DETERGENT FREE PURIFICATION OF MEMBRANE PROTEINS USING STYRENE-MALEIC ACID CO-POLYMER NANOENCAPSULATION

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ABSTRACT

One of the unsolved challenges of protein biochemistry has been finding a reliable method for the production of membrane proteins. This is particularly frustrating for biochemists as the vast majority of pharmaceutical targets are membrane proteins. Extraction of membrane proteins has always been complex as reagents have to somehow replicate the complex physico-chemical environment of the lipid membrane that is required to support membrane protein function. In the past detergents have been employed for membrane protein extraction. But while these are good for disrupting the membrane to release the chosen protein, they are not good mimics of the membrane environment. In 2008 we developed a method that is able to extract the membrane protein complete with a small piece of its local lipid environment. The process involves excising a 10 nm diameter piece of membrane using a styrene maleic acid co-polymer. We have shown that is a generically applicable method that can be used to produce a range of active membrane proteins including GPCRs, ABC-transporters and ion channels. We have also show that the particles are a good basis for structural studies.