42247 Atto 647N DOPE

Atto-Dye Labeled Phospholipids

Sigma-Aldrich offers a variety of glycero-phospholipids carrying one or two fatty acid groups (lipophilic groups) and a phosphate ester residue (hydrophilic group). They are labeled at the hydrophilic head group. After incorporation of the phospholipid into a membrane the fluorophore is located at the water/lipid interface of the membrane. We currently provide **1,2-dipalmitoyl-*sn*-glycero-3-phosphoethanolamine** (DPPE), **1,2-dioleoyl-*sn*-glycero-3-phosphoethanolamine** (DOPE), **palmitoyl-*sn*-glycero-phosphoethanolamine** (PPE), and **1,2-dimyristoyl-*sn*-glycero-3-phospho-ethanolamine** (DMPE) labeled with Atto-dyes.

Optical properties of Atto-dye labeled phospholipids in ethanol

Label	**λ_{abs}, nm**	**e_{max}, M^{-1} cm^{-1}**	**τ_{fl} , nm**
Atto 488	500	90000	520
Atto 532	532	115000	552
Atto 550	554	120000	576
Atto 594	603	120000	626
Atto 633	630	130000	651
Atto 647N	646	150000	664

λ_{abs} longest-wavelength absorption maximum; e_{max} molar decadic extinction coefficient at the longest-wavelength absorption maximum; τ_{fl} fluorescence maximum

Application

Membrane incorporation of fluorescent lipid analogues can be performed as described in literature[1, 2,3.] Generally a complex of the fluorescent labeled phospholipid and Bovine Serum Albumin (BSA) is prepared, dried, preferably redissolved in ethanol and simply injected to the cell containing aqueous medium. The amount of the labeled species in a plasma membrane varies with the concentration of the BSA-lipid-complex and other conditions (incubation time and temperature).
For recent applications using Atto-dye labeled phospholipids we refer to literature [3,4,5,6].

References

1. Martin O.C. & Pagano R.C., Internalization and sorting of a fluorescent analogue of glucosylceramide to the Golgi apparatus of human skin fibroblasts: Utilization of endocytic and nonendocytic transport mechanisms, J Cell Biol 125 (1994) 769–781.
2. Schwarzmann G., Hofmann P., Pütz U. & Albrecht B., Demonstration of direct glycosylation of nondegradable glucosylceramide analogs in cultured cells, J Biol Chem 270 (1995) 21271–21276.
3. Eggeling C., et al., Direct observation of the nanoscale dynamics of membrane lipids in a living cell, Nature 457 (2009) 1159–1163.
4. Sahl, S.J.; Leutenegger, M. et al., Fast molecular tracking maps nanoscale dynamics of plasma membrane lipids, PNAS 107 (2010), 6829-6834.
5. Kulakowska, A.; Jurkiewicz P. et al., Fluorescence Lifetime Tuning - A Novel Approach to Study Flip-Flop Kinetics in Supported Phospholipid Bilayers, J. Fluoresc. 20 (2010), 563-569.
6. Honigmann, A.; Walter C. et al., Characterization of Horizontal Lipid Bilayers as a Model System to Study Lipid Phase Separation, Biophys. J 98 (2010), 2886-2894.

Storage and Handling

Fluorescent phospholipid derivatives are supplied in solid form and should be stored at ≤–20°C, desiccated and protected from light. When stored as indicated, Atto-dye labeled phospholipids are stable for at least three years.
For the preparation of stock solutions we recommend using dichloromethane as solvent of choice. The labeled phospholipids are distinctly less soluble in more polar solvents such as ethanol or methanol. For very hydrophilic labels such as Atto 488 and Atto 532, solvent mixtures of dichloromethane/methanol (8:2) should be used. The stock solution of labeled phospholipids has to be stored in the same way as the solid. However, the shelf life of such solutions might be significantly shorter than 3 year.

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.