

# The research of integral conductivity and single ion channels in cell and bilayer lipid membranes at the presence of macrocycle compounds

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**Abstracts.** Study of biological activity and physical and chemical properties of macrocycle polyene compounds that have status of polyene antibiotics (PA) is very actual in medical and cell biophysics. Interaction of mentioned above PA with cell membranes and with their alternative model – bilayer lipid membranes (BLM) leads to the formation of ion channels which are present as integral conductivity or as single ion channels providing the transport of ions and low molecular size compounds through membrane. From a medical point of view, PA are pharmacological drugs used against pathogens of fungal and bacterial diseases and, as it turned out, even against viruses and some types of cancer cells [1]. The physical and chemical parameters of ion channels, such as selectivity and conductivity formed by PA in cell membranes, are influenced even by not very significant changes in the number of double bonds and the number of hydroxyl and carbonyl groups in the molecule of these compounds. It was shown that biological activity of antibiotics was rising with the more number of the double binds in the PA molecule. We used amphotericin B, levorin A, nystatin and filipin preparations in our work [1,2]. The research of physical and chemical properties of the single and combined ion channels induced by macrolactone PA in membrans show the correlative dependence of the structure and function of these compounds. The conductivity of amphotericin B channels in the solution of 2M CsCl is  $6 \pm 1$  pSm but the conductivity of nystatin channel in the solution of 3M KNO<sub>3</sub> is  $1,5 \pm 0,5$  pSm[3].

The comparative analysis of the experimental data of conductivity and selectivity of single and combined ion channels in bimolecular membranes in the presence of macrocycle PA opens up prospects for scientifically based chemical modification of new generation antibiotics for further use of these drugs in practical medicine

**Keywords:** polyene antibiotics (PA), amphotericin B, ion channels, bilayer lipid membranes (BLM), single ion channels, combined ion channels.

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