtOH

DiIC18(3) [DiI] (*) **FP-46804A, 50 mg**
CAS: 41085-99-8 ; MW: 933.88 (L)
λexc./λem.: 551 / 566nm. EC: 148 000; Soluble in DMSO, EtOH, CH3CN

DiIC18(3) [DiI], crystalline **FP-162451, 25 mg**
CAS: 41085-99-8 ; MW: 933.88 (L)
λexc./λem.: 551 / 566nm; EC: 148 000; Soluble in DMSO, DMF, EtOH, CHCl3

Dilinoleyl DiI Solid **FP-12792A, 5 mg**
MW: 1017.97 (L)
λexc./λem.: 549 / 564nm; EC: 134 600; Soluble in DMSO

Delta9-DiI **FP-M1280A, 25 mg**
MW: 925.49 (L)
λexc./λem.: 550 / 565nm; Soluble in DMSO, CH3CN, EtOH, DMF

6,6'-Ph2-DiIC18(3) **FP-M1613A, 5 mg**
CAS: 217199-28-5; MW: 1022.06 (L)
λexc./λem.: 557 / 572; Soluble in DMSO, CHCl3, EtOH, DMF

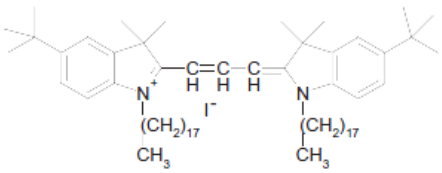
DiIC18(5) [DiD] 4-chlorobenzenesulfonate salt **FP-22574A, 50 mg**
MW: 1052.1 (M)
λexc./λem.: 644 / 663nm;EC: 193 000; Soluble in DMSO, EtOH, DMF

DiIC18(5) oil [DiD] perchlorate **FP-929099, 10 mg**
CAS: 127274-91-3; MW: 959.9
λexc./λem.: 644 / 665nm; EC: 270 000; Soluble in CHCl3, DMSO, MeOH, acetone

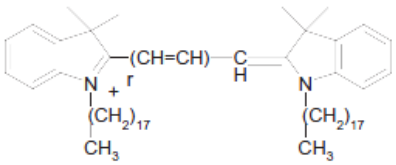
DiIC18(5) oil [DiD] iodide **FP-DY3330, 25 mg**
CAS: 127274-91-3; MW: 987.36
λexc./λem.: 644 / 665nm; EC: 270 000; Soluble in DMSO

DiIC18(7) [DiR] **FP-69084A, 25 mg**
CAS: 100068-60-; MW:1013.43 (M)
λexc./λem.: 748 / 780(MetOH); EC: 270 000; Soluble in DMSO, EtOH

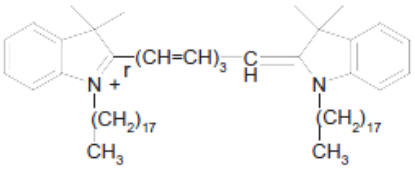
Neuro-DiI **FP-AM330A 25 mg**
$C_{67}H_{115}IN_2$ MW : 1075.58; Store at 4°C
Soluble in methanol, ethanol, DMF and DMSO.
λexc./λem.: 550/565 nm ; EC : (MeOH) : 148 000 M-1cm-1
Diffuses faster than DiI in cells membranes and also may result in a more stable labeling.



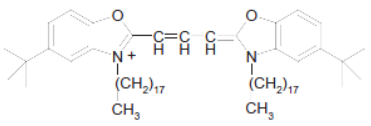
DiIC18(5) [DiD] **FP-22574A**
1,1'-dioctadecyl-3,3,3',3'-tetramethyl-indodicarbocyanine, 4-chlorobenzenesulfonate salt
C67H103ClN2O3S MW : 1052.1; Store at 4°C
Soluble in DMSO or ethanol
λexc./λem. : 644/663 nm ; EC : 193 000 M-1cm-1
Similar to DiIC18(3), but excitable with longer wavelength than carbocyanines (He-Ne laser). It is useful when significant intrinsic fluorescence is observed with DiI or DiO.



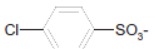
DiIC18(7) [DiR] **FP-69084A 25 mg**
1,1'-dioctadecyltetramethyl indotricarbocyanine Iodide
C63H101IN2 MW : 1013.43; Store at 4°C
Soluble in DMSO or ethanol
λexc./λem. (MetOH) : 748/780 nm ; EC : 270 000 M-1cm-1
Lipophilic carbocyanine similar to DiI and DiO with near IR absorption and emission, allowing lowering the level of autofluorescence. Can be used in multicolor detection, combined to DiD (FP-22574A), DiI (FP-46804A) and Neuro-DiO (FP-AM330A).



Neuro DiO **FP-AM331A 25 mg**
C67H105ClN2O5S MW : 1086.11; Store at -20°C and protect from light
Soluble in ethanol, hexane, DMSO and oil.
λexc./λem. : 484/501 nm
Similar features to DiO but with better solubility in membranes, less self quenching by aggregation, and higher diffusion rate in membranes.



NeuroDiO solution, for microinjections **FP-BA641A 0.2 ml**

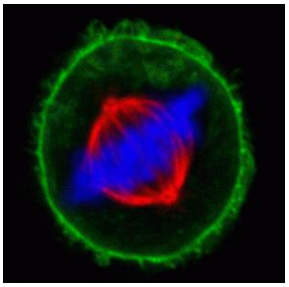


Do not frezze.
A convenient formulation of NeuroDiO (FP-AM331A) in oil, with uniform dissolution.
Applications: microinjection, combined to NeuroDil solution (FP-AM330A).

DiA **FP-66096A, 25 mg**
4-(4-Dihexadecylaminostyryl)-N-methylpyridinium iodide; MW: 787.06 (L)
λexc./λem.:491 / 613nm; EC: 52 000(MetOH); Soluble in DMSO and EtOH
DiA is a green fluorescent membrane dye which diffuses much faster than DiO in cell membranes. DiA and DiI have been used together for two color membrane staining.

DiB **FP-YS2860, 10 mg**
MW: 1074 (L)
λexc./λem.: / nm; EC: 000(MetOH); Soluble in DMSO
DiB is a lipophilic cationically charged blue fluorescent dye useful for staining cytoplasmic membranes. λEx/λEm (MeOH) = 353/442 nm.

CellBrite cytoplasmic Membrane labeling



CellBrite™ Blue Cytoplasmic Membrane Labeling Kit is designed to label cell cytoplasmic membranes with blue fluorescence. The labeling is stable and nontoxic, suitable for long-term tracking of cells. The kit includes Biotium's novel blue fluorescent membrane dye DiB (Abs/Em = 360/420 nm) pre-dissolved in an optimized staining solution. Similar to our lipophilic carbocyanine dyes, DiB has long hydrocarbon chains that insert into the lipid bilayer, resulting in stable labeling which is resistant to intercellular dye transfer. By combining multiple CellBrite™ Cytoplasmic Membrane Stains, one can label multiple cell populations with different colors for studies of cell-cell interactions.

- **Simple**: Cell staining by direct addition of the supplied dye solution to normal culture media
- **Stable Labeling**: Highly lipophilic dye ensuring no dye transfer between cells
- **Bright, Photostable and Nontoxic**: Unique blue fluorescent membrane dye with high quantum yield, high photostability and relatively low toxicity

Cellbrite Cytoplasmic Membrane-Labeling Kits:
CELLBRITE - BLUE (based on DiB, A/E:360/420nm) **JW7360, 250µl** BTM.30024
Contains 250 uL DiB cell labeling solution, 250 uL DiB loading buffer
CELLBRITE - GREEN (based on NeuroDiO, A/E:484/501nm) **JW7330, 1ml** BTM.30021
Contains Neuro-DiO cell-labeling solution. TS/S. Add 5 uL of the cell labeling solution per 1 mL of cell suspension : Incubate 1-20min 37°C.
CELLBRITE - ORANGE (based on DiI, A/E:549/565nm) **JW7340, 1ml** BTM.30022
Contains Neuro-DiI cell-labeling solution. TS/S
CELLBRITE - RED (based on DiD, A/E:644nm/665nm) **JW7350, 1ml** BTM.30023
Contains Neuro-DiD cell-labeling solution. TS/S

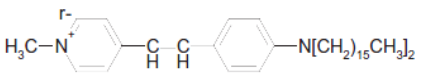
Other membrane probes

● The **FP Membrane Marker** dyes, that are are cationic styryldyes, less lipophilic than above Carbocyanine dyes DiO/DiI/DiR but still amphilic. They become highly fluorescent once internalized in membranes. They are described in section "Neural Cell Study" as one important application is to follow synaptic activities. They are however very usefull as well for endocytosis of vesicules and vacuoles. See the Technical sheet. The most popular ones are:

Green FP Membrane Marker 1-43 **FP-51254A, 1 mg**
A/E: 480/598 nm in membranes
Green FP Membrane Marker 4-64 **FP-41109A, 1 mg**
A/E: 480/598 nm in membranes

● The **DialkylAminoStyryl dyes** (Di-ASP) also insert in membranes. They are slightly less hydrophobic than above Carbocyanine dyes.

