**Drug Stability in Soft Matter Systems**

*Dr John Sanderson (Durham University) – with GSK*

Following our recent discovery that drugs can react with lipid membranes, both in vitro and in vivo (doi: 10.1039/c8sc04831b), this project will examine the molecular aspects that determine this reactivity and establish whether this reactivity is associated with toxicity in alveolar and liver cells. The work will involve analytical measurements of known actives in model liposomes and some measurements of drug toxicity in vivo.

The key aims will be to screen a number of compounds for adverse activity (phospholipidosis, steatosis, hemolysis) and for selected drugs, determine the effects of physicochemical properties (pKa, lipid phase, logP, logD etc) on the kinetics of chemical processes in the membrane (e.g. drug lipidation and lipid hydrolysis). Kinetics will be determined by solid-state NMR and fluorescence methods. The work will involve some chemical synthesis (heterocycles, labelled lipids), spectroscopy (NMR, fluorescence), liposome preparation and handling, and mass spectrometry (LC-MS).