Nontoxic Raman Tags for Study of Cell Functions

Raman tags with biologically inert alkyne technology provide an enhanced imaging method for visualizing small molecules, such as cholesterol, enabling applications in neurodegenerative disease study, cancer diagnostics, and therapeutic management.

At present, a problem with assays used to check the distribution of cholesterol in cells are limited by separation techniques and use of cholesterol oxidase, radiolabeled cholesterol, and fixation by filipin in cells, which allows for imaging cholesterol in a living system.

Researchers at Purdue University have utilized Raman tags (with tagged cholesterol) that provide a new innovative method to image these small molecules and help visualize cholesterol metabolism, neuronal activity, and drug delivery. These tags can visualize molecules, such as EdU and cytochrome c, via a Raman microscope. The alkyne tags also allow direct visualization of DNA synthesis and cytochrome c release from mitochondria in living cells. This enhanced imaging technique is due to the large scattering cross sections of the alkyne tags that are biologically inert. With this new technology, there is potential for use in the study of NP-C, which is a fatal neurodegenerative disease that use lysosomal accumulation of cholesterol and can be used for atherosclerosis and various cancer diagnoses. Therefore, genomic screening of cholesterol related genes could lead to an improvement in therapy and management of these conditions.

Advantages:

-Images small cholesterol based molecules

-Biologically inert and better scattering section

-Can be applied to screen multiple conditions

Potential Applications:

-Therapy

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Category

Materials Science & Nanotechnology/Nanomaterial Characterization & Imaging Tools Pharmaceuticals/Computational Drug Delivery & Nanomedicine Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

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-Health condition management

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