Avanti Research

Fluorescent Probes and Lipids

Check out our selection of fluorescent probes and lipids!

More than lipids

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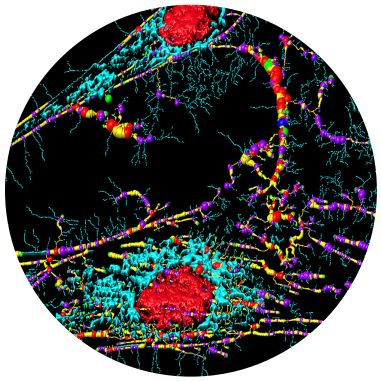
Fluorescent Probes

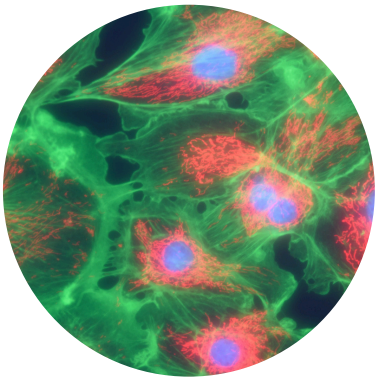
General Information

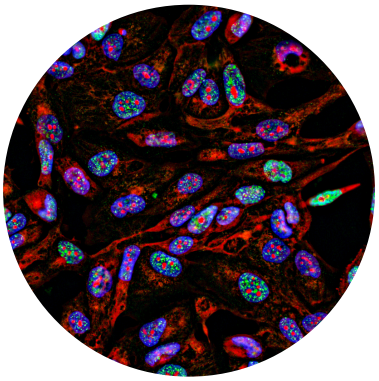
Fluorescent probes (or fluorophores) are molecules that absorb and emit light at specific wavelengths. This results in illumination of the molecule and a researcher being able to visualize and study various biological targets by attaching these probes. Fluorescent probes are a critical tool for researchers to study cellular and molecular biology, discover new drugs, protein studies and much more.

Fluorescent probes are extremely useful research tools as they can be used in highly sensitive fluorescence techniques even at low concentrations. Ability to use fluorophores at low concentrations makes them ideal for biological systems due to minimal impact on the system's function. Their high sensitivity is due to their intense fluorescent emission which can be measured with great accuracy. This high sensitivity combined with the ability to tune fluorescent probes for specific biomolecules, creates a tool that is integral for tracking biological substances and monitoring disease markers.

Avanti offers a wide variety of fluorescent probes and lipid-conjugated probes to fulfil your research needs. We use a wide variety of fluorophores to address a wide range of emission spectrum needs as well as biomolecule targets. Keep reading to learn more about our fluorescent probe and fluorescent lipids offering and start visualizing the biological system for your research today!







