



Fluorescence-based assay for probing lipid transfer activity

A sensitive, reproducible and quantitative assay to study lipid transfer using bicelles as model membranes.

IP Status: Issued US Patent; **Issued Patent No.** 11,740,235

Applications

- Lipid transfer assay kits for biological, medical, and bioengineering research
- Fluorescent-based assay kit
- Biophysical and membrane biochemistry research tool kit
- Drug discovery

Fluorescence based assay to identify and study lipid transfer proteins

Lipid composition of cell membranes plays an important role in determining the permeability, interaction with biomolecules, and stability of the membrane. Lipid composition is therefore tightly regulated by a number of factors, including lipid transfer proteins and interaction with lipid particles. Quantitative understanding of lipid transfer from one biomembrane to another has significant implications in discerning complex biophysical behavior of proteins and other biomolecules. Changes in the expression of certain lipid transfer proteins can also trigger biomedical-related events such as inflammation and programmed cell death processes (e.g. autophagy and necroptosis). Researchers at the University of Minnesota have created a new assay to quantify lipid transfer activity using a fluorescence resonance energy transfer (FRET)-based approach with bicelles. This technology can be used to: determine if a protein of interest facilitates lipid transfer between membranes, accurately determine the rate of lipid transfer, and identify and evaluate drug candidates that can modulate lipid transfer activity.

This bicelle-based assay offers several advantages over liposome-based approach by providing higher stability and enabling high-throughput screening. Bicelles exhibit enhanced 'shelf-life' such as stability during refrigeration and avoidance of freeze-thaw changes that plague lipid vesicles. In addition, the small size of bicelles results in minimal light scattering artifacts increasing the reliability and reproducibility of FRET measurements. Lastly, this assay can be used to study lipid transfer between donor bicelles and a variety of acceptor model membranes (such as bicelles, liposomes, and micelles).

Potential Market Opportunity

The stability of this technology enables it to be the basis for a commercial benchtop kit that will allow researchers to investigate lipid transfer activity without needing to acquire expertise in lipid techniques.

Phase of Development

Proof of concept to study transfer activity of GLTP and CPTP with highly reproducible data. (GLTP - glycolipid transfer protein; CPTP - ceramide-1-phosphate transfer protein)

Technology ID

2019-171

Category

Engineering & Physical Sciences/Photonics
Life Sciences/Human Health
Life Sciences/Research Tools
Agriculture & Veterinary/Ag Biotechnology

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Features & Benefits

- FRET-based assay offers high sensitivity and accuracy
- FRET measurements offers safety advantages over traditional radioactive approaches by avoiding radioactive lipids needed to track the intermembrane transfer of lipids
- Assay can be used for identifying lipid transfer specificity
- Assay applicable for studying any protein/biomolecule of interest
- Applicable in high-throughput screening (e.g. plate reader)

Researchers

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Publications

[Measuring Lipid Transfer Protein Activity Using Bicelle-Dilution Model Membranes.](#)

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Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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