MELITTIN-LIPOSORME INTERACTIONS: DIRECT VISUALIZATION OF PEPTIDE INDUCED STRUCTURAL PERTURBATION

PER WESSMAN* and KATARINA EDWARDS
Department of Physical Chemistry, Uppsala University, Box 579, 751 23 Uppsala, Sweden

Melittin is the main constituent of bee venom and has been widely studied on account of its cell-lytic ability. It can be used as a model peptide in the strive to understand how other, from a pharmaceutical point of view, more interesting peptides can be used as antibiotic agents.

The influence of the amphiphilic and lysogenic peptide melittin on 1-palmitoyl-2-oleyl-phosphatidylcholin (POPC) bilayers was investigated using both spectroscopic and microscopic techniques. At high melittin/lipid ratios, dramatic bilayer perturbations, manifested as liposome rupture, was observed by cryo-transmission electron microscopy (cryo-TEM). The interaction at lower peptide/lipid ratios was probed by means of leakage and turbidity measurements. Correlation of data collected in the different concentration regimes was obtained by use of spectroscopically determined partition coefficients. The results of the study provide a deeper understanding of the mechanistic aspects of melittin/membrane interactions. Importantly, the data presented show that, melittin induce severe lytic effects at concentrations well below those causing major structural rearrangements of the lipid membranes.

* E-mail: Per.Wessman@fki.uu.se