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Emission Spectrum Guide

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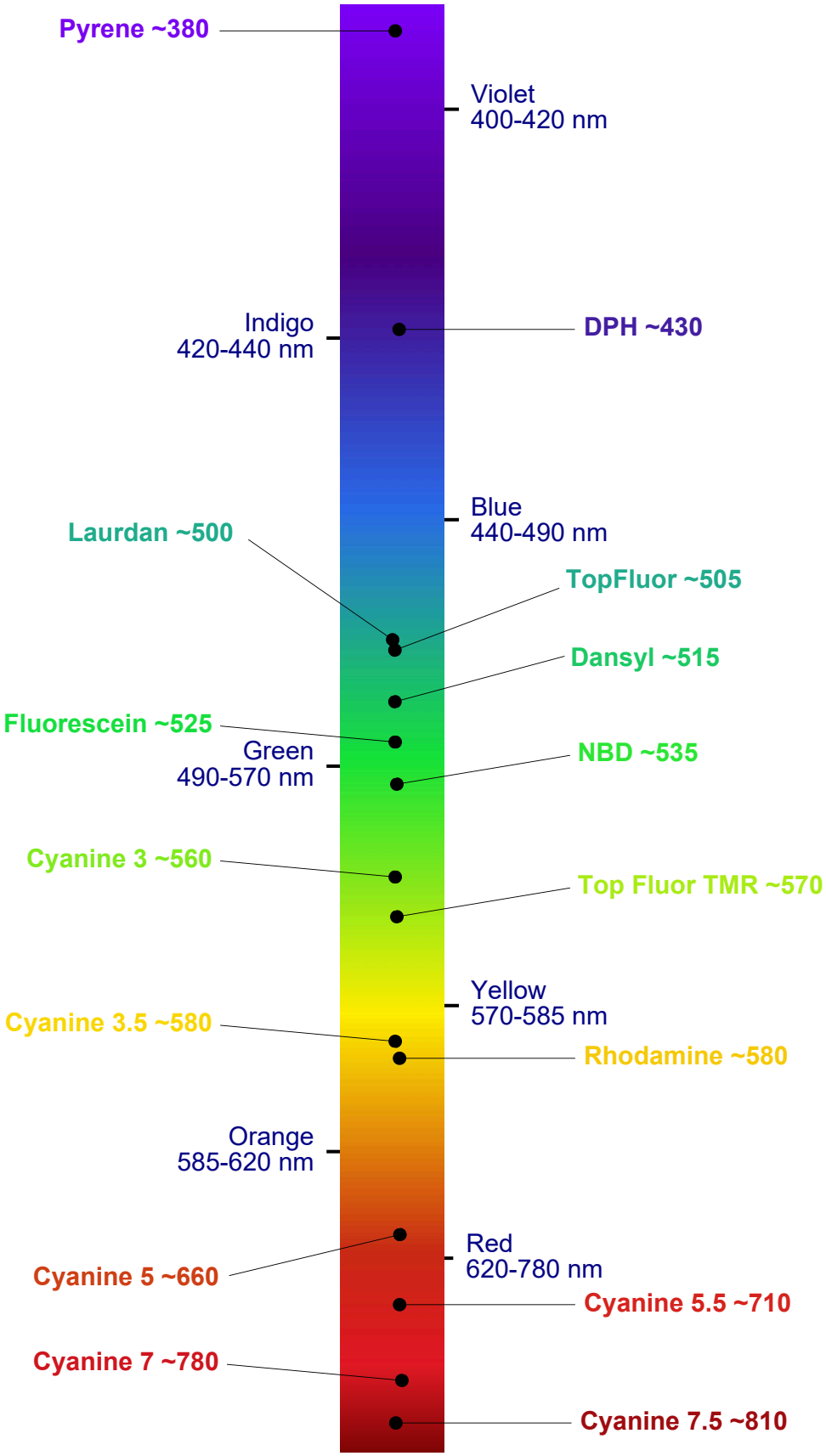
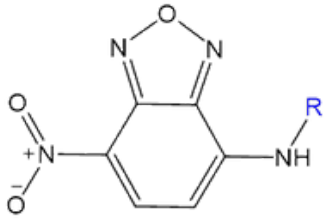


Fluorescent Probes: NBD & TopFluor™

Nitrobenzoxadiazole (NBD)

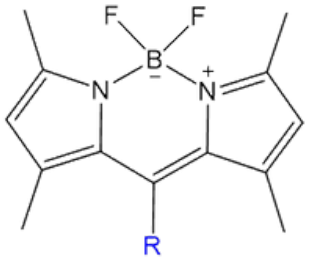
Nitrobenzoxadiazole (NBD) is a common fluorescent label, especially for lipids. NBD was discovered several decades ago but continues to be a popular choice for fluorescent labelling due to its desirable fluorescent characteristics. NBD shows maximum excitation and emission wavelengths of 465nm and 535nm, respectively.