4-Di-16-ASP [DiA] **FP-66096A 25 mg**
4-(4-dihexadecylaminostyryl)-N-methylpyridinium iodide
C46H79IN2 MW : 787.06; Store at 4°C
Soluble in DMSO or ethanol
λexc./λem. : 491 / 613 nm ; EC : 52 000 M-1cm-1
Commonly used for neuronal membrane tracing : diffuses faster than DiO.
Has a very broad emission spectrum (can be detected with green, orange or even red filters), combined notably DiIC18(3) for 2 colors staining.



■ Lipophilic and Lipids staining

Lipid stains:

Oil Red O Lipid stain (Sudan 5B) **N13002, 100 g**

SUDAN BLACK B **AR7910-BP2915, 100 Tests**
stains lipid granules

NILE RED **EZE70-M1441, 10 mg**
a lipophilic dye that stains intracellular lipid droplets to produce a bright red fluorescence

LipidSpot™ Lipid Droplet Stains: see below (70065 & 70069)

Lipophilic probes:

ADIFAB, fatty acid indicator **FP-040791, 200µg** **FP-040792, 1mg**
ADIFAB # is a fluorescent dye that can detect fatty acids. See description in section cell biology probes.

ADIFAB2, fatty acid indicator **FP-BB6681, 200µg** **FP-BB6682, 1mg**
high affinity version of the original adifab. Technical sheet

1,6-DIPHENYL-1,3,5-HEXATRIENE (DPH) **FP-123023, 100 mg** **FP-12302B, 1g**
probe for viscosity, polarity and lipid order (350/420nm)

FluoProbes 581/591 C11 (Lipid Peroxidation Sensor) **FP-M12781, 1 mg**

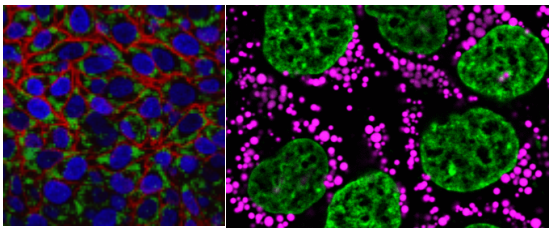
Lipophilic charged probes:

Tetramethylrhodamine, ethyl ester (TMRE) **FP-41391A / FP-EZE520**
Positively charged lipophilic red-orange fluorophore; rapidly accumulates in mitochondria due to relative negative charge of active mitochondria with respect to cytosol

LipidSpot Lipid Droplet Stains

rapidly stains lipid droplets in live cells or fixed cells, with no wash step required. Available with green or red/far-red fluorescence.

Intracellular lipid droplets are cytoplasmic organelles involved in the storage and regulation of triglycerides and cholesterol esters. LipidSpot™ dyes are fluorogenic neutral lipid stains that rapidly accumulate in lipid droplets, where they become brightly fluorescent. The dyes can be used to stain lipid droplets in both live and fixed cells, with no wash step required. Cells also can be fixed and permeabilized after staining. LipidSpot™ stains show minimal background staining of cellular membranes or other organelles, unlike traditional dyes like Nile Red.



LipidSpot™ 488 has excitation around 430 nm, and can be excited equally well at 405 nm or 488 nm. In cells, it stains lipid droplets with bright green fluorescence detectable in the FITC channel. LipidSpot™ 610 has excitation/emission at ~592/638 nm in cells; it is optimally detected in the Texas Red® channel, but is also bright in the Cy®3 and far-red Cy®5 channels. Therefore, we don't recommend pairing LipidSpot™ 610 with other red or far-red probes.

Features

- Rapidly and specifically stain lipid droplets
- Stain live or fixed cells, or fix and permeabilize after staining
- Available with green or red/far-red fluorescence
- Supplied as 1000X stock solutions in DMSO

LipidSpot™ Lipid Stains	Abs/Em	Detection channel	Catalog no.	Size
LipidSpot™ 488 Lipid Droplet Stain, 1000X in DMSO	427/585 nm	FITC, GFP	70065-T	20 uL
			70065	125 uL
LipidSpot™ 610 Lipid Droplet Stain, 1000X in DMSO	610/663nm (in vegetable oil) ~592/638nm (in cells)	TR TexasRed® or Cy®5	70069-T	20 uL
			70069	125 uL

Cy Dye is a registered trademark of GE Healthcare.

■ Cytoplasm staining

For cytosol staining, see cell tracers section for dyes that accumulate in cytoplasm (CFDA, Calceins), and bind to solutes (CMTMR).

■ Lipophilic and Lipids Assays

#

CELL NAVIGATOR FLUORIMETRIC LIPID DROPLET ASSAY KIT, Red Fluorescence AXEYF0-22735, 500 tests

CELL NAVIGATOR FLUORIMETRIC LIPID DROPLET ASSAY KIT, Green Fluorescence AXEMVA-22730, 200 tests

CELL METER PHOSPHATIDYLSERINE APOPTOSIS ASSAY KIT for Microplate Reader

***Blue Fluorescence Optimized for Microplate Reader**	**AXEYK0-22790**
***Green Fluorescence Optimized for Microplate Reader**	**JQ8780-22791**
***Red Fluorescence Optimized for Microplate Reader**	**JQ8790-22792**
***Deep Red Fluorescence Optimized for Microplate Reader**	**ZE8030-22793**
***Orange Fluorescence Optimized for Microplate Reader**	**GCZ210-22794**

CELL METER PHOSPHATIDYLSERINE APOPTOSIS ASSAY KIT for Cytometry

***Green Red Fluorescence Optimized for Cytometry**	**CJG080-22831**
***Deep Red Fluorescence Optimized for Cytometry**	**CJG080-22832**
***Red Fluorescence Optimized for Cytometry**	**CJG090-22831**
***Blue Fluorescence Optimized for Cytometry**	**CGZ350-22835**

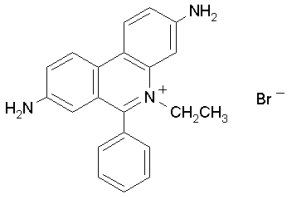
CELL METER PHOSPHATIDYLSERINE APOPTOSIS ASSAY KIT CGZ360-22836 *Blue Fluorescence Optimized for Cytometry*

■ Cell Nucleus staining / DNA&RNA probes

Fluorescent DNA/RNA stains / counterstains

EB, PI and other ethidium based dyes: stains for DNA

●***Ethidium Bromide (EB, BEt)*** does not permeate viable cell membranes. However, it passes through the disrupted membranes of dead cells to stain nucleic DNA. The excitation and emission wavelengths of EB-DNA complex are 518 nm and 605 nm, respectively. Technical sheet



CAUTION: Because of EB and related dyes toxicity as potent mutagens, we offer and recommand to purchase the solutions –rather than more hazardous powdery form- , i.e. in convenient dropper (EB as #32790A), or to choose safer alternatives: see **GelRed** and **EZ-Vision** (non mutagenic).

Ethidium Bromide (EB, BET) stain **FP-06022A, 5x1g** **FP-06022B, 5g**
CAS:1239-45-8; MW: 394.32 (Z)
λexc./λem. (EB-DNA complex): 518/605nm. Technical sheet
Ethidium Bromide (EB, BET) stain, Solution **32790B, 5ml at 0.625mg/ml (dropper)**
Ethidium Bromide (EB, BET) stain, Solution **UP89244B, 10ml at 10mg/ml**
Technical sheet

●***Ethidium Homodimer***, first developed by Dr. Le Pecq and his colleagues, is a high affinity fluorescent nucleic acid stain. It binds to both DNA and RNA in a sequence-independent manner and with a >30-fold fluorescence enhancement. The DNA binding of each Ethidium Homodimer covers four base pairs and is believed to occur by intercalation. Because the dye is highly positively charged, it can not cross cell membranes to stain living cells. However, it is very useful to detect nucleic acids in solution, or cells with disintegrated cell membranes. Our high purity grade Ethidium Homodimer while other suppliers often haves a high amount (as much as 20%) of inorganic salt that lowers the weight percent purity.

