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Summary

Membrane proteins (MPs) are usually maintained soluble in aqueous solution thanks to the use of detergents. The dissociating character of detergents, associated to the need to work at high concentrations, leads often to a rather rapid inactivation of the proteins. To avoid such a problem macromolecular structures called “amphipols” (APols) have been proposed. Up to today the most studied APols are anionic, characteristic that prevent their use in different analytic systems (isoelectrofocusing) or separation techniques (ions exchange chromatography), and which is not a favourable factor for their crystallization. This has prompted the design and development of completely non-ionic amphipols (NAPols), which carry glucose moieties. The ability of NAPols to maintain membrane proteins soluble in aqueous solution in the absence of detergent has been investigated. The characterisation of the properties and uses of NAPols took the course followed earlier for the development of A8-35, which comprises two main branches. First, the composition and solution properties of MP/NAPol particles is currently begin established by DLS, SEC, AUC, small angle neutron scattering and surface-tension measurements. Second, we have explored the usefulness of these new APols in membrane biochemistry and biophysics, particularly for those applications, such as IEF, folding of MPs from a denatured state, cell-free synthesis and functionality of NAPol-trapped MPs, where they can advantageously substitute to the current anionic APols.