NBD probes are environmentally sensitive and highly reactive to amines and thiols. This environmental sensitivity provides key advantages that facilitate biomolecular interactions and self-assembly within buffers and live systems. The strong electron withdrawing nature of the nitro groups results in NBD derivates able to undergo aromatic substitution (if a suitable leaving group is present) which has helped researchers develop a variety of different sensing motifs for biological nucleophiles. These key chemical properties result in a fluorophore that is easily chemically modified and can be attached to a variety of proteins as well as other biomolecules. Due to the ease at which NBD can be attached to biomolecules, it makes NBD compounds valuable assets in lipid membrane studies, lysosomal lipid body analysis, and for drug screening.

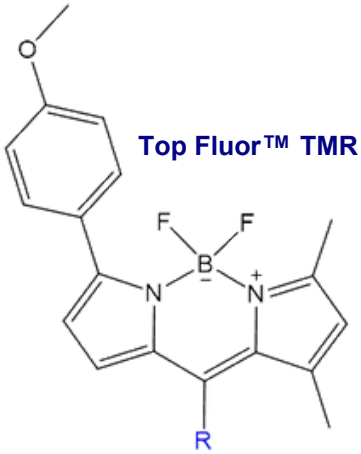
TopFluor™

TopFluor (also referred to as BODIPY) is an extremely versatile fluorophore that can be structurally modified to fulfil a variety of roles. TopFluor is an extremely versatile fluorophore due to its chemical makeup and its high tolerance for substitutions which results in a compound that can be derivatized to suit a researcher's needs.



Top Fluor™

TopFluor-labeled lipids are great aids in studying the distribution of lipids, lipid diffusion rates, and lipid dynamics. TopFluor has a tunable fluorescence emission range from 500 - 700nm, high fluorescent quantum yields regardless of the solution, and a high level of photostability. TopFluor has also been used to study accessibility in the lipid bilayer, cellular localization, and membrane dynamics via fluorescence recovery. Studies have indicated that this fluorescent label alters the biochemical and biophysical properties of lipids less than some other fluorescent labels, such as NBD, while also maintaining a low toxicity, low polarity, and a high degree of biocompatibility.



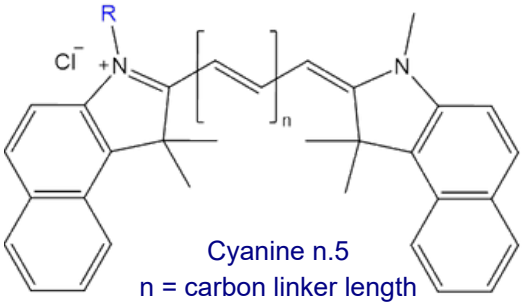
Top Fluor™ TMR

Fluorescent Probes: Cyanines & Squaraines

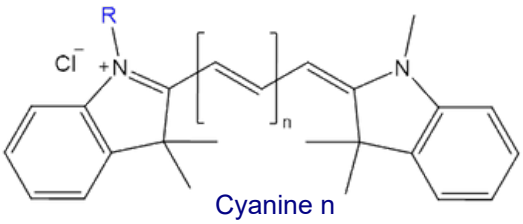
Cyanines

Cyanine Probes are a family of probes that are chemically constructed from two indole rings connected via a polyalkene linker of various carbon lengths. The suffix at the end of the Cyanine name (Cyanine 2 or Cyanine 5, for example) indicates the number of carbons in the polyalkene linker, and if the suffix includes 0.5 (Cyanine 3.5 or Cyanine 5.5, for example) , this indicates a benzo-fused indole.

By increasing the number of carbons in the linker, the excitation and emission wavelengths can be shifted. These probes have a similar fluorescent profile to traditional dyes such as fluorescein but have increased photostability and water solubility. These properties make these probes excellent for labelling amine groups such as those on antibodies, nucleic acids, and proteins. These probes can be detected using a variety of fluorescence detection techniques such as microscopy and flow cytometry.



