Effect of cholesterol on the interaction between amphiphilic peptides and liposomes

Sara Anselmo1, Giuseppe Sancataldo1 and Hanne Mørck Nielsen2, Vito Foderà2 and Valeria Vetri1

1Dipartimento di Fisica e Chimica – Emilio Segré, Università degli Studi di Palermo, Palermo, Italy; 2Department of Pharmacy, University of Copenhagen, Universitetsparken 2, 2100 Copenhagen;
sara.anselmo@unipa.it.

With the rise of antibiotic resistance, antimicrobial peptides (AMPs) have been proposed as an alternative novel class of therapeutic agents. They are polycationic, with a net positive charge of more than +2, and they are characterized by amphipathic structures, with both a hydrophobic and a hydrophilic domain. These characteristics allow them to selectively bind to negatively charged lipids (largely present in bacteria, not in mammalian cells), via hydrophobic and electrostatic interactions. Moreover, mammalian cells are characterized by a high content of cholesterol [1].

For this reason, here we present an experimental study on the effect of the presence of cholesterol on the capability of amphiphilic peptide Trasportant 10 (TP10) to interact with model membranes with selected composition. The study was performed by means of fluorescence spectroscopy and fluorescence confocal microscopy measurements also exploiting the advantages of phasor plot analysis of Fluorescence Lifetime Imaging (FLIM) measurements.

Our results show that the presence of cholesterol inhibits TP-10 interaction with lipid vesicles, the extent of the observed effect being dependent on the cholesterol concentration in the membrane.