

New Amphiphiles for Manipulating Integral Membrane Proteins

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Technology description

Integral membrane proteins are crucial cellular components, helping to transfer material and signals through the cytoplasm or between different cell compartments. Analyzing the structures and functions of these proteins is important for research and medicine. More than half of current pharmaceutical agents target integral membrane proteins.

Integral membrane proteins have large hydrophobic surfaces that are not compatible with watery environments. Amphiphilic detergents (containing both hydrophobic and hydrophilic regions) therefore are required to extract membrane proteins from the lipid bilayer and to hold the proteins in their natural shape. Detergents like dodecyl- β -maltoside (DDM) commonly are used but many membrane proteins denature and/or aggregate in response to such agents. Moreover, a vast number of amphiphiles are required to meet the needs for various proteins and applications. Only empirical testing allows researchers to identify useful amphiphiles for a particular need.

Desired are alternative amphiphilic ‘aids’ that can work to extract, stabilize and manipulate the huge diversity of membrane proteins in cells. UW–Madison researchers have developed new amphiphiles that better aid in the solubilization, isolation, purification, stabilization, crystallization and structural determination of integral membrane proteins.

The new molecules use a multifused ring system as a lipophilic group. They are synthesized from commercially available steroidal precursors (cholesterol, in most cases) and fall into two types – GLC and GCT amphiphiles.

Membrane preparations containing some protein of interest can be treated with the novel amphiphiles to achieve protein extraction and solubilization. The amphiphiles are able to stabilize membrane proteins for several weeks.

The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a new class of amphiphiles that outperforms standard detergents in the manipulation of membrane proteins.

Additional Information

WARF reference number P09037US02 describes carbohydrate-based amphiphiles useful for the manipulation of membrane proteins.

<http://www.warf.org/technologies/summary/P09037US02.cmsx>

WARF reference number P07482US describes glycotripod amphiphiles that provide new tools for solubilizing, isolating and characterizing membrane proteins.

<http://www.warf.org/technologies/summary/P07482US.cmsx>

Application area

Agents for solubilization, isolation and other manipulation of membrane proteins and integral membrane proteins

Reagents for researchers conducting crystallography

Alternative biochemical detergents

Advantages

Outperform conventional detergents

Proteins remain stable for much longer.

No sacrifice in extraction efficiency

Work at lower concentrations

Effective with diverse group of membrane proteins

Institution

[Wisconsin Alumni Research Foundation](#)

Inventors

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