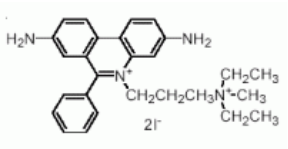
Ethidium homodimer I (EthD-II, EtDi **FP-258105, 1mg**
Ethidium homodimer I solution **FP-AT758A, 500µl at 1mM in DMSO**
CAS:61926-22-5; MW:856.78 (L)
λexc./λem. (with DNA) = ~528/617 nm; λexc.-H2O)=493nm; Red solid soluble in DMSO or MeOH. Technical sheet

●***Ethidium Homodimer III*** is an alternative to Ethidium Homodimer I. It has absorption and emission spectra similar to those of Ethidium Homodimer I. However, the dye stains DNA 70% brighter than Ethidium Homodimer I. It is used for Cell Viability/Cytotoxicity Assay for detecting both live and dead cells in the same population of animal cells (see kit #BF4710) and of bacteria (see Kit #BU1040)

Ethidium homodimer III (EthD-III) **FP-BP9340, 1mg**
MW: ~1000; λexc./λem. (with DNA) = ~530/~620 nm; Red solid soluble in DMSO, MeOH, or H2O . Technical sheet
Ethidium homodimer III solution **BP93441, 200µl at 1mM in DMSO**

+

●***Propidium Iodide (PI)*** does not permeate viable cell membranes, but it passes through disturbed cell membranes and stains the nuclei. PI is often used in combination with green fluorescent compound, such as Calcein-AM or FDA or Annexin V-FluoProbes® 488, for simultaneous staining of viable and dead cells. The excitation and emission wavelengths of PI-DNA complex are 535 nm and 615 nm, respectively. PI is carcinogenic.

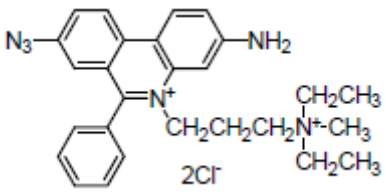


Propidium Iodide (PI) stain **FP-31238B, 100mg** **FP-31238C, 1g**
Propidium Iodide (PI) stain, Fluopure grade **FP-R1345A, 25mg** **FP-R1345B, 5g**
Propidium Iodide (PI) stain, Solution **FP-31238B, 1ml 10mM**
FP-36774A, 10ml at 1mg/ml

CAS: 25535-16-4; MW: 668.41 (L);
$\lambda_{exc}/\lambda_{em}$ (no DNA, water) = 493 / 636 nm EC: 5900; $\lambda_{exc}/\lambda_{em}$ (DNA bound) = 535 / 617 nm EC: 5400. Technical sheet

●***Other DNA stains (PMA, EMA, HI)***

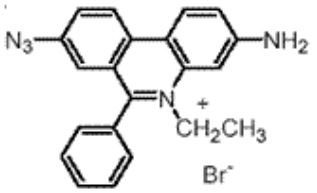
PMA™ DNA modification agent **BZ9340, 1 mg**
Propidium Monoazide
CAS: -; MW= 512.51 (M)
Soluble in DMSO, DMF at least 5mg/ml
λexc. (pH3) = 458 nm
λexc./λem (free in water) = 462/625nm (weak) EC: 5 400 M-1 cm-1
λexc./λem (hydrolysed, DNA bound) = 504/600nm
PMA™ DNA modification agent, 20mM in H_2O **FO5630, 100µl**



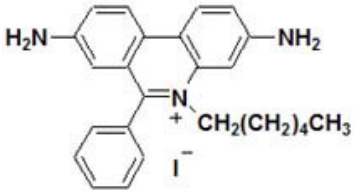
PMA is a cell membrane-impermeable DNA modification dye that can be used to selectively covalently modify DNA from dead cells, rendering the modified DNA unamplifiable. Subsequently, DNA from viable cells can be quantified by qPCR. Thus, PMA can be used in selective detection of viable pathogens in the presence of dead pathogens by qPCR. Technical sheet

EMA, Ethidium Monoazide **FP-48256A, 5 mg**

CAS: 58880-05-0; MW= 420.32 (M)
Soluble in DMSO, DMF, Methanol, EtOH and water at least 5mg/ml
λexc. (pH3) = 458 nm
λexc./λem (free in water) = 462/625nm (weak) EC: 5 400 M-1 cm-1
λexc./λem (hydrolysed, DNA bound) = 504/600nm
Similarly to PMA, EMA selectively and covalently label dead cells in the presence of live cells. Technical sheet

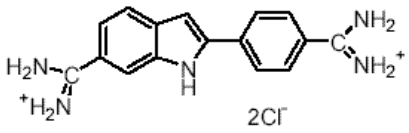


Hexidium Iodide (HI) stain, **FP-38915A, 5mg** **FP-38915C, 250mg**
CAS:211566-66-4; MW: 497.42 (M)
Soluble in DMDO & DMF; λexc./λem.(pH7) = 482/624nm
HI can be used to stain dead cells with compromised membranes. Technical sheet



DAPI (Phenyl Indol based dyes): stains for DNA

DAPI, di-HCl **37186D, 25mg** **37186F, 500mg**
DAPI, di-HCl **FP-371867, 10mg** **371868, 25mg**
DAPI, FluoProbes Pure Grade powder **FP-99963A, 10mg**
fluorescent blue stain for nuclei; Technical sheet
DAPI stain (dead cell staining) **AP4460, 50tests** **AP4461, 2x625TS**
DAPI solution **BE8260, 1ml at 1mg/ml**
(diHCl) CAS:28718-90-23; MW:350.25 (M)
λexc./λem. (DAPI-DNA complex): 360/460nm
Though DAPI is not permeable through viable cell membranes, it passes through disturbed cell membranes to stain the nucleus. DAPI is utilized for the detection of mitochondrial DNA in yeast, chloroplast DNA, virus DNA, mycoplasm DNA and chromosomal DNA. The excitation and emission wavelengths of DAPI-DNA complex are 360 nm and 460 nm, respectively. DAPI is carcinogenic. Technical sheet



See other vital stains (Trypan Blue, Neutral Red) and formazan dyes (MTT, WSTs.) in section 'Cell Viability'.

Hoechst dyes: stains for DNA

Hoechst are bisbenzimides dyes that bind to minor-grooves of DNA (multiple affinity types) with fluorescence enhancement. Fluorescence depends on pH (higher at pH5), and surfactants. Their use as nucleic acid stains has been popularized thanks to their relatively non toxicity (a substitute for DAPI), ability to be excited by most common light sources (i.e. argon/ion laser), and suitability for multicolor imaging (large Stocke's shift). Hoechst 33258 and Hoechst 33342 are popular cell-permeant nuclear counterstain. Both can be used in living cells because they can disrupt DNA replication during cell division. Care should be taken in their handling and disposal (potentially mutagenic and carcinogenic). Hoechst 333342 is relatively more specific for DNA.

Hoechst 33342 emits blue fluorescence when bound to dsDNA. This dye is often used to distinguish condensed pycnotic nuclei in apoptotic cells and for cell-cycle studies in combination with BrdU.

Hoechst 33258 emits blue fluorescence when bound to dsDNA. Its uses are similar to Hoechst 33342 for counterstaining, apoptosis and cell cycle studies, but Hoechst33258 is reportedly less cell-permeant. It also has been used to detect DNA in solution between 250ng/ml to 20µg/ml in solution.

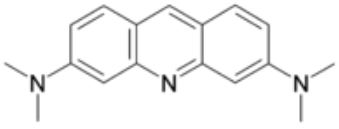
Hoechst33342, TriHydrate **FP-71131A, 100 mg**
Bisbenzimide, 2'-(4-Hydroxyphenyl)-5-(4-methyl-1-piperazinyl)-2,5'-bi-1H-benzimidazole, trihydrochloride, solution; CAS: 23491-45-4; MW: 533.88 (L) Technical sheet
Hoechst33342, FluoPure **FP-99964A, 100mg**
Hoechst33342 solution, 10mg/ml **FP-59046A, 10mL**
Hoechst33342 solution, 20mM in water **FP-BB1340, 5mL**

Hoechst33258, PentaHydrate **FP-61248A, 100mg** **FP-61248B , 1g**
Bisbenzimide, 2'-(4-Ethoxyphenyl)-5-(4-methyl-1-piperazinyl)-2,5'-bi-1H-benzimidazole, trihydrochloride, solution; CAS: 23491-52-3 (free base); MW: 561.93 (L) Technical sheet
Hoechst33258, FluoPure **FP-P62759, 100mg**
Hoechst33258 solution, 10mg/ml **FP-41387A, 10mL**
Hoechst33258 solution, 20mM in water **FP-BB1330 , 5mL**

See also CellStain 1mg/ml Hoechst solutions #BD60611 and #BE8270, and Hoechst Cell Proliferation Assays #Q70130 and Q0150

