

In Situ Lipid Synthesis for Protein Reconstitution (INSYRT)

Tech ID: 27496 / UC Case 2017-150-0

BACKGROUND

While current methods for membrane protein functional reconstitution in biomimetic membranes approaches are powerful and have uncovered fundamental properties of protein function, they are methodologically cumbersome, requiring chromatography steps to remove detergents. Moreover, structural features normally found in cell membranes such as curvature and polarity are mostly absent. In this regard, an efficient reconstitution methodology that better mimics the native chemical environment of a whole-cell embedded protein would be highly useful.

TECHNOLOGY DESCRIPTION

Researchers from UC San Diego have developed a novel approach that uses native chemical ligation to reconstitute the A2A adenosine receptor as a model GPCR into proteoliposomes, without the need for detergent removal. More specifically, the inventors have shown that A2AR, a subclass of GPCRs, can be spontaneously reconstituted in synthetic liposomes resulting from NCL driven membrane formation.

APPLICATIONS

This technology can be leveraged for high-throughput drug screening against GPCR targets. Other biotechnological applications of INSYRT may include designing new functional biomimetic materials and the application to developing synthetic cells.

ADVANTAGES

Key features of this method include orthogonality, rapid reaction rates, and biocompatibility, making it a powerful option for reconstituting challenging membrane proteins.

STATE OF DEVELOPMENT

The incorporation of A2AR into synthetic lipids demonstrates the utility of this technology to GPCR research. The receptor activity was validated by radioligand saturation and competition binding, as well as by confocal microscopy imaging of the resulting proteoliposomes (Brea et al in press).

INTELLECTUAL PROPERTY INFO

A provisional patent has been submitted

RELATED MATERIALS

- [Brea, R; Cole, C; Lyda, B; Ye, L; Prosser, R; Sunahara, R; and N. Devaraj. In Situ Reconstitution of the Adenosine A2A Receptor in Spontaneously Formed Synthetic Liposomes. J Am Chem Soc. 2017 Mar 15;139\(10\):3607-3610. - 03/15/2017](#)

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	2020-0022915-A1	01/23/2020	2017-150
Patent Cooperation Treaty	Published Application	2018160876	09/07/2018	2017-150

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OTHER INFORMATION

KEYWORDS

de novo lipid synthesis, G protein-coupled receptor (GPCR), liposome, reconstitution, synthetic cell

CATEGORIZED AS

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