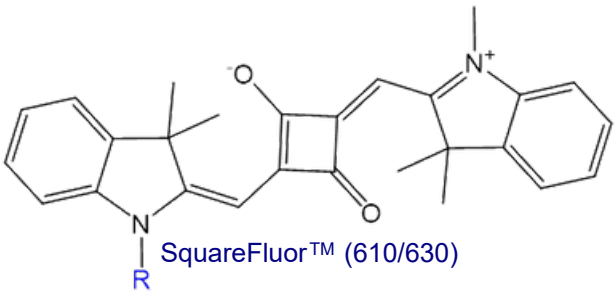
Cyanine n.5
n = carbon linker length



Cyanine n
n = carbon linker length

SquareFluor™ (Squaraines)

SquareFluor (Squaraine) probes are defined by their unique squaric acid derived aromatic ring which leaves the probe vulnerable to nucleophilic attack which destroys its fluorescent ability. This glaring issue has historically prevented these probes from being studied as much as others, but they recent advancements in their synthetic design to overcome these issues has led to a re-emergence of their use.



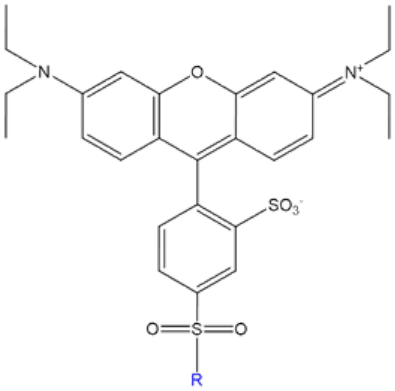
SquareFluor™ (610/630)

Squaraines are known to have extremely intense absorption bands and good photoconductivity while maintaining incredible photostability and a good quantum yield. Another key factor that makes Squaraine probes useful is that they can be synthesized with specific functional groups that target various biomolecules without compromising their photophysical properties. These properties make these probes promising in photodynamic therapy, bioimaging, and trace analyte sensors.

Fluorescent Probes: Liss Rhod, DPH, & Pyrene

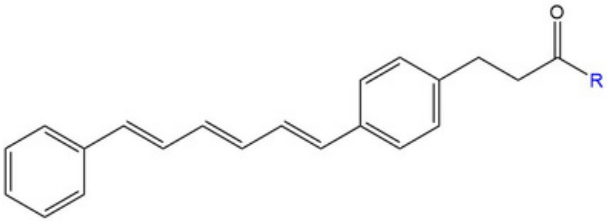
Lissamine Rhodamine (Liss Rhod)

Lissamine Rhodamine (Liss Rhod) is a fluorescent probe that can be used in a variety of applications including cell membrane dynamics and membrane fusion studies. Liss Rhod can also be used in liposome visualization to visualize the shape and size of a liposome as well as its interactions with other molecules. Avanti sells a variety of lipids tagged with the Liss Rhod fluorophore such as phosphatideylethanolamines (PEs), fatty acids, and triglycerides.



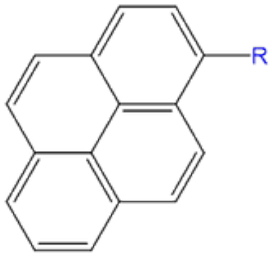
DPH

1,6-diphenyl-1,3,5-hexatriene (DPH) has become a popular moiety for investigating the dynamic and structural properties of lipid bilayers and cellular membranes. The technique used for these studies is steady-state or time-resolved fluorescence anisotropy. DPH-labels also help explore properties such as lipid tail order, hydration at the membrane-water interface, membrane electrostatic properties, and dynamics of membrane components. One of the key properties of DPH that helps with these studies is its weak fluorescence in water but strong fluorescence in hydrophobic environments.



