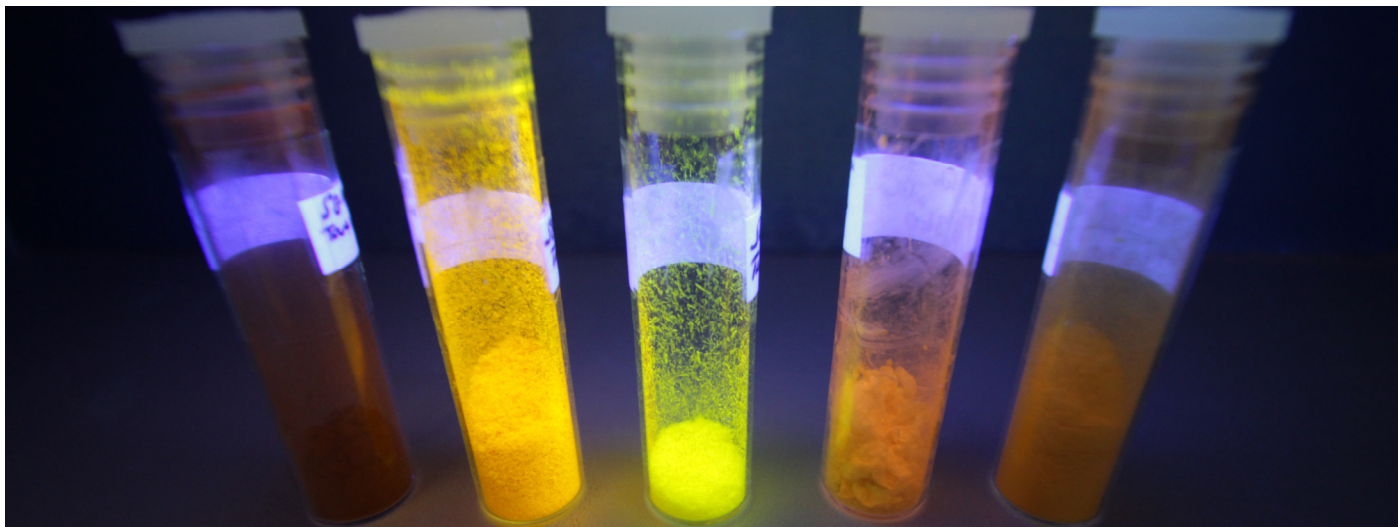


LipidPro – FLUORESCENT DYE FOR DETECTION OF LIPID AGGREGATES IN LIVING CELLS AND OTHER SAMPLES



TECHNOLOGY SUMMARY

Family of dyes to be used in fluorescence microscopy imaging of cells in culture or entire organisms, including live cell imaging. The fluorophores are not toxic, and preferentially bind to lipid aggregates, such as intracellular lipid droplets. They also light up cells by binding weakly to several subcellular structures. Importantly, the fluorophores change color with the polarity of the environment and may be used to initially characterize alterations in organelle polarity. The most promising fluorophore, LipidPro, has been tested in fibroblast-based High Throughput Screens for the diagnosis of Farber's disease.

BENEFITS

VERY LOW PRODUCTION COSTS

EASY TO SYNTHESIZE AND SCALE UP

VERY SIMPLE APPLICATION PROTOCOL

VERY LOW TOXICITY IN EUKARYOTIC CELLS: allows live cell imaging over extended periods.

LARGE STOKES SHIFT: good signal to noise ratio.

PREFERENTIAL STAINING / HIGH AFFINITY FOR LIPID AGGREGATES

SOLVATOCHROMISM: changes emission color with the polarity of the environment – blue shift with increasing hydrophobicity.

CONTEXT

The ability to mark cells and to identify and characterize subcellular structures such as lipid aggregates is instrumental in basic and applied research, in medical diagnostics and drug screening for e.g. disorders involving lipid accumulation such as Gaucher, Farber, and Tay-Sachs diseases. A great majority of these studies rely on fluorescing-based detection methods.

A family of fluorophores was prepared through an efficient and low cost synthesis method. They are non-toxic and rapidly enter in live cells in culture and small organisms. The staining protocol is fast, easy and straightforward. With a large Stokes shift and an emission spectrum ranging from blue to red depending on the polarity of the environment (solvatochromism), they selectively stain lipid aggregates and can be used for its detection and quantification in High Throughput Screens.

APPLICATIONS

The present dyes can be used for:

CELLULAR IMAGING (of living or fixated cells)

ORGANISMS IMAGING (e.g. zebrafish embryos)

DIAGNOSTIC OF LIPID-RELATED DISORDERS

DRUG SCREENING FOR LIPID-RELATED DISORDERS (via High Throughput Screens)

MONITOR LIPID CONTENT IN MICROALGAE for biodiesel production

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IP RIGHTS

European patent application (EP17742298.7).

DEVELOPMENT STAGE

TRL 4: Small-scale prototype built in a laboratory environment.

Proof-of-concept: some probes are fully tested on cultured mammalian cells. One probe, LipidPro, is tested on zebrafish larvae and in High Throughput Screening assay for Farber's disease diagnosis using fibroblasts of Farber patients.

KEYWORDS

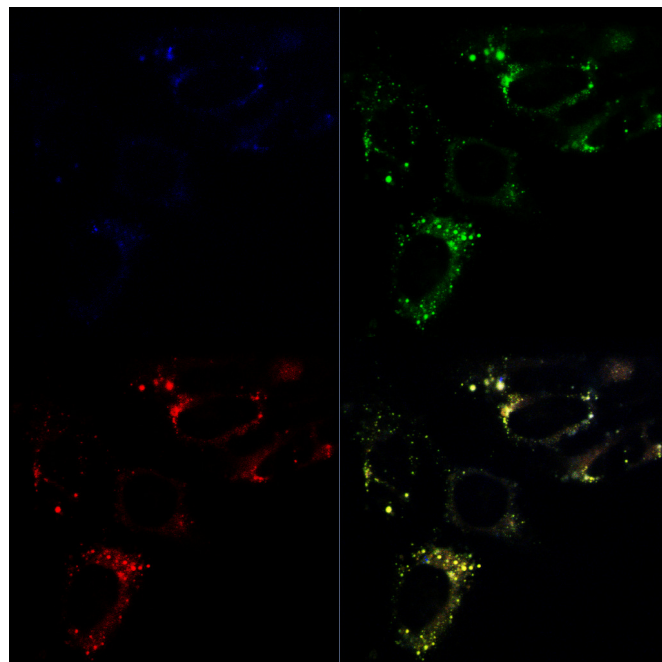
FLUOROPHORES

LIPID AGGREGATES

LIPID-RELATED DISORDERS

FARBER'S DISEASE

FIBROBLAST-USING DIAGNOSTICS



DEVELOPED BY

Researchers from QOPNA – Organic Chemistry, Natural and Agro-food Products, CICECO – Aveiro Institute of Materials and iBiMED – Institute for Biomedicine, from the University of Aveiro.

BUSINESS OPPORTUNITY

Licensing agreement.

Joint development.

PARTNERSHIP

The University of Aveiro seeks partners within industrial manufacturers of biotechnology products, pharmaceutical companies, biodiesel producers or public organisms with interest in co-develop and/or commercialize molecular probes and cellular markers. The University also seeks partners with experience in diagnostics of lipid-related disorders, particularly metabolic diseases and syndromes.

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