The lyso-phospholipids (e.g., LMPG—below) are unusual among commercially available detergents in that they have a polar, but uncharged spacer between the non-polar tail and a charged headgroup.

Lyso-phospholipids have been reported to be effective at solubilizing difficult membrane proteins such as GPCRs and the CFTR channel in a manner that retains native function.

Shown below are NMR spectra and crystals of the vasopressin V2 receptor obtained using LMPC as the detergent component.

For 3 out of 5 of the integral membrane proteins being studied by solution NMR in the Sanders lab, lysolipids yield the best spectrum. Shown below is the NMR spectrum of KCNE1, a protein that regulates voltage-gated potassium channels.

The structure of KCNE1 in LMPC micelles was determined using NMR. Shown below the experimental KCNE1 structure (TM domain only shown) which has been ROSETTA-docked into a homology model for the KCNQ1 channel.

Shown below are whole cell oocyte KCNQ1 potassium channel currents measured after injecting oocytes with micellar solutions of purified KCNE1. The lysolipids yielded native-like KCNE1 regulation of KCNQ1, while DPC and SDS did not.