Pyrene

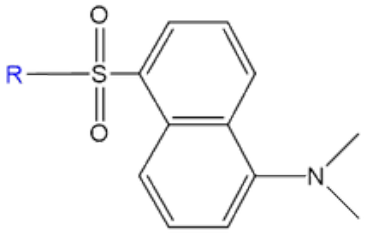
Pyrenedecanoyl (Pyrene) is one of the most common fluorescent labels and is commonly incorporated as a head group in phospho- and glycerophospholipids. Pyrene labeled lipids are particularly useful for monitoring membrane fusion and phospholipid transfer processes due to their excimer-forming properties. The formation of the excited state pyrene-dimers, also called excimers, is concentration-dependent, and exhibits a red-shifted emission peak at ~470nm. Not only are pyrene probes useful for studying membrane fusion, but they are also excellent tools for studying protein folding and changes in structural confirmations of biomolecules.



Fluorescent Probes: Dansyl, Laurdan, and Fluorescein

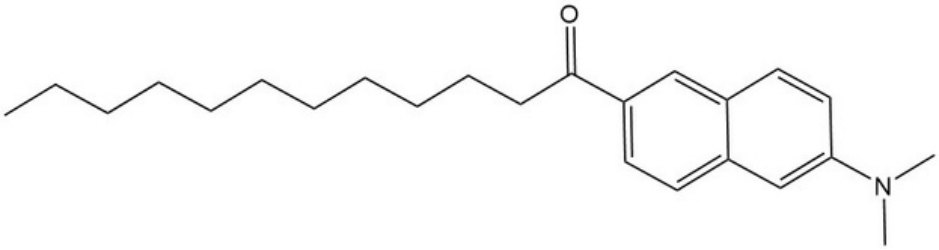
Dansyl

Dansyl based probes are commonly used to modify proteins and amino acids to have fluorescent properties. By modifying these proteins, it makes them much easier to detect for researchers due to dansyl having a high quantum yield and large Stokes shifts. Dansyl probes also see use in heavy metal detection due to the electron transfer effect between the metal and the excited probe.



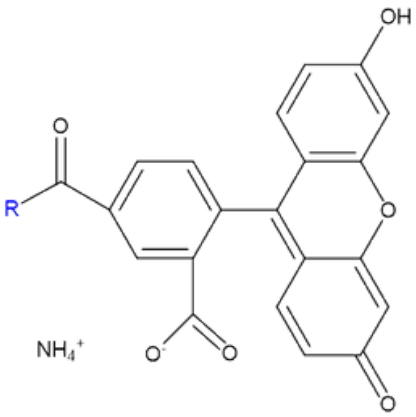
Laurdan

Laurdan is a fluorescent probe that is highly sensitive to the polarity of its environment. This sensitivity results in the probe's emission spectra varying from environment to environment. Due to this key characteristic, it makes Laurdan an excellent tool for studying cell membrane and lipid bilayer dynamics.



Fluorescein

Fluorescein is a probe that commonly sees uses in ophthalmic procedures as a contrast agent. However, it has many uses outside of the ophthalmic world as well. Fluorescein can be used to differentiate healthy tissue from diseased tissue making it an excellent tool for bioimaging. Many Fluorescein derivates have also proven to be useful to biological researchers. Fluorescein isothiocyanate (FITC) is commonly used for the labelling of protein and antibodies.



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Fluorescent Probes: Functionalized Probes

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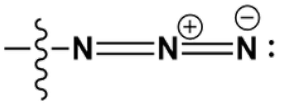
Functionalized fluorescent probes

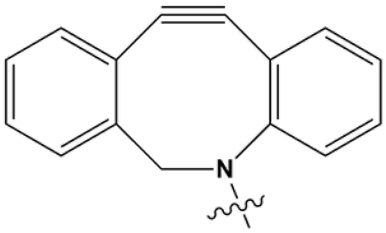
Azide functionalized fluorescent probes

Azide functionalized fluorescent probes allow copper-catalyzed click chemistry reactions with other molecules containing “acceptor” functional groups such as an alkyne.