Acridine based dyes: stains for DNA

A nucleic acid-selective fluorescent cationic dye useful for cell cycle determination.
Acridine Orange (AO) stains dsDNA in green and RNA or single stranded in DNA red. Membrane-permeant. Used for cell-cycle studies. Has also been used for the detection of microorganisms in cerebrospinal fluid and other clinical specimens. Highly purified form while most of the other commercially available grades of AO are either in zinc chloride complex form or of low purity. Also



used for Electrophoresis. Technical sheet

CAS:10127-02-3; MW : 438.1; Soluble in water, EtOH; (M)
λabs./λem.(DNA bound) : 501/526 nm; EC : 53 000 M-1cm-1
λabs./λem.(RNA bound) : 460/650 nm

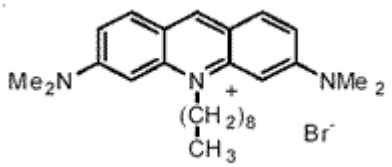
Acridine Orange **FP-05920A, 1g**
FP-05920D 50 g

Acridine Orange, for electrophoresis **05920E, 50g** **05920F, 100g**
CAS:494-38-2; MW: 265.35; CAS:[10127-02-3]; C17H20ClN3 · HCl · 1/2ZnCl2; MW:369.96 (Z).
Soluble 2mg/ml in Ethanol, 4 mg/mL in 2-methoxyethanol (EGME)

Acridine Orange Solution, 10mg/ml in water **21092A, 10ml**
10mg/ml solution
See also CellStain AO solution #RI6430.

Nile Blue Sulfate **FP-IT2021, 100mg**
CAS: 3625-57-8; MW:353.8; λexc\λem = 633 / 672nm (M) Technical sheet
Nile Red Sulfate **FP-46875A, 100mg**
CAS: 73585-67-3; MW:318.37; λexc\λem = 450-500 / 528nm (M) Technical sheet
Nile blue sulfate,and Nile blue A, is a cationic dye that can be used to visualize DNA during electrophoresis. The dye is used both in the gel and in the gel buffer. At higher concentrations, Nile blue might change the migration of DNA and inhibit resolution

Nonyl Acridine Orange (NAO) **FP-58566A, 50 mg**
Acridine Orange 10-nonyl Bromide; CAS: 75168-11-5; MW: 472.52; (M)
λabs./λem.(MeOH) : 495/522nm; EC : 63 000 M-1cm-1



Used notably for mitochondria studies; also for phagosome-lysosome fusion study, and multidrug resistance. Technical sheet

Hematoxylin, MethylGreen, and Pyronin: stains for DNA

●
Pyronin Yellow, UltraPure **FP-IT2831, 100mg**
CAS:92-32-0; MW: 302.81; λmax: 546-551 nm. Note: Pyronin Y is also called Pyronin G, Pyronin J
Pyronin B **N13070, 10g**
CAS:[2150-48-3]; MW: 358.91
Pyronin G **149794, 5g** **149795, 10g**

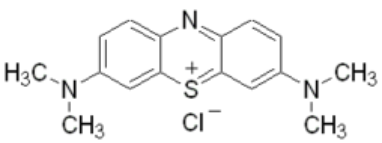
●
Methyl Green Pyronin (MGP) (stains RNA, DNA) **AP7340, 100tests**
Chromogenic RNA/DNA stain.

Methyl Green, Zn Chloride **25461A, 5g**
MW: 653.24
Methyl Green stain (stains DNA) **P56540, 50ml**

●
Hematoxylin, Immuno/Histo Aqueous **FP-WU1440, 15 ml . FP-WU1441, 100 ml ; FP-WU1442, 250 ml ; FP-WU1443, 1L**
stains nuclei in blue. Sides stained with this hematoxylin can be mounted with aqueous or organic mounting mediums. Technical sheet
Hematoxylin (Natural Black) **09192O, 25 g** **09192P, 100 g**
Nucleic chromogenic stain used for general animal histology.
Mayer's Hematoxylin counter stain **82342A, 500ml**
stains nuclei in blue

● Methylene Blue is a general non toxic but temporary stain for DNA and RNA (do not intercalate). For electrophoresis gels, it can only be used as a post-electrophoretical stain for DNA. It is useful especially for oligonucleotides. It also stains RNA on hybridization membranes in northern blotting to verify the amount of nucleic acid present. It also has many other uses for histological staining (intravital or supravital staining of nerve fibers; in different staining procedures such as Wright's stain and Jenner's stain to différentiate blod cells; indicator to show if bacteria or yeasts are alive or not) but also redox indicator, peroxide generator, MBAS assay for anionic surfactant in water.

Methylene Blue **02284**
CAS:[61-73-4]MW: 319; Soluble in Water 50g/L, in ethanol at 10g/L; (x)



Methylene Blue, Chloride Trihydrate **022843, 100mg** **022846, 1kg**
CAS:[7220-79-3]; MW: 373.90;
Soluble in Water, DMSO; (x) λabs.: 661nm
Methylene Blue, Staining solution **FP-WYM960, 15ml** **FP-WYM960, 100ml**

Ask for Methylene Blue formulated products, i.e. Eosins Methylene Blue Agar #A2WQP0 for bacteria cultivation and differentiation.
Ask for methylene derivatives, i.e. Benzoyl Leuco Methylene Blue #67647

●

Methyl Green counter stain, 1% solution **Q69250, 50 ml**
stains nuclei in blue/gree. provides excellent contrast with DAB detection systems

Other nucleic acid probes – specialities

AMCH-biotin **FP-R07565 10 mg**
CAS: 139585-03-8;MW : 331.4; (M)
An aldehyde reactive biotin. Application: detection of abasic sites of DNA (AP sites, depurinated/depyrimidated sites). Less than one abasic site in 104 nucleotides can be detected.

Psoralen-PEO-biotin **FP-L77845 10 mg**
MW : 688.8; (L)
Labels nucleic acids in one step. Psoralen intercalates between thymine and other pyrimidine containing bases.
Labeling occurs by photolysis at 350nm, 10-30min. PEO spacer confers excellent water solubility. DNA//RNA modification does not interfere with hydridization. Technical sheet

See also DNA stains for electrophoresis gels[PH], i.e. **DNAzure Blue stain**:

Technical tip - **DNA/RNA oligonucleotidess staining**
[s]
The most effective method to visualize oligonucleotides is gel staining with **methylene blue** for both DNA and RNA oligos.
oligonucleotides can be lectrophoresed in denaturing 7M urea 15% polyacrylamide gels for oligo resolution from 5 mer to over 150 mer, while 10 -12% polyacrylamide gels are recommended for longer oligos. Staining can be particularly useful if the gel is to be preserved or for photographic documentation.
As an analytical tool, staining has limited sensitivity; sequences present in low concentrations may not be visible. Nevertheless, staining is more sensitive than UV shadowing and is considered easier than radiolabeling.
The gel after electrophoresis and removal from the plates, may be soaked in a shallow pan with 0.02% methylene blue in water for approximately 1 0–15 min. Drain the pan and rinse the gel of all excess, unbound dye for several minutes. De staining with water should be continued till the back ground ha s almost no stain . Stained o ligonucleotides are visualized as blue bands and may be photographed under ambient light.

Ethidium bromide staining is a well -established technique for visualizing double -stranded DNA fragments. It is however not recommended, because of its toxicity, and because it is no effective or visualizing short, single -stranded DNA fragments such as synthetic oligonucleotides. (poorly intercalates in short intra-strand duplexes)

Other nucleic acid probes - Fluorescent

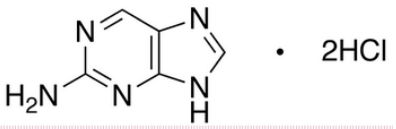
AAD (7-aminoactinomycin D) **FP-132303, 1mg**
CAS:7240-37-1; MW : 1270.46; Soluble in DMF, DMSO; (M)
λabs./λem. (DNA) : 546/647nm ; EC : 25 000 M-1cm-1
dsDNA intercalator with GC specificity. Weakly membrane permeant. Can penetrate cell membranes of dying or dead cells. The caused binding site distortion changes the pattern of other dyes or enzymes interacting with DNA.
Applications : Chromosome banding (polytene chromosomes and chromatin) multicolour fluorescence microscopy (argon-ion laser); Flow cytometry.
Also available as non fluorescent form, Actinomycin D #FP-09086A (used in a similar way). Technical sheet

ACMA **FP-155822, 25mg**
CAS: 3548-09-2; MW: 258.71; Soluble in DMSO; (K) λabs./λem.: 412/471nm
A DNA intercaltor that selectively binds to AT sequences. Technical sheet

AdyNA (DNA dyes) **Inquire**

2-Aminopurine, DiHydroChloride **NAB140, 500mg**
CAS: 76124-64-6; MW: ; Soluble in DMSO; (K) λabs./λem.: 370/303nM
A cell permeable adenine analog that is widely used as a versatile fluorescent probe to investigate RNA and DNA secondary and tertiary structures and their conformation dynamics in response to local environment when interacting with other biomolecules with great sensitivity. Forms stable base pairs with nucleobase uracil found in RNA and thymine in DNA, and moderately stable base pairs with cytosine. Exhibits intensive fluorescence emission (IAbsmax = 303 nM, Iflmax = 370 nM, and fluorescence quantum yield in solution QFI = 0.68) and longer excitation wavelength compared with other nucleobases enabling its selective excitation with low background signals.

