Total lipid composition of intact *Torpedo nobiliana* electric Organ and *Torpedo californica* detergent solubilized nicotinic acetylcholine receptor using GC-MS and HPLC-MS-MS

The activity of membrane proteins in many cases is dependent on the lipid environment in which these are found in their respective tissues. This has the consequence that in trying to solubilize the proteins using detergents, the resulting detergent protein complex does not necessarily contain all critical lipids required for optimal activity. This is a main issue, in particular if the final objective is to process the sample in order to obtain its crystallographic structure. Previous studies in our laboratories using the electric organ of the *Torpedo californa* as a source for the nicotinic acetylcholine receptor (nAChR), in which a homologous series of lipid-like detergents were used, showed a correlation between the nAChR-detergent complex and the activity of the nAChR. In the proposed work, we intend to validate the specificity and capability of the same detergent family used before in terms of the lipid composition and activity of the solubilized nAChR from *Torpedo nobiliana* (*Tn*). First, the complete lipidomics of the intact electric organ will be determined after Bligh & dyer extraction and solid phase separation of the lipid component and analyzed using high-performance liquid chromatography mass spectrometry and gas chromatography mass spectrometry. Second, the lipid composition of each nAChR detergent complex will be determined using the same strategy. The activity of the nAChR will be obtained after the microinjection of the nAChR detergent complex and the crude membranes into oocytes from *Xenopus laevis* using the two-electrode voltage clamp technique.