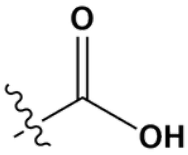
DBCO functionalized fluorescent probes

DBCO functionalized fluorescent probes allow for copper-free click chemistry with other molecules containing a “donor” functional group such as an azide.



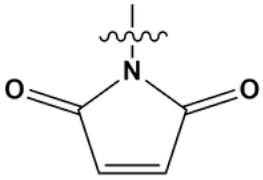
Free acid functionalized fluorescent probes

Free acid functionalized fluorescent probes have a carboxylic acid moiety capable of reacting with primary amines to form stable amide bonds.



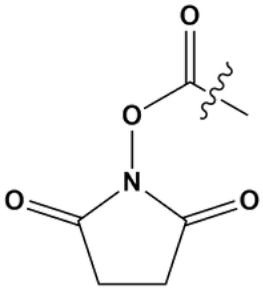
Maleimide functionalized fluorescent probes

Maleimide offers a selective and efficient method to attach the fluorescent probe to molecules containing a thiol functional group. Maleimide is particularly useful for conjugating the probe to proteins or peptides with cysteine residues.



NHS functionalized fluorescent probes

These fluorophores feature an activated NHS ester moiety which is extremely reactive with nucleophiles such as amines. NHS esters are capable of reacting with amines in mild alkaline conditions without further activation. Applications of these probes include fluorescent tagging of peptides or proteins.



Fluorescent Probes Reference Guide

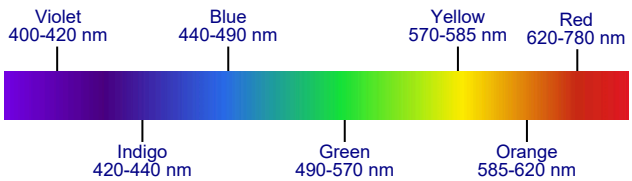
Avanti Research

Product Name	Product Number
Cyanine Probes	
Cyanine 3 Probes	
Cyanine 3, free acid	
Cyanine 3, Azide	810327
Cyanine 3, DBCO	880187
Cyanine 3, Maleimide	810329
Cyanine 3, NHS ester	810326
Sulfo-Cyanine 3, free acid	
Cyanine 3.5 Probes	
Cyanine 3.5, free acid	
Cyanine 3.5, Azide	810356
Cyanine 3.5, DBCO	880189
Cyanine 3.5, Maleimide	810359
Cyanine 3.5, NHS ester	810349
Cyanine 5 Probes	
Cyanine 5, free acid	
Cyanine 5, Azide	810323
Cyanine 5, DBCO	880185
Cyanine 5, Maleimide	810322
Cyanine 5, NHS ester	810320
Sulfo-Cyanine 5, free acid	810355
Cyanine 5.5 Probes	
Cyanine 5.5, free acid	
Cyanine 5.5, Azide	810357
Cyanine 5.5, DBCO	880186
Cyanine 5.5, Maleimide	810358
Cyanine 5.5, NHS ester	810352
Cyanine 7 Probes	
Cyanine 7, free acid	880183
Cyanine 7, DBCO	880190
Cyanine 7, NHS ester	
Meso-Cl Cyanine 7, free acid	
Cyanine 7.5 Probes	
Cyanine 7.5, free acid	
Cyanine 7.5, DBCO	880266
Cyanine 7.5, NHS ester	
Cyanine 7.5, azide	880201

Product	Product Number
Organelle Targeting Probes	
C-Laurdan	
ER-Laurdan	880197
Golgi-Laurdan	880196
Lyso-Laurdan	880193
Mito-Laurdan	810341
SquareFluor™ Probes	
SquareFluor™ (631/646), free acid	867211
Bromo-SquareFluor™ (620/650), free acid	
Cyano-SquareFluor™ (690/715), free acid	
Sulfo-SquareFluor™ (630/650), free acid	
Di-Sulfo SquareFluor™ (640/660), free acid	880195

We are actively expanding our line of fluorescent probes and lipids. If you don't see a product number associated with a probe, that means the product is coming soon.