NAB141, 5g



A probe of structural dynamics and charge transfer in DNA.

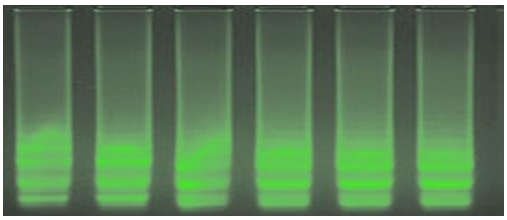
DMAO **FP-CA8150, 1ml**
MW: ; λabs/em.(dsDNA): 488/525nm
DsDNA and Nuclei green stain for live and dead cells

Applications: fluorescence green staining on live bacteria, when combined with dead red stain EthD-III. Technical sheet: see DMAO/EthD III Dead/Live Bacteria Viability Assay Kit BU1040.

FionaGreen1 dssDNA stain, 1000X **AW3DV0-M1900, 50 µl**

.: λabs/em.(dsDNA): xxx/520nm (M)

FionaGreen™1 is a highly sensitive dsDNA binding dye. Upon binding to DNA the spectral properties of the dye are similar to other green intercalating dyes ensuring compatibility with a wide range of instrumentation. It is usefull for several molecular biology applications including qPCR, DNA melt curve analysis, and Isothermal Loop Mediated Amplification (LAMP)



References:
Chandler Y, Koelbl J, Puckett J, Moser MJ, Klingele AJ, Liles MR, Carrias A, Mead DA, Schoenfeld TW. (2014) " A novel thermostable polymerase for RNA and DNA loop-mediated isothermal amplification (LAMP)." Front. Microbiol., 01 August 2014 | doi: 10.3389/fmicb.2014.00395.
Moser MJ, Chander Y,Mead D, Klingele AJ, Schoenfeld T, Mielke C, Shrago A (2013)"One-step rapid molecular assay for the detection of Clostridium difficile" Presented at 29th Clinical Virology Symposium, Daytona Beach, FL
Notomi T, Okayama H, Masubuchi H, Yonekawa T, Watanabe K, Amino N, Hase T. (2000)"Loop-mediated isothermal amplification of DNA." Nucleic Acids Res. 28(12):E63

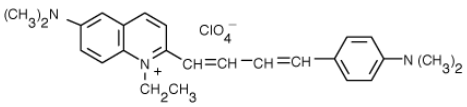
Hydroxystilbamidine methane sulfonate **FP-40766A 10 mg**

Also known as Fluoro-Gold™; MW : 472.54; (M)
λabs./λem. (DNA) : 360 nm/ca450 nm, ca 625 nm ; EC : 27 000 M-1cm-1

Exhibits AT-selective binding/II structure. Complex fluorescent properties allow DNA/RNA distinction. Technical sheet
Also used as a neuronal tracer (initial use – see section Neurology).

LDS 751 **FP-97384A 1g**

CAS: 181885-68-7; MW: 471.99; Soluble in DMSO/DMF; (M)
λabs./λem.(DNA): 543/712 nm
λabs./λem. (RNA): 590/607 nm

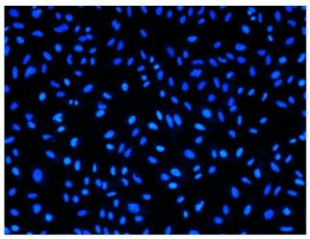


Membrane permeant excited by the argon-ion laser at 488 nm. Stains DNA of live cells. High Stockes shift allows multicolour imaging.
Application : analysis of intact nucleated or distinct cell types in mixed populations. Technical sheet

Nuclear Blue™ DCS1 **SNX280-17548, 0.5 ml**

.λabs/em.(dsDNA): 350/461nm; Soluble in DMSO(M) - TechSheet

Nuclear Blue™ DCS1 is a fluorogenic, DNA-selective and cell-impermeant dye for analyzing DNA content in dead, fixed or apoptotic cells. The Nuclear Blue™ DCS1 has its blue fluorescence significantly enhanced upon binding to DNA. It can be used in fluorescence imaging, microplate and flow cytometry applications. This DNA-binding dye might be used for multicolor analysis of dead, fixed or apoptotic cells with the DAPI filter sets. For example, Nuclear Blue™ DCS1 can be used with GFP cell lines.



Thiazole Orange **FP-24149B, 100mg**

MW:476.61 (). Technical sheet
Thiazole Orange, FluoProbes Pure Grade **FP-241491, 100mg**
Thiazole Orange, 10mM Solution **FP-FI9531, 10ml**

Stain-All Stain - Protein, DNA, & RNA **JQ6531, 25mg**

.Stains RNA iIn Purple, DNA in Blue, and Proteins in Red on PAGE Gels

See also Cell Stains for DNA materials (section countertains such a PI/, DAPI, Hoechst, Pyronins, Acridins, NuclearFastRed…), as well as other cell structures.

Others: see also

- DNA stains for electrophoresis gels[PH] i.e. **GelRed&GelGreen stains** for sensitive and non cancerigen DNA/RNA staining, RNA stain #FJ252.
- Nucleic Acids Amplification PCR [], for DNA stains for PCRs i.e. **Evagreen** #BI1790 for RT-PCR).
- Stain-All Stain - Protein, DNA, & RNA (JQ6530)
- Specific DNA detections – ARP probes for abasic sites, damage,...

+

Biochemicals for Nuclear Receptors

* Nuclear receptors		
BADGE	S03610	25 g
Carbaprostacyclin	300370	1 mg
Ciglitazone	Q87580	1 mg
8(S)-HETE	127350	25 µg
(±)-Ibuprofen	Q87360	500 mg
Indomethacin	27155A	1 g
Leukotriene B4	419051	25 µg
MCC-555	J74220	1 mg
Meclofenamate (sodium salt)	Q87420	1 g
MEDICA 16	Q88320	1 mg
Phenethyl Caffeiate	Q87560	10 mg
PPAR.alpha. Blocking Peptide	S00450	1 ea
PPAR.gamma. Blocking Peptide	Q88990	1 ea
Prostaglandin A1	244102	1 mg
Prostaglandin A2	401172	1 mg
Prostaglandin D1	Q84960	1 mg
Prostaglandin D2	366032	1 mg
Prostaglandin I2 (sodium salt)	401162	1 mg
Prostaglandin J2	300400	500 µg
15-deoxy-.delta.12,14-Prostaglandin J2	861300	1 mg
TO-901317	S03620	5 mg
Trichostatin A	Q88120	500 µg
Wy 14643	789395	5 mg

DNA/RNA differential staining

DNA staining is widely used in fixed/dead cells and in living cells (i.e. with permeant DAPI or the impermeant PI), however used dye are not strictly selective of DNA and stain more or less RNA species. Many attempts have been made to stain distinctively DNA and RNA in cells, i.e. to distinguish G0 phase from G1 phase. Useful dyes include (see description above):
-Hoechst dyes, i.e. Hoechst 333342 #71131A: colorimetric, relatively specific for DNA
-Pyronine Y: colorimetric, relatively specific for RNA
In fixed cells, good DNA/RNA staining can be obtained after a few minutes incubation with 500 nm pyronin Y and 1 ug/ml Hoechst 33342 at room temperature. DNA versus RNA distinction can be precised by RNAse (or DNAse) treatment. However the staining is trickier in living cells, because of dye toxicity and mitochondria staining.

+

Anti nucleic acid antibodies (probes)

See PrimAbs search engine– over 500 000 primary antibodies, including many specificities for the staining and research of cell nuclei (anti DNA damage, and transcription factors, histones,...).

■ Mitochondria staining and probes

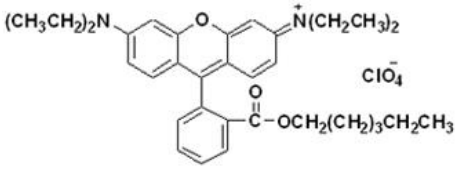
Stains and probes for mitochondria study are listed below. Most popular are classic ones as Rhodamine123, NAO, or new superior ones such as MitoRed and MitoVue (green). They probe typically the membrane potential (i.e. resazurin redox indicator), the mitochondrial-DNA material (i.e. NAO), or distribute preferentially in mitochondrial membrane (MitoRed, TMRE,Rh123). They are used in cell structure studies, for oxidative metabolism or apoptosis applications.
See also the sections Study of Mitochondry (kits), study of Oxidative Metabolism[BE100a], and above membranes staining.

