VCU Innovation Gateway
Office of the Vice President for
Research and Innovation

Native Cell Membrane Polymer Nanoparticles

Novel Molecules for Protein Isolation and Drug Discovery

Evaluation and characterization of membrane proteins are essential for drug discovery and engineering. Current methods to extract these membrane proteins involve using lipids or nanoparticle-based molecules in conjunction with a detergent to encapsulate the membrane protein. Unfortunately, the use of detergents can alter the protein of interest when they disassociate the lipid membrane structure, preventing effective characterization. Researchers at Virginia Commonwealth University (VCU) have developed a novel polymer-based series of molecules.

The technology

The unique family of molecules developed here at VCU are native cell membrane nanoparticle (NCMN) polymers. These NCMN can extract membrane proteins without the use of detergents. This allows for the extraction of protein from the membrane while keeping its local lipid environment intact, therefore, securing the native properties and activity of the membrane protein for functional study and structure characterization. These polymers exhibit very good water solubility and strictly defined distribution of molecular weight. In addition, they have demonstrated has a very good tolerance for divalent ions, and a wider pH tolerance (pH 4-11), remaining soluble in presence of 25mM Ca^{2+}. It differs from the present technologies in membrane protein research. Traditionally, detergents have to be used to extract membrane protein from the cell membrane. The NCMN have been successfully applied for functional study and high-resolution structure determination of membrane proteins using single-particle Cryo-EM.

Benefits

» Does not require detergents

» High water solubility

» Maintains protein environment

» Tolerant over a wide range of pH conditions (4-11)

» Tolerance for divalent electrons

Applications

» Structural Biology

» Drug Discovery

» Protein Discovery and Characterization

Patent status:
Patent pending: U.S. and foreign rights are available.

License status:
This technology is available for licensing to industry for further development and commercialization.

Category:
Biomedical

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