Crystallization of membrane proteins in lipidic bilayers

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Abstract

The \textit{in meso} technique of membrane protein crystallization has been successfully used to crystallize several membrane proteins. However, perceived and actual difficulties with this method have led to it not being extensively adopted. Our work has been aimed at streamlining the crystallization of membrane proteins using the \textit{in meso} method. To this end, robotic systems have been developed to set up screens and visualize the drops that are used for crystallization, making the process less time-consuming, and less material-intensive (1, 2).

New monoacylglycerol systems have also been developed to be used as bilayered hosts in which to grow crystals of membrane proteins (3, 4). To date, the lipids used have had chains 16 and 18 carbon atoms long. We hypothesized that a shorter chained lipid producing a thinner bilayer would facilitate the so-called \textit{in meso} crystallization process. A 14 carbon monoacylglycerol was chosen as the lipid with which to test the proposal. The target lipid was synthesized and its phase behavior was mapped. Crystals of bacteriorhodopsin and the outer membrane vitamin B\textsubscript{12} transporter were successfully produced in this system. The latter is the first β-barrel protein to be crystallized by the \textit{in meso} method.

References