

## **Microbial biofilms in activity of a human body: facts, possibilities, prospects**

**Piminov O.F., Shulga L.I., Kvitchata A.I.**

*Department of general pharmacy and safety of drugs*

*Institute of Pharmacy Professionals Qualification Improvement*

*National University of Pharmacy*

*Kharkiv, Ukraine*

farmtex-ipksf@ukrfa.kharkov.ua

The increasing researchers' attention of contemporaneity is attracted by the system of human microflora. Correlations between functioning of various human organs and its microbiota are set up: a negative correlation between intestinal microflora and intestine with a high probability is a possible reason of development of the purchased autoimmune disease; influence of connection between activity of intestinal microflora and cognitive functions of human et al.

At the present stage of development of microbiology it is set that in the nature the majority of bacteria does not exist in a free state. They are organized in specific formations – biofilms. Microbial biofilms are the most ancient forms in biological associations. They are not casual mixture of different types of microorganisms, but highly coordinated three-dimensional structures, architecture of that envisages concrete communicative cooperations which are determined by relative spatial distribution of organs of human body. Biofilms are built-in in a polymeric matrix that is the extraordinarily active and difficult component of a biofilm, but remains rather low-studied.

Such matrix presents in all microbial populations and associations that provides unique properties of a biofilm, for example stability to a stress. The microflora, which is organized in biofilms, shows more expressed stability to unfavorable effects of different nature factors (physical, chemical and biological) in comparison with bacteria which are not organized in biofilms, that is provided with a mucous-polymeric layer of a biofilm.

The analysis of complicate mutual relations in multicomponent microbial associations needs further studying by methods of computing biology, bioinformatics and systems biology in forming of adequate approaches for the achievement of significant results.

Microflora of a gastrointestinal tract, as the most numerous in a human body, deserves special attention. Microbial associations are situated in lumens and mucous places of intestine that influences on the state of health and human being. Microbial associations specialize on a fermentation of soluble fibers of legumes, grain-growing, vegetables and fruits (metabolic function), degradation of toxic connections, production of vitamins. Some microbes can use sugar for existence maintenance, in cases when other food is inaccessible, and by-products of

fermentation is feeding cells that covering large intestinal and can correct the immune system, preventing such diseases as bronchial asthma and Crohn's disease. Discovery of plenary powers of microbial biofilms can be perspective in a quantity control of pathogenic microorganisms in a human body, their detection and control.

The close mechanisms between numerous cooperations microbial associations and surfaces of a human body this is an actual direction of experimental researches. So an engineering method is worked out bacteria which excrete anti-inflammatory molecules at an inflammation and provide the web-site of their specific delivery in intestine that is automatically turned off when the inflammation is removed. Such bacteria can prevent invasion of pathogenic bacteria, to diagnose early stages of a cancer, eliminate diarrhea or a constipation, to regulate behavior and mood.

Studying of multiple roles of microorganisms of intestinal of healthy people can become perspective in treatment of such pathologies, and creation of engineering biofilms – effective in a quantity control of contaminants in environment or regeneration of new bioactive biofilms.

New technologies of engineering sciences offer unprecedented possibilities of decision future questions of evolution of a biofilm and its adequate application in ecology that will allow more deeply understand the mechanisms of influencing biofilm factors on a human body and processes of Earth.

### **Література**

1. Biodiversity acts as insurance of productivity of bacterial communities under abiotic perturbations / A. Awasthi, M. Singh, S. K. Soni et al. // ISME J. – 2014. – N. 8. – P. 2445–2452.
2. Joan A. Role of Surface Protein SasG in Biofilm Formation by *Staphylococcus aureus* / A. Joan Geoghegan // Journal of Bacteriology, Nov. – 2010. – Vol. 192, N 21. – P. 5663–5673.
3. Тец В. В. Биопленки возбудителей уроинфекций и использование фторхинолонов / В. В. Тец, Н. К. Артеменко // Consilium Medicum. – Урология. – 2008. – Т. 10, № 4. – С.17–23.