P0388
Poster Session I
Basic science: biofilm treatment

LED EFFECTS ON E.COLI ABILITY TO FORM BIOFILMS AND ON PHAGOCYTIC ACTIVITY OF NEUTROPHILS WITH NETS PRODUCTION IN EXPERIMENTAL LOCALIZED PYOINFLAMMATORY PROCESSES

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Objectives. Lack of effectiveness of traditional drug therapy associated with the appearance of resistant forms of microorganisms due to biofilms formation and decreased host immunity keeps search for new methods of combine therapy of purulent infections at particular relevance. The research aim was to study the influence of LED blue and red spectrum on E.coli biofilms and phagocytosis in localized pyoinflammatory processes.

Methods. *E.coli* ability to form biofilms was determined in microtiter plates with pre-synchronization of periodic culture. Biofilms absorbance was measured on photometer 'Multiskan EX 355' and evaluated in conventional units of optical density (un.od.). The experimental research was carried out on mice lines BALB/cJLacSto. Neutrophils phagocytic activity was investigated by ability to absorb latex particles. The reaction with using of neutrophils cell suspension on gradient solutions and activated *E.coli* and latex was provided to determine Neutrophil Extracellular Traps (NETs). Data were analyzed using «Statistica» program.

Results. It was found that after 15-minutes exposure of blue LED at wavelength of 470 nm in 'Barwa-Flex' photonic matrix the ability to inhibit formation of biofilms by *E.coli* isolates was in 1.6 times higher (1.09 ± 0.06 un.od.) than when irradiated with red LED at wavelength of 627 nm. The ability to form secondary biofilms decreased in 1.9 times under blue LED influence(1.17 ± 0.05 un.od.) and in 1.6 times under red LED (1.33 ± 0.08 un.od.) in comparison with control (2.16 ± 0.09 un.od.).

Phagocytosis integral indicators in animals of infected group were lower than the control values (3.8 ± 0.2 units and 80.1 ± 1.3 %) and were as follows:phagocytic neutrophils index – 1.5 ± 0.2 units and their absorptive capacity – 41.4 ± 2.3 %, respectively. It was found that neutrophils actively phagocytized latex particles under red and blue LED action on the focus of inflammation. Comparing the phagocytic activity of neutrophils and efficiency of catching bacteria in NETs it was established that phagocytosis rate under red LED influence was with latex – 7.9 ± 0.08 units and *E.coli* – 3.4 ± 0.07 units that in 1.6 - 2 times lower that antigen content in NETs (12.4 ± 0.08 and 7.1 ± 0.04 units respectively). Under blue LED influence phagocytosis rate (latex particles – 6.7 ± 0.09 and *E.coli* – 2.8 ± 0.07 units) and antigen content in NETs (latex particles – 8.5 ± 0.04 and *E.coli* – 6.1 ± 0.07 units) reduced almost in 1.2 - 1.5 times compared with red LED action.

Conclusions. It was established that blue LED inhibits ability of planktonic cells to form biofilms and red LED increases neutrophil activity with phagocytosis activation and NETs, so it allows recommending the use of LED radiation in complex antimicrobial therapy of localized pyoinflammatory processes.