●Mitochondria stains

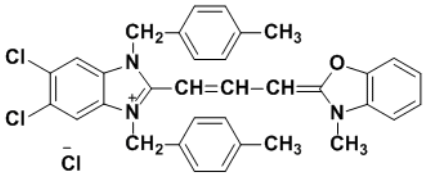
MitoRed Viable Cell Stain **T32840, 8x50µg**
9-[2-(4'-Methylcoumarin-7'-oxycarbonyl)phenyl]-3,6-bis(diethylamino)xanthylium chloride; MW: 637.18(L)
λexc./em.(oxidized): 560 nm / 580 nm
MitoRed is a cell membrane permeable rhodamine-based dye. It localizes in mitochondria and emits red fluorescence. The interaction of MitoRed with mitochondria depends on the membrane potential of the mitochondria. Mitochondria can be stained with 20 to 200 nM MitoRed. The excitation and emission wavelengths of MitoRed are 560 nm and 580 nm, respectively. See BE030d for more info.

Resazurine, sodium salt **FP-06224A, 10mg**
Rezasuring sodium salt; MW: 251.18; CAS:[62758-13-8]
Soluble in water
A blue dye used mainly as an oxidation-reduction indicator for cell viability in bacteria and mammalian cells. Technical sheet
Also available Resazurine (CAS:[550-82-3]; MW: 229.19) #08062, and in ready solution for cell viability assay (see UptiBlue #UP664162).

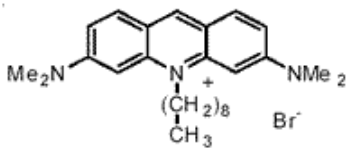
Rhodamine B, hexyl ester perchlorate [R 6] **FP-89216A, 10mg**
CAS: 877933-92-1; MW: 627.17; C34H43ClN2O7 (M)
Nontoxic fluorescent cell permeant probe for mitochondria staining. Technical sheet



MitoVue Green **FP-17218A, 1mg**
5,6-dichloro-2-(3-(3-methylbenzo[d]oxazol-2(3H)-ylidene)prop-1-en-1-yl)-1,3-bis(4-methylbenzyl)-1H-benzo[d]imidazol-3-ium chloride (Z)
[Known as Mitofluor® Green, TM of Mol ecular Pr obes,MitoHunt Green TM of SEH]
λmax: 489 ± 3 nm in Methanol; EC: 125,000 ± 9,000 cm-1 M-1; λEm: 515 ± 4 nm in Methanol; Soluble in DMSO, DMF, Methanol; Red solid. Technical sheet



Nonyl Acridine Orange (NAO) **FP-58566A, 50 mg**
Acridine Orange 10-nonyl Bromide; CAS:[75168-11-5]; MW: 472.52; (M)
λabs./λem.(MeOH) : 495/522nm; EC : 63 000 M-1cm-1
A DNA stain used notably for mitochondria studies, being not dependent on mitochondrial membrane potential unlike JC-1 and Rhodamine 123; also for phagosome-lysosome fusion study, and multidrug resistance. Technical sheet



Rhodamine 123 **FP-47372A, 50mg**
6-Amino-3-imino-3H-xanthen-9-yl)benzoic acid methyl ester, hydrochloride; CAS: 62669-70-9; MW: 380.82 (L)
Red to reddish-brown powder or solid
Rhodamine 123 (Rh123) is cell-membrane permeable and localizes in mitochondria of viable cells to emit yellowish-green fluorescence. Rh123 is utilized for staining a wide variety of cells, including plant cells and bacteria. Since there is a correlation between the amount of ATP in a cell and the fluorescence intensity of Rh123, this compound is used for the detection of intracellular ATP. Rh123 is also used in cancer research. Technical sheet

See also: Dihydrorhodamine 123 (FP-83775A)
This reduced form of rhodamine 123 is useful for detecting reactive oxygen species: it readily enters most of the cells and is oxidized by oxidative species or by cellular redox systems to the fluorescent rhodamine 123 that accumulates in mitochondrial membrane. See description in section Oxidative metabolism / ROS probes or in the Technical sheet

Tetramethylrhodamine, ethyl ester (TMRE) **FP-41391A / FP-EZE520**
Positively charged lipophilic red-orange fluorophore; rapidly accumulates in mitochondria due to relative negative charge of active mitochondria with respect to cytosol

MitoFlo Mitochondria Membrane Potential detection for Flow Cytometry **FLO200, 100tests** **FLO200, 500tests**
MitoFlow assay is a easy to use one color assay for Flow Cytometry to visualize mitochondrial membrane potential of cells. It utilizes the MitoFlo dye, a cell permeable cationic dye that has a strong fluorescent signal and exhibits low membrane potential independent (non specific) binding and toxicity
BENEFITS: Cell Permeable | Exc.488nm/Em.FL2 channel | Can be used with both suspension and monolayer adherent cell lines | Adaptable for High troughput format | Compatible with fluorescent protein expression vectors

●Other reagents for Mitochondria study

Other mitochondria probes (redox potential, pH, membrane,…) and assay kits on line[527, 530] or on inquire. +

■ CytoSkeletton probes

Phalloidin

Phalloidin and ist derivatives with over 30 labels (biotinylated, fluorescent) are popular probe for F-actin detection, used in various analysis techniques (microscopy, FCM...). It allows to detect, identify, quantitate and stabilize F-actin in fixed and permeabilized tissue sections, cell cultures or cell free experiments. Phalloidin bind to a site at which few actin-binding proteins bind. So most of the F-actin in cells is available for phalloidin labeling. These properties make phalloidin more attractive than actin specific antibodies for fluorescence microscopy, giving high contracts staining. Technical sheet.

Phalloidin Bicyclic(Ala-DThr-Cys-cis-4-hydroxy-Pro-Ala-2-mercapto-Trp-4,5-dihydroxy-Leu)(S-3→6)	**FP-547012, 1mg**
Phalloidin – FluoProbes® FITC FITC (494/518nm) with extended spacer	**FP-47548A 300 tests**
Phalloidin-FluoProbes® 505 FP 505 is used alternatively to FITC, but with the stability of rhodamine *	**FP-AZ0130, 300U**
Phalloidin-FluoProbes® 547 FP547 (557/574nm) is used alternatively to Rhodamines, Cy3, AF546 *	**FP-AZ0330, 300U**
Phalloidin-FluoProbes® 647 FP647 (652/673nm) is used alternatively to AF647 and Cy5 *	**FP-BA0320, ,300U**
Phalloidin-FluoProbes® 682 FP682 (679/702nm) is used alternatively to Cy7 *	**FP- BG0480,300U**
Phalloidin-SR101 SulfoRhodamine101 label*	**FP-033991, 300U**
Phalloidin- Rhodamine	**FP-475741, 300U**
over 30 available labels – Phalloidin conjugates Please inquire for other dyes	see in the Technical sheet

See more information on dyes in section of FluoProbes or conventional labeling agents..

Tubulin probes (AnnexinV)

AnnexinV detects apoptotic cells in the early step, recognizes the cell surface-exposed phosphatidylserine (PS) that is translocated from plasma membrane surface. Annexin V and binds with high affinity to it, before the dying cell changes morphology and cleaves its DNA (Vermes 1995). Apoptotic cells are stained with a fluorescent conjugate of Annexin-V by a simple and quick one-step staining procedure. No fixation of the cells and no washing procedures are necessary. The stained cells can be measured by flow cytometry, microscopy or other fluorescent based instruments. AnnexinV is available labeld with various conventionnal fluorochromes, and biotin. Technical sheet

Annexin V-FluoProbes® 488, for FCM	**FP-BH9390 100 tests**
, for Confocal Microscopy FP488 (494/519nm) is a superior alternative to FITC and other gren dyes *	**FP-BH4140 500 µl**
Annexin V-FITC FITC(494/518nm) *	**FP-M19651 500 µl**
Annexin V-RPE R-PhycoErythrin (496.546.565/578nm) *	**FP-AH191A 50 tests**
Annexin V-APC APC (650/660nm)	**FP-AK194A 100 tests**
Tubulin-Tetramethylrhodamine Tubulin from bovine brain conjugated to TetraMethyl Rhodamine.	**FP-966921 5x20 µg**
Annexin V-Biotin Biotin is detected wit (strept)avidin conjugates	**FP-FX8470 100 µl**

See more information on dyes in section of FluoProbes or conventional labeling agents..

