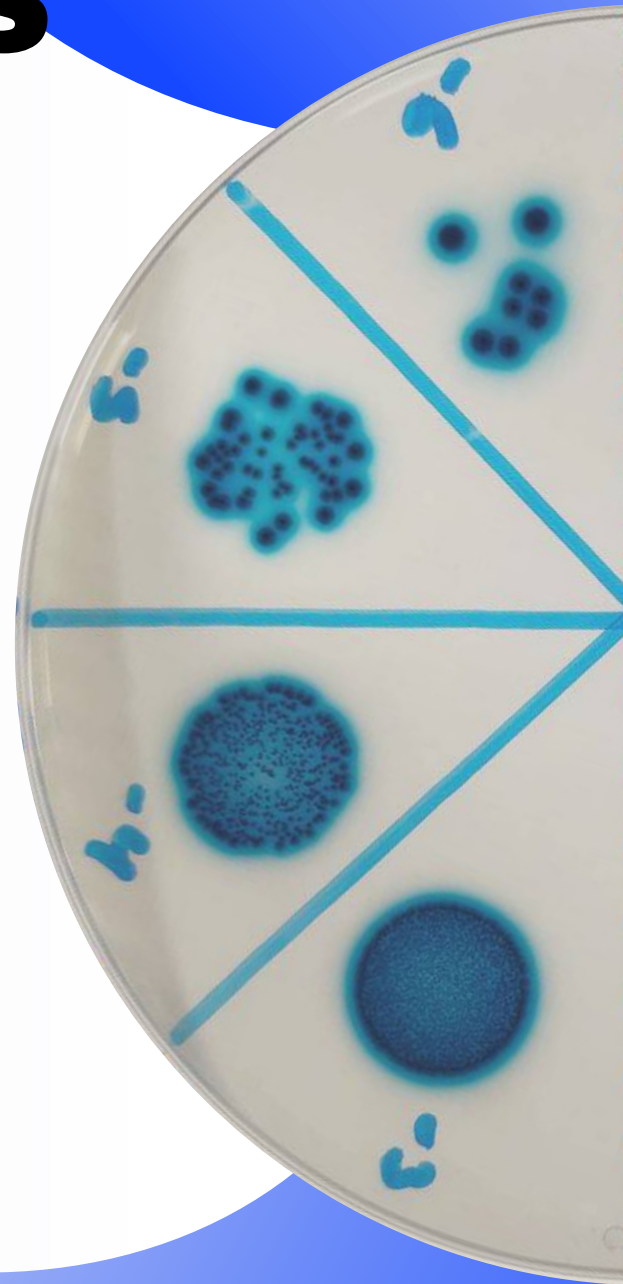

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**ANTIBIOFILM ACTIVITY OF CLARITHROMYCIN AGAINST *PSEUDOMONAS AERUGINOSA*
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Introduction. Biofilms (specifically organized microbial communities that attached to the surface) are the one of the mechanisms of protection from environmental factors, in particular from the influence of high concentrations of antimicrobial drugs [1]. Biofilms are formed on biotic (wounds, tissues) and abiotic (catheters, implants) substrates and cause more than 65% of diseases of microbial origin [1, 2]. Among microorganisms, a high biofilm forming ability is characteristic for many *Pseudomonas aeruginosa* [3]. *P. aeruginosa* is one of the main causes of nosocomial infections (chronic diseases of the ENT organs, soft tissues, respiratory and excretory systems, genitals, gastrointestinal tract, etc.), complicates the course of cystic fibrosis, and causes inflammatory processes in people with weakened immunity. Due to many mechanisms of adaptation, survival and resistance to many classes of antibiotics, infections caused by *P. aeruginosa* can pose a threat to public health [4]. According to literature data, macrolides can inhibit the biofilm formation by intrinsically resistant bacteria, such as *P. aeruginosa*, *Klebsiella pneumoniae* and *Acinetobacter baumannii*. The basis of the anti-biofilm effect of macrolides has not been completely elucidated: for instance, azithromycin seems to block quorum signaling in *P. aeruginosa* [5].

The aim of this study was to determine the antibiofilm activity of antimicrobial drug from macrolides group against *Pseudomonas aeruginosa*.

Materials and methods. In experiments strain *P. aeruginosa* 449, isolated from pus, was used. The test-strain displayed resistance to cefepime and susceptibility to ciprofloxacin, meropenem, aztreonam and amikacin. The minimum inhibitory concentration of clarithromycin was determined by broth microdilution method [6]. The antibiofilm activity of antimicrobial drug was determined in sub-inhibitory concentrations: 25 and 100 µg/mL as described by O’Toole [7].

When evaluating the clarithromycin effect on the biofilm formation, its solution and inoculum were applied to wells simultaneously. To determine the biofilm biomass, the content of plates was removed, 0.1% solution of gentian violet was added. To detect biofilm, the dye was extracted with ethanol. Optical density was measured by Adsorbance Microplate Reader ELx × 800 (BioTek, USA) at a wavelength of 630 nm. Intact cultures of microorganisms grown under the same conditions without the clarithromycin adding were served as a control.

Statistical analysis for the biofilm assay was performed by nonparametric Kruskal-Wallis *H*-test. A *p*-value of <0.05 was considered as significant. All experiments were repeated in triplicate.

Results and discussion. It was found that clarithromycin does not exhibit a significant antimicrobial activity against *P. aeruginosa* 449 (MIC value was >200 µg/mL). The macrolide treatment at subinhibitory concentrations caused a stimulation of *P. aeruginosa* biofilm formation. At concentration of 25 and 100 µg/mL clarithromycin led to increasing biofilm biomass by 1,5-fold as compared to control (*p* < 0,05). Notably, that the bacteria producing biofilm are more resistance to antimicrobial agents, and its formation can be stimulated by subinhibitory concentrations of some antimicrobial agents [7].

Conclusions. Despite the presence of complex pharmacological effect in macrolides, in particular antimicrobial and anti-inflammatory, as well as their effectiveness in many diseases, it should consider the ability of clarithromycin in a sub-inhibitory concentration to stimulate the biofilm formation, that can cause the chronicity of the infection process.

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PORTABLE DEVICE FOR EXPRESS DIAGNOSTIC OF EARLY STAGE POST-TRAUMATIC SYNDROME *IN SITU*

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Actuality. Post-traumatic syndrome (PTSD) is recognized world-wide as a condition affecting not only soldiers and veterans but also the civilian population in societies/countries devastated by war. Post-traumatic stress disorder represents a global public health concern, affecting about 1 in 20 individuals. The symptoms of PTSD include involuntary nightmares or flashbacks, avoidance of