Visit www.avantiresearch.com to find our most up to date product listings. We add new products on a monthly basis so check back every month as we expand our line of fluorescent probes and lipids!



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Fluorescent Lipids Reference Guide

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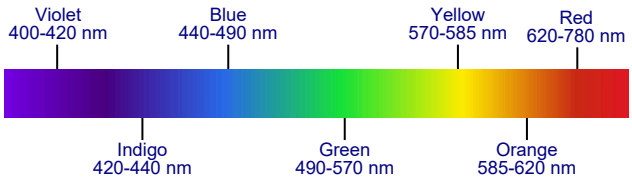
Product	λex max	λem max
Phospholipids - Headgroup Labeled		
18:1 NBD PS	469	539
18:1 Dansyl PS	335	518
18:1 Dansyl PE	336	513
18:1 Pyrene PE	351	379
18:1 PE CF	490	515
Egg Liss Rhod PE	560	583
18:1 Liss Rhod PE	560	583
14:0 Liss Rhod PE	560	583
16:0 Liss Rhod PE	560	583
18:0 Liss Rhod PE	560	579
Egg NBD PE	460	535
18:1 NBD Lyso PE	463	535
18:0 NBD PE (NBD-DSPE)	460	535
4ME 16:0 NBD PE (NBD-DPhPE)	460	535
14:0 NBD PE	460	535
16:0 NBD PE	460	535
18:1 NBD PE	460	535
18:1 Cyanine 5 PE	646	663
18:0 Cyanine 5 PE	646	663
DSPE PEG(2000)-N-Cyanine 5	646	663
DOPE PEG(2000)-N-Cyanine 5	646	663
18:1 Cyanine 5.5 PE	684	710
18:0 Cyanine 5.5 PE	684	710
DSPE PEG(2000)-N-Cyanine 5.5	684	710
18:1 Cyanine 7 PE	756	779
18:0 Cyanine 7 PE	756	779
DSPE PEG(2000)-N-Cyanine 7	756	779
18:0 PE-TopFluor™ AF488	496	519
18:1 PE-TopFluor™ AF488	495	519
18:1 PE-TopFluor™ AF594	583	615
18:1 Cyanine 5 PC	646	663
18:1 Cyanine 5 Cardiolipin	646	663
Phospholipids - Fatty Acid Labeled		
14:0-06:0 NBD PE	460	533
14:0-12:0 NBD PE	460	533
16:0-06:0 NBD PE	460	533
16:0-12:0 NBD PE	460	533
18:1-06:0 NBD PE	460	533
18:1-12:0 NBD PE	460	533

Product	λex max	λem max
Sphingolipids - Omega Fatty Acid Labeled		
C6-NBD Ceramide	467	535
C12-NBD Ceramide	468	535
C12-NBD Sphinganine	468	535
C12-NBD Phytosphingosine	468	535
C6-NBD Sphingomyelin	465	530
C12-NBD Sphingomyelin	468	535
C6-NBD Galactosyl Ceramide	468	535
C6-NBD Glucosyl Ceramide	468	535
C12-NBD Glucosyl Ceramide	468	535
C6-NBD Lactosyl Ceramide	468	535
C12-NBD Lactosyl Ceramide	468	535
12:0 pyrene GM1 (synthetic)	336	384
DPH Sphingomyelin	360	430
DPH Ceramide	360	430
Sphingolipids - Omega Sphingosine Labeled		
NBD Lyso SM	468	535
NBD Sphingosine	465	530
NBD Sphinganine	468	535
NBD Sphingosine-1-Phosphate	468	535
NBD 18:0 Ceramide	468	535
C16 Cyanine 5 SM	464	663
Glycerolipids		
16:0-LR/18:1/18:1 TG - lissamine rhodamine	495	503
C16/C11-TF/C12-DNP TG	495	503
18:1-C11 TopFluor™-C11 TopFluor™ TG	495	503
18:1-6:0 DNP-C11 TopFluor™ TG	495	503
C4 TopFluor™ MG	495	503
C11 TopFluor™ MG	495	506
18:1-C11 TopFluor™ DG	495	503
18:1-18:1-C11 TopFluor™ TG	495	506



