FRET-CAL SCREENING PLATFORM FOR MEMBRANE SIGNALING PROTEIN MODULATORS

Tech ID: 34058 / UC Case 2025-142-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

Current methods for studying and screening compounds that modulate the activity of receptor proteins, particularly those that form complexes, often lack the sensitivity and real-time kinetic information needed for high-throughput drug discovery. This innovation, developed by UC Berkeley researchers, addresses this need by providing novel receptor proteins engineered for enhanced functional analysis and screening. The core of the invention is a receptor protein complex comprising a first and a second subunit, both incorporating a Förster Resonance Energy Transfer (FRET) pair consisting of a donor and an acceptor fluorophore. This molecular design allows for the direct, real-time measurement of conformational changes or complex formation upon ligand binding or compound interaction, offering a significant advantage over traditional methods that rely on less direct or end-point assays. The unique subunit structures—which can include various combinations of domains such as a ligand binding domain, a cysteine rich domain, a transmembrane domain, and an intracellular domain—enable the construction of versatile biosensors for a wide range of receptor types, facilitating the identification of positive or negative modulators with greater speed and precision.

SUGGESTED USES

- High-throughput screening (HTS) assays to rapidly identify candidate compounds that act as modulators (agonists, antagonists, allosteric modulators) of the receptor protein.
- Real-time kinetic analysis of ligand-receptor interactions, including binding, dissociation, and conformational changes.
- Investigating the stoichiometry and dynamics of receptor complex formation and dissociation.
- Developing novel biosensors for detecting specific ligands or environmental stimuli.
- Studying the mechanism of action of drugs and endogenous signaling molecules on receptor activity.

ADVANTAGES

- Enhanced Sensitivity: The use of a FRET pair provides a highly sensitive, proximity-dependent readout of molecular events (e.g., conformational change, association/dissociation) within the receptor complex.
- Real-Time Monitoring: Allows for kinetic measurements, providing richer data on compound action compared to end-point assays.
- Versatility: The modular design of the receptor subunits, encompassing various domain combinations, makes the technology applicable to a broad spectrum of receptor types (e.g., G protein-coupled receptors, receptor

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OTHER INFORMATION

CATEGORIZED AS

» **Biotechnology**

» Proteomics

» **Medical**

» Screening

RELATED CASES

2025-142-0

tyrosine kinases).

● High-Throughput Compatibility: The FRET-based readout is well-suited for automation and use in high-throughput screening formats, accelerating drug discovery efforts.

● Direct Readout of Function: Measures molecular events directly related to receptor activity and complex formation, offering a more direct functional assay.

RELATED MATERIALS

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