Research Tools

Fluorescent Ligand Complexes with Strong Fluorescence in the Far-Red Region for Tissue and Cell Labeling

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Overview

Biomarker engineering and development has evolved to answer infinitely complex biological questions and the discovery of novel molecules could provide additional tools for biotechnology. Fluorescent reporter molecules, such as Green Fluorescent Protein (GFP), are available as biomedical research tools to monitor gene activity and protein distribution within cells. Currently known reporter molecules have limitations that restrict their use, including short wavelength of absorption and fluorescence emission, which prevents use in thick samples and delayed development of fluorescence after expression. Furthermore, discovery and development of fluorescent markers that emit in the infrared region of the electromagnetic spectrum, away from inherent autofluorescence and background scattering of cellular components has been a significant hurdle.

The Invention

UW – Washington County researchers have developed a fluorescent biomarker with strong fluorescence in the far-red region. These biomarkers can be used to localize and monitor proteins of interest or detect gene expression in cells, tissues, and whole organisms. The fluorescent molecules were discovered in a wild walleye fish species and their properties enhanced by targeted mutation of particular amino acid residues. The fluorescent molecules have several advantages over currently used reporters such as GFP, including small size, large stoke shift, far-red fluorescence, and long quenching time.

Applications

- Tracking macromolecule movements in living cells due to near infra-red emission
- Reporter stable cell lines
- Reporter for therapeutic viral incorporation and replication experiments
- Replace quantum dots for monitoring vasculature during in vivo imaging studies
- Detection of protein:protein interactions in Fluorescence
- Resonance Energy Transfer (FRET) experiments

Key Benefits

- Tetramer with subunit molecular mass of >22 kDa
- Mutations have yielded monomeric protein with similar fluorescent properties
- Ultra long quenching time
- Greater spectral range in confocal microscopy studies
- Does not contain transition metals
- Exhibit a large stoke shift with absorption and emission at 380 nm and 660 nm respectively
- Non-covalent ligand binding

Tech Fields

- Research Tools : Protein interactions & function

For current licensing status, please contact Jennifer Souter at jennifer@wisys.org or (608) 316-4131