

БИОЛОГИЧЕСКИЕ НАУКИ

ANTIBACTERIAL EFFECT LEUKOCYTE PEPTIDE COMPLEXES ON THE CULTURE OF MICROORGANISMS ISOLATED FROM PATIENTS WITH ABDOMINAL SURGICAL INFECTION

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ABSTRACT

At present, the rapid decline in the bacteria sensitivity to antibiotics complicates treatment of infectious diseases. Taking into account the bacterial resistance to medicines, the drugs containing natural human components are of preference [1]. The effect of antibacterial peptide complex on the abdominal bacterial strains of different concentrations was studied and the leukocyte peptide complex efficiency in the control of pathogens in abdominal infections was proved.

Keywords: antibacterial peptide complex, abdominal bacterial strains, leukocyte, antibiotic resistance.

Introduction

Recently, there has been a significant increase in the antibiotic resistance of community-acquired and nosocomial infections all over the world; which is of great socio-economic significance in all countries of the world and is believed to be a threat to national security. Diseases caused by resistant strains are characterized by longer duration, often require hospitalization, prolong the hospital stay and worsen the disease prognosis. The second- and third- line agents, which often are more expensive, less safe and are not always available, are the drugs of choice in this situation. But on the other hand, they drive up costs and increase the risk of the drug-resistant strains spread.

Antibacterial peptide complex, found by Russian scientists [5] is an alternative to antibiotics due to its properties. Antimicrobial peptides influence the fundamental cell structure as well as the target within the cell, which reduces the antimicrobial resistance. According to statistical data [2], antimicrobial peptides will occupy a significant place in the world market of antimicrobial drugs due to their relatively low cost, lack of side effects and minimum probability of developing antibiotic resistance.

The purpose of this study was to investigate the antimicrobial susceptibility of microbial strains isolated from exudates of patients with abdominal surgical infections to leukocyte peptide complex (LPC), synthesized by human leukocytes.

Materials and methods

The method of serial dilutions was used to research into the LPC antibacterial effect on several abdominal bacterial strains. The study was conducted on

pathogens, causing abdominal infections, in the concentrations of 1×10^7 and 1×10^9 bacterial cell (bacteria of the genera *Staphylococcus*, *Escherichia*, *Streptococcus*, *Klebsiella*).

Results and discussion

Most of the strains tested at the concentration of 1×10^7 bacterial cells were found to be susceptible to the antibacterial action of the peptide complex, synthesized in the interferon. It is worth noting that the LPC concentration of 0.015 mg/ml (*E. Coli*, *S.aureus*, *S. epidermidis*) is sufficient in order to stop the growth of most strains examined. The highest sensitivity of microorganisms to the antibacterial peptide complex was found at the LPC concentration of 0.060 mg / ml - *S.aureus* in 100% of cases; *E. Coli*, - 73%.

We analyzed the antibacterial activity of a test peptide complex against gram-positive bacteria (*Staphylococci*) and Gram-negative microorganisms belonging to the genera of *Escherichia*, *Klebsiella*, *Proteus*. The LPC activity against *E.Coli*, *S.aureus* and *S.epidermidis* was noticed at the concentration of 0.0005 mg/ml LPC. However, the LPC showed low antibacterial activity against *Klebsiella pneumoniae* and no activity in case of *Proteus*.

The dynamics of the *Staphylococcus* and *Escherichia coli* sensibility in concentrations 1×10^7 and 1×10^9 bacterial cells/ml (Figure 1) showed that the *Staphylococcus*, *Streptococcus*, *Klebsiella* and *Escherichia coli* in concentrations of 1×10^9 bacterial cells/ml are sensitive to LPC at the concentration of 0.03 mg/ml, with more than 50 % of *Escherichia coli* and *Staphylococcus* and 100 % of *Staphylococcus* alone being sensitive to LPC.

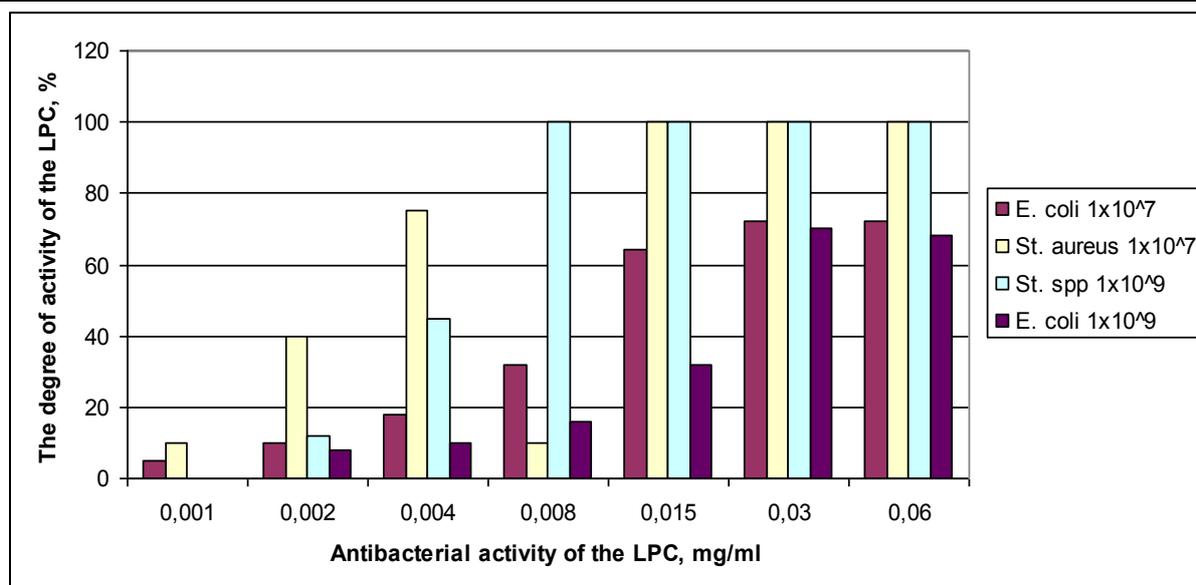


Fig. 1. Comparative analysis of sensitivity to LPC pathogens genera *Staphylococcus* and *Escherichia coli* in concentrations of 1×10^7 and 1×10^9 cells/ml

Thus the Gram-positive microorganisms are substantially more sensitive to the LPC antibacterial action than Gram-negative ones which does not contradict to the literature data [3, 4].

Most species of *Escherichia coli* strains studied were sensitive to the LPC at the concentration of 0.03 - 0.06 mg/ml. While *Staphylococcus* spp. at the concentration of 1×10^9 bacterial cells in 1 ml is sensitive to the LPC concentration of 0.0075 mg/ml, *Escherichia coli* at the concentration 1×10^9 bacterial cells/ml shows its sensibility to the LPC concentration of 0.03 mg/ml.

Conclusion

As the research into the antimicrobial susceptibility of microbial strains isolated from exudates of patients with abdominal surgical infections to leukocyte peptide complex, synthesized by human leukocytes showed, the LPC at the concentration of 0.03 mg/ml is an effective against pathogens, such as *Escherichia coli* and *Staphylococcus* spp.

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