Related products:

AnnexinV 10x binding buffer	FP-BU2080, 1.7ml
Anti-Annexin V-FITC	R51380, 100 tests

3/Special probes for cell bioloby

ExtraCellular Matrix (ECM)

See **Cell Adhesion catalog**

e.g. **Biocolor cellular adhesion** compounds assays (collagen, fastin, elastin, sGAG) SHU23e, List

Anti cytoskeletton and celular matrices antibodies

See PrimAbs chapter D – over 130 000 primary antibodies.

+

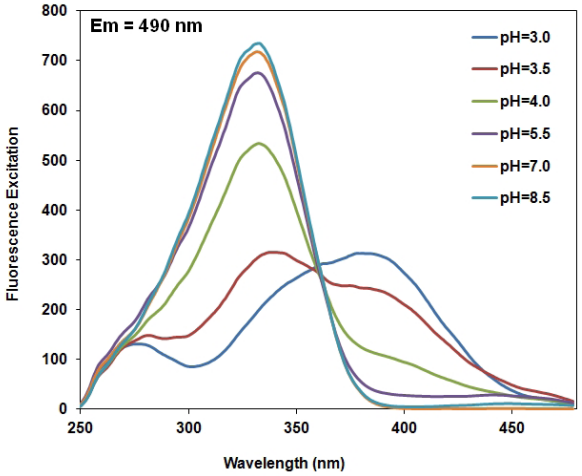
■ Acidic organelles probes

The existing pH probes are ill-adapted to study acidic organelles because their fluorescence is significantly reduced at lower pH. In addition, most of the existing pH probes (such as BCECF and SNARF) are not selectively localized in acidic organelles. Following are efficient tracking dyes for these applications.

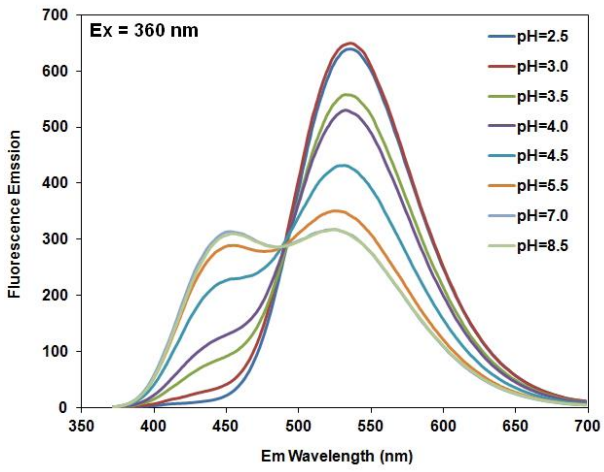
The Sensor dyes are acidotropic pH probe that selectively labels acidic organelles such as lysosomes, endosomes, exosomes, spermatozoa and acrosomes. They demonstrate pH-dependent fluorescence, but unlike most of the existing fluorescent dyes, their fluorescence intensity dramatically increases as pH decreases from neutral to acid. The lack of fluorescence outside the cell eliminates the wash steps. This enables, together its bright fluorescence in acidic compartments, the specific detection of cellular acidic compartments with reduced signal variability and improved accuracy for imaging or flow applications.
3 colors are available: 450/540Ratiometric Yellow/Blue (PDMPO, DNP-160, 500-Green and 600-Red (Lys oSen sor dyes)
In peculiar, PDMPO has dual-excitation and dual-emission and emits intense yellow fluorescence at lower pH to intense blue fluorescence at higher pH. This unique pH-dependent fluorescence makes PDMPO an ideal pH probe for acidic organelles with pKa = 4.2-4.5, to monitor the pH fluctuations of live cells in ratio measurements. Additionally, its very large Stokes shift and excellent photostability make PDMPO an excellent fluorescent acidotropic reagent for fluorescence imaging. PDMPO can be well excited by the violet laser at 405 nm for flow cytometric applications.
PDMPO is available as a dextran conjugate, and other conjugates can be prepared using the Succinimidyl Ester (SE) derivate. Bioconjugates allow for specific detection of phagocytosis and endocytosis with reduced signal variability and improved accuracy, and for multiplexing cell functional analysis with complementar colors.

Cat #	Probe	Abs * (nm)	Em * (nm)	pKa
FP-44201A FP-022900 FP-024010	**Acidic pH Sensor 450/540Ratiometric**, Yellow/Blue **PDMPO**, DNP-160 (SE ester) (Dextran 10K)	384 to 329*	540 to 440*	3.9
FP-JQ7870 FP-JQ7880 FP-JQ7890	**Acidic pH Sensor 500, Green** (SE ester) (Dextran complex)	443	505	ND
FP-GCZ160 FP-GDA090 FP-GDA090	**Acidic pH Sensor 600, Red** (SE ester) (Latex beads)	575	597	ND
See also	Acidic-pH ***Tracking*** dyes FT-97578A (Lys o Tra cker dyes: Blue DND-122, Green DND26, Yellow HCK123, Red DND99)			

Excitation spectrum

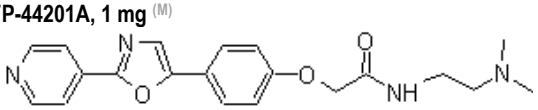


Emission spectrum (with exc.@360nm)



Sensor 450/540-ratiom. Yellow/Blue for Acidic pH – PDMPO, DNP-160 **FP-44201A, 1 mg** (M)

2-(4-pyridyl)-5-((4-(2-dimethylaminoethylaminocarbamoyl)methoxy) phenyl)oxazole; CAS: -
Lys oSen sor ™Yellow/Blue DNP160, RatioWorks™ PDMPO; MW= 366.42
Soluble in DMSO. λ_{exc}\\λ_{em} (MeOH) = 405 / 550 nm - Use ratio: Ex= 360 nm, and Em= 450 and 540 nm



Also available as:

-Succinimidyl ester (SE, FP-022900): amine reactive

-Dextran conjugate (FP-024010: ~10K, soluble/water)

Sensor 500-ratiom. Yellow/Blue for Acidic pH – PDMPO, DNP-160 **FP-JQ7870, 1 mg**

MW= 398.46; λ_{exc}\\λ_{em} (MeOH) = 443 / 505 nm

Also available as: -Succinimidyl ester (SE, FP-JQ7880); MW: 539.54

-Dextran complex (FP-JQ7890)

Sensor 600-ratiom. Yellow/Blue for Acidic pH – PDMPO, DNP-160 **FP-GCZ160, 1 mg**

MW= 984.03; λ_{exc}\\λ_{em} (MeOH) =575 / 597 nm

Also available as:

-Succinimidyl ester (SE, FP-GDA080); MW:953.06 -Latex Beads conjugate (FP-GDA090)

Lysosyme assay

Lysosomes are acidic cytoplasmic organelles that are present in all nucleated mammalian cells. Lysosomes have been found to be involved in a variety of cellular processes including repair of the plasma membrane, defense against pathogens, cholesterol homeostasis, bone remodeling, metabolism, apoptosis, and cell signaling. Defects in lysosomal enzyme activity have been associated with a variety of diseases including Parkinson's, Tay-Sachs, Sandhoff, Krabbe, Wolman, and Gaucher syndromes.

LysoLive™ Lysosomal Metabolic Health Assay Kit **M1910, 1Kit**

Utilizes a sensitive substrate for esterase to stain only actively metabolizing lysosomes. The kit allows for labeling lysosomes in a live-cell format and is capable of monitoring lysosomal metabolic activity.

References ▲

Carpenter AE,Jones TR, Lamprecht MR, Clarke C, Kang IH, Friman O, Guertin DA, Chang JH, Lindquist RA, Moffat J, Golland P, Sabatini DM (2006) "CellProfiler: image analysis software for identifying and quantifying cell phenotypes." Genome Biology 7:R100.

Michihara A, Toda K, Kubo T, Fujiwara Y, Akasaki K, Tsuji H. (2005) "Disruptive effectof chloroquine on lysosomes in cultured rat hepatocytes." Biol Pharm Bull. 28(6):947-51.

Karageorgos LE, Isaac EL, Brooks DA, Ravenscroft EM, Davey R, Hopwood JJ, Meikle PJ (1997) "Lysosomal Biogenesis in Lysosomal Storage Disorders" Experimental Cell Research 234, 85-97.

SophiaGreen™ 421 **M1931, 50µl**

Excellent green membrane-impermeant counterstain for DNA and chromatin, providing high increase in fluorescence upon binding to nucleic acid membrane impermeant, does not stain live cells

RE / Golgi study

Fluorescent Golgi Labeling Kit **M2018, 1Kit**

Convenient kit for labeling Golgi apparatus using fluorescence microscopy.

Technical sheet.

