Water-soluble cationic porphyrins have been studied in relation to antisense therapy and they have been successfully used to enhance the delivery of oligonucleotides to cells. The main focus of this study was to characterize the mechanism of interaction of liposomes as model membranes, and porphyrins. We applied the drop coating deposition Raman spectroscopy (DCDR) to study complexes of liposomes and porphyrins. DCDR allowed us to measure complexes of low concentration as it uses the ‘coffee ring’ effect to concentrate the sample at the edge of a drop. We studied four different complexes combined of lipids: 1, 2-dipalmitoyl-sn-glycero-3-phosphocholine, 1, 2-dioleoyl-sn-glycero-3-phospho-(1′-rac-glycerol) and metalloporphyrins: copper 5, 10, 15, 20-tetrakis(1-methyl-4-pyridyl)porphyrin, copper 5, 10, 15, 20-tetrakis(4-sulfonatophenyl)porphyrin. We have found that the way these two components interact strongly depends on a specific lipid and porphyrin used. We observed partial incorporation of porphyrins into the liposome bilayer, their localisation to the surface of the liposome or the change of the conformation and ordering of lipid molecules. Moreover, we have found that the distribution of porphyrins in the dried drop is randomly non-homogenous.