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THE EFFECT OF CHLORHEXIDINE DIGLUCONATE ON ROTATIONAL MOBILITY OF AS PROBES IN PHOSPHOLIPID MODEL MEMBRANES

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To provide a basis for studying the biophysical mechanism of action of chlorhexidine digluconate, we carried out a study of membrane actions of the antimicrobial agent. Giant unilamellar liposomes (PL) were prepared with mixture of 1,2-dipalmitoyl-*sn*-glycero-3-phosphoethanolamine (DPPE) and 1,2-dipalmitoyl-*sn*-glycero-3-phosphocholine (DPPC). The anthroyloxy probes are located at a graded series of depths inside a membrane, depending on its substitution position (*n*) in the liposome phospholipids' aliphatic chain. Magnititude of the rotational mobility of the intact six membrane components differed depending on the substitution position in the descending order of 16-(9-anthroyloxy)palmitic acid (16-AP), 12, 9, 6 and 2-(9-anthroyloxy)stearic acid (12-AS, 9-AS, 6-AS and 2-AS). Chlorhexidine digluconate increased the rotational mobility of hydrocarbon interior of the liposomes in a dose-dependent manner, but decreased the mobility of membrane interface of the liposomes. The sensitivities to the increasing effects of chlorhexidine digluconate on the rotational mobility were in proportion to probes (located depths) in the descending order of the 16-AP, 12-AS, 9-AS and 6-AS. However, chlorhexidine digluconate was decreased the mobility of 2-AS in the membrane interface of the liposomes. Disordering or ordering effects of chlorhexidine digluconate on membrane lipids may be responsible for some, but not all of its bacteriostatic and bacteriocidal actions.