Fluorescent Lipids Reference Guide

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Product	λex max	λem max
TopFluor™ Derivatives - Phospholipids		
TopFluor™ TMR PC	544	571
TopFluor™ PI(4,5)P2	495	503
TopFluor™ PI(4)P	495	503
TopFluor™ PI(3,5)P2	495	503
TopFluor™ PI	495	503
TopFluor™ TMR PI	544	571
TopFluor™ PI(3,4,5)P3	495	503
TopFluor™ TMR PA	544	571
TopFluor™ TMR PE	544	571
TopFluor™ TMR PS	544	571
TopFluor™ Lyso PA	495	503
TopFluor™ PC	495	503
TopFluor™ PE	495	503
TopFluor™ PS	495	503
TopFluor™ Lyso PC	495	503
TopFluor™ Lyso PE	495	503
TopFluor™ Cardiolipin	498	507
16:0-C4 TopFluor™ DNP Cap PE	495	503
TopFluor™ TMR Cardiolipin	495	503
TopFluor™ TMR PI(3)P	495	503
TopFluor™ TMR PI(4)P	495	503
18:1 TopFluor™ PE	495	503
18:0 PE-TopFluor™ AF488	496	519
TopFluor™ TMR PI(4,5)P2	495	503
18:1 PE-TopFluor™ AF488	495	519
18:1 PE-TopFluor™ AF594	583	615
TopFluor™ Derivatives - Sphingolipids		
C11 TopFluor™ GM3	495	507
C11 TopFluor™ Ceramide	495	503
C11 TopFluor™ Sphingomyelin	495	503
C11 TopFluor™ Galactosyl Ceramide	495	503
C11 TopFluor™ Glucosyl Ceramide	495	503
C11 TopFluor™ Ceramide-1-Phosphate	495	503
TopFluor™ Sphingosine	495	507
TopFluor™ Derivatives - Sterols		
TopFluor™ Cholesterol	495	507
16:0 TopFluor™ cholesterol	495	507
18:2 TopFluor™ cholesterol	495	507
25-(C4 TopFluor™) 25-OH cholesterol	495	503
TopFluor™ TMR cholesterol	545	571

Product	λex max	λem max
TopFluor™ Derivatives - Other		
TopFluor™ Oleic Acid	497	507
TopFluor™ DG	495	503
TopFluor™ - SOBRAC	496	511
TopFluor™ - oxPAPC	495	511
Sterols		
25-NBD Cholesterol	467	538
NBD-6 Cholesterol	467	538
NBD-12 Cholesterol	465	530
25-NBD cholest-4-en-3-one	481	539
22-NBD-Cholesterol	460	525
22-NBD 25-hydroxycholesterol	467	538
Fluorescent PEG Lipids		
18:0 PEG2000 PE CF	485	523
DSPE PEG(2000)-N-Cyanine 5	646	663
DSPE PEG(2000)-N-Cyanine 7	756	779
DOPE PEG(2000)-N-Cyanine 5	646	663
DSPE PEG(2000)-N-Cyanine 5.5	684	710
Other		
DPH-propionic acid	360	430
Palmitic Acid - Lissamine Rhodamine	560	585
NBD Palmitic Acid	465	530
NBD AA	467	535
12-NBD Stearate	460	533
18-NBD 18:1 Coenzyme A	468	535
Laurdan	366	497

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