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PSEUDOMONAS AERUGINOSA BIOFILM GROWTH DYNAMIC IN PRESENCE OF PORPHYRINS BISMUTH COMPLEXES

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Intraduction: Biofilm formations is a one of most important processes that provide potential pathogenic bacteria such as *Pseudomonas aeruginosa* to cause human diseases and to be resistant to the numerous of antimicrobial drugs. Bacterial biofilms characterize with unique difficult structures and process of its formation fallow in some consistent stages. All of these stages from adgesion of bacterial cells to decomposition of an old biofilms characterize with some biological processes and time intervals. Biofilm formation of *P. aeruginosa* begin in laboratory conditions after 15 minutes of incubation and live of this pathogen biofilms continue up to 18 days. Even in the earlier stages of this process, biofilms completely separates from planktonic culture, dynamics and live time of which is very distinguish from biofilms.

Aim. Earlier we have shown that synthetic porphyrins and there bismuth complexes can disrupt bacterial biofilms. The aim of this work were, study the influence bismuth complex of *meso*-tetra (4-N-methyl-piridyl)porphyrin (Bi^{3+}-ÒPP), a most active compound of the group, on biofilm formation dynamic and life time of *P. aeruginosa* biofilm.

Materials and Methods. For a dynamic study biofilm were grow onto cover glasses in presence of 0,4 è 40 µÌ Bi^{3+}-ÒPP. Glasses were incubate for 15 minutes to 4 hours and stained with crystal violet. Data of experiments were obtained by microscopic control of the biofilm development.

For a life time study biofilm were grow onto 48-hole plates for a 7 days. Data of experiments were obtained by staining of the biofilms with cristal violet and 0,1 Ì NaOH + 1% SDS was added to disrupt biofilms after staining. Optical density of the dilutions were measured on the fotoelectrocolorimeter Specol-10, ë=592 í ì .

Results. Obtained data show that Bi^{3+}-ÒPP can harm *P. aeruginosa* biofilms on the earliest stages of its development. So, if in control, adhesion began after 15-30 minutes, in presents of the lowest concentration of Bi^{3+}-ÒPP 0,4 µÌ this process delayed, and adhesion began only after 45-60 min of incubation. After that, biofilm development in presence of 0,4 µÌ Bi^{3+}-ÒPP left behind by control. In presence of 40 µÌ Bi^{3+}-ÒPP biofilm formation process stopped on the adhesion stage and there were a single cells on the cover glasses even after 4 hours of incubation.

Obtained life time data show that in all concentration of the tested compound biofilm formation process were delay. In control, in contrast with 24 hour biofilm cell population increase after 7 days of incubation near 200 %. After the same period of time in presence of Bi^{3+}-ÒPP population density in concentration 0,4 µÌ equal 52 % of 7 days control population and in concentration 40 µÌ only 28 %. So, it were shown, that Bi^{3+}-ÒPP can provide not only rapid effect on the early stages of the biofilm formation, but cause there action in such long period of time.

Conclusion. All obtained data show that one of the most active porphyrin bismuth complexes begin there inhibitory action on the biofilm formation process in the early stages, and cause there action in such long period of time.