■ Labeled Dextrans (Fluorescent, Biotin)

Inquire / in progress

■ Lectins

Biotin Lectin -ConA **FP-MS9690, mg** **FT-MS969.0.pdf**

Canavalia Ensiformis Lectin (Jackbean) is specific of αD-Mannose, αD-Glucose, Branched mannose.

WGA Lectin -SR101 **FP-MS9540, mg** **FT-MS954.0.doc**

Wheat Germ Agglutinin (WGA) is specific of (GlcNAc-β-(1,4)-GlcNAc)$_{1\text{-}4}$>β-GlcNAc>Neu5Ac.

GS-I Lectin - FITC **FP-MS9020, 2mg** **FT-MS9020.pdf**

Pure Griffonia simplicifolia lectin is specific for Melibiose, α-D-Galactose (calcium is required); Working range: 20-30µg/ml (blood cells agglutination)

Please inquire at Fluoprobes@fluoprobes.com for other lectins, conjugated to Biotin, FITC, or AP (Alckaline Phosphatase):

Abrus Precatorius Lectin (Jequirity Bean)	-APA-	Lens Culinaris Lectin (Lentil)	-LCH-
Aegopodium Podagraria Lectin (Ground Elder)	–APP-	Limax Flavus Lectin (Garden Slug)	-LFA-
Agaricus Bisporus Lectin (Mushroom)	-ABA-	Limulus Polyphemus Lectin (Horseshoe Crab)	-LPA-
Allium Sativum Lectin (Garlic)	-ASA-	Lotus Tetragonolobus Lectin (Asparagus Pea)	-LOTUS-
Anguilla Anguilla Lectin (Fresh Water Eel)	-AAA-	Lris Hybrid Lectin (Dutch Iris)	-IRA-
Arachis Hypogaea Lectin (Peanut)	-PNA-	Lycopersicon Esculentum Lectin (Tomato)	-LEA-
Artocarpus Integrifolia Lectin (Jackfruit) –Jacalin		Maackia Amurensis Lectin	-MAA-
Bauhinia Purpurea Lectin (Camel's Foot Tree)	-BPA-	Maclura Pomifera Lectin (Osage Orange)	-MPA-
Bauhinia Purpurea Lectin	-BPA-	Marasmium Oreades Agglutinin Lectin (Mushroom)	-MOA-
Bryonia Dioica Lectin (White Bryony)	-BDA-	Morniga G Lectin (Black Mulberry)	-MNA-G-
Calystega Sepiem Lectin (Hedge Bindweed Rhizomes)	–CALSEPA-	Morniga M Lectin (Black Mulberry)	-MNA-M-
Canavalia Ensiformis Lectin (Jackbean)	-CON A-	Narcissus Pseudonarcissus Lectin (Daffodil)	-NPA-
Cancer Antennarius Lectin (California Crab)	-CCA-	Phaseolus Lunatus Lectin (Lima Bean)	-LBA-
Caragana Arborescens Lectin (Pea Tree)	–CAA-	Phaseolus Vulgaris Lectin (Red Kidney Bean)	-PHA-E-
Cicer Arietinum Lectin (Chick Pea)	-CPA-	Phaseolus Vulgaris Lectin (Red Kidney Bean)	-PHA-L-
Colchicum Autumnale Lectin (Meadow Saffron)	-CA-	Phytolacca Americana Lectin (Pokeweed)	–PWM-
Cytisus Sessilifolius Lectin (Portugal Broom)	-CSA-	Pisum Sativum Lectin (Garden Pea)	-PEA-
Datura Stramonium Lectin (Jimson Weed)	-DSA-	Polygonatum Mulitiflorum Lectin (Commom Solomon's Seal)	-PMA-
Dioclea Grandiflora Lectin (Legume)	-DGL-	Polyporus Squamosus Lectin (Mushroom)	-PSL-
Dolichos Biflorus Lectin (Horse Gram)	-DBA-	Ricinus Communis Lectin (Castor Bean)	-RCA-I-
Erythrina Cristagalli Lectin (Coral Tree)	-ECA-	Ricinus Communis Lectin (Castor Bean)	-RCA-II-
Euonymus Europaeus Lectin (Spindle Tree)	-EEA-	Triticum Vulgare Lectin (Wheat Germ)	-WGA-
Galanthus Nivalis Lectin (Snowdrop Bulb)	-GNA-	Tulipa Sp. Lectin (Tulip)	-TL-
Glechoma Hederacea Lectin (Ground Ivy)	-GHA-	Ulex Europaeus Lectin (Gorse)	
Glycine Max Lectin (Soybean)	-SBA-	Ulex Europaeus Lectin (Gorse)	
Griffonia Simplicifolia Lectin	-GS-I-	Urtica Dioica Lectin (Stinging Nettle)	-UDA-
Griffonia Simplicifolia Lectin	-GS-II-	Vicia Fava Lectin (Fava Bean)	-VFA-
Helix Aspersa Lectin (Garden Snail)	-HAA-	Vicia Villosa Lectin (Hairy Vetch)	-VVA-
Helix Pomatia Lectin (Edible Snail)	-HPA-	Viscum Album Lectin (Mistletoe)	-VAA-
Hippeastrum Hybrid Lectin (Amaryllis)	-HHA-	Wisteria Floribunda Lectin (Japanese Wisteria)	-WFA-

■ Lysochrome dyes (Sudan dyes, Oil red)

A lysochrome is a fat soluble dye that have high affinity to fats, therefore are used for biochemical staining of triglycerides, fatty acids, and lipoproteins. They also may be useful for staing lipoproteins, and other lipids. Some examples are Sudan IV, Oil Red O and Amido Black.

Technical sheet

Sudan IV **N13862, 100g**

Sudan R, Lipid Crimson, Oil Red, Oil Red BB, Fat Red B, Oil Red IV, Scarlet Red, Scarlet Red N.F, Scarlet Red Scharlach, Scarlet R; CAS: [85-83-6]; MW: 380.45

λabs = 513-529 nm (red); Soluble in EtOH (0.09%). (Z)

Sudan IV is a diazo dye used for the staining of lipids, triglycerides and lipoproteins on frozen paraffin sections.

Sudan III **08002A, 25g**

Other names: Rouge Sudan ; rouge Ceresin ; CI 26100; CI Solvent Red 23; CAS:[85-86-9]; MW: 352.40

λabs = 503-510 nm (red); Solulble in EtOH (0.15%). (Z)

Sudan III is similarly to Sudan IV. Applications include staining lipidic inclusions or fat globules in histological section, and the determination the level of fecal fat to diagnose steatorrhea. It is less popular than oil red O as it has a more orange shade.

Sudan Black B **279040, 25g** **AR7910, 100tests stain for lipids granules**

Sudan Black; Fat Black HB; Solvent Black 3; C.I. 26150; CAS: [4197-25-5]; MW: 456.54

λabs = 596-605nm (blue-black). (Z)

Sudan Black B is a diazo dye used for staining (blue-black) neutral triglycerides and lipids on frozen sections and some lipoproteins on paraffin sections. It can be used to stain some other materials than the other Sudan dyes, as it is not so specific to lipids. In differentiating haematological disorders Sudan black will stain myeloblasts but not lymphoblasts.

Oil Red O **N13002, 100g**

Solvent Red 27, Sudan Red 5B, C.I. 26125; CAS: [1320-06-5]; MW: 408.51

λabs = 518(359) nm (red); Soluble in EtOH (moderate) (Z)

Oil Red O is a diazo dye used for staining of neutral triglycerides and lipids on frozen sections and some lipoproteins on paraffin sections. It has maximum absorption at 518(359) nm. Oil Red O provides much deeper red color than Sudan III and Sudan IV hence replace them for more visible image

■ Enzymes probes

See also section Enzymes assays and sections dedicated to each cell biology application in which the enzyme is involved (i.e. Apoptosis section for capases, Reporter assays for β-Galactosidase,…)

Fluorescent labeled Glucosides

cat.number	CAS	Product
M1312, 5mg		**Resorufin maltotriose** α-amylase substrate with red emission
M1340, 5mg		**Resorufin-α-D-mannopyranoside** Red fluorogenic substrate for monitoring intracellular mannosidase activity
M1940, 50mg.	242-736-7	**4-Methylumbelliferyl β-D-glucopyranoside** Fluorescent substrate for analysis of beta-glucosidase activity, exhibits bright blue fluorescence
M0095, 10mg	5894-59-7	**alpha-DGalU(1-4) DGalU, Digalacturonic Acid**
M0203, 10mg	95079-19-9	**Resorufin beta-D-galactopyranoside (Res-Gal)** Long Wavelength (Red), Stable Fluorescent beta-Galactosidase Substrate

■ Counter staining, AutoFluorescence quenching

See following product lines:

BE144q TrueBlack Lipofuscin Autofluorescence Quencher (superior alternative to Sudan Black B)