

Chiral Harmonophores for Alignment Detection Microscopy

Chiral harmonophores enable background-free SHG that reports lamellar lipid alignment in LNPs, unlocking real-time nanoscale structure imaging.

Researchers at Purdue University have developed a novel optical imaging method that enables enhanced visualization of lamellar lipidic phases by using new harmonophores in second harmonic generation (SHG). This technology allows for high-resolution, real-time imaging of internal lamellar organization within therapeutic lipid nanoparticles (LNPs), which play a crucial role in drug delivery. Unlike traditional imaging methods that fall short due to background interference or limited structural specificity, this technology offers a new framework for probing lipid structure and dynamics in living systems.

Technology Validation:

relimin It ti Preliminary results supporting CHAD detection of lamellar lipid assemblies. The theory underpinning CHAD predicts only crosspolarized CHAD SHG irrespective of sample orientation.

Advantages:

- Background-Free Optical Contrast
- Enables Real-Time Imaging
- High Spatial Resolution

Applications:

- Imaging Therapeutic Lipid Nanoparticles (LNPs)
- Nanomedicine Development

TRL: 4

Intellectual Property:

Technology ID

2026-SIMP-71296

Category

Digital Health &
Medtech/Wearable Health Tech
& Biosensors
Pharmaceuticals/Drug Discovery
& Development
Materials Science &
Nanotechnology/Nanomaterials
& Nanostructures

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