ACTA SCIENTIFIC MICROBIOLOGY (ISSN: 2581-3226)

Volume 3 Issue 1 January 2020

Editorial

Actual Problems and Tasks of Microbiology

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Received: November 20, 2019; **Published:** December 02, 2019

DOI: 10.31080/ASMI.2020.03.0443

Currently, the actual problems of microbiology are the issues of infectious diseases within the framework of associative symbiosis (from fundamental research to applied development). The important tasks of medical microbiology of the 21st century are to decipher the biological role of norm flora in the regulation of homeostasis, the participation of bifid flora in the regulation of human intestinal homeostasis, issues of antimicrobial recognition, the maintenance of the barrier function of enterocytes and the selection of effective probiotic strains.

Studies over the past years have shown that the taxonomic diversity of the human body's microflora is much wider than previously thought. Of great scientific interest are the prospects of practical use of microorganisms isolated from the intestine to solve the problems of biotechnology, in particular, as producers of antimicrobial peptides, demulsifies, xenobiotic destructors.

Relatively new direction - research of the role of microorganisms in the development of noninfectious pathology: arterial hypertension, atherosclerosis, obesity, type 2 diabetes, kidney diseases, bronchial asthma.

There is an acute problem of increasing resistance of microbes to antibiotics. The possibility of using leukocytic cationic protein, antimicrobial peptides from platelets to suppress persistent properties and increase the sensitivity of pathogenic microorganisms to antagonistic active substances of norm flora is of interest. Recently, a great deal of attention has been paid to the applied issues of diagnostics of infectious and inflammatory diseases, in particular, the use of FISH method in the diagnosis of sepsis and to assess the severity of septic conditions of patients.

The study of immunoregulatory mechanisms of microbial homeostasis maintenance, mechanisms of "acceptant immunity", the phenomenon of tolerance as a key mechanism of intestinal homeostasis is an important task, which has been the subject of numerous studies in recent years. Particular attention should be paid to the immunoregulatory effect of microbiota in the large intestine through cytokines and various metabolites.

Actual problems of microbiology are evolutionary, Eco physiological and biotechnological aspects of the formation of symbiotic systems on the example of alga-bacterial associations, the issues of mass destruction and death of endemic flora and fauna as a result of pathological changes in the composition of symbiotes, which may later have catastrophic consequences for the entire ecosystem of certain regions in different countries. The actual task of microbiology is to study the peculiarities of survival and long-term preservation of potentially pathogenic microorganisms in saline water reservoirs and methods of their detection, as well as to evaluate new bacterial consortia that effectively degrade various hydrocarbons.

The undoubted regulatory influence of dominant microorganisms on the host's immune system and its resistance to superinfection from competing, invading microbes makes it possible to use this synergy when microbes become a means of therapy and disease prevention. Along with the search for new effective probiotic strains another way is possible - the use of microbial metabolites as the basis for metabiotic drugs.

Many researchers consider it necessary to create a line of probiotic strains, the choice of which will be carried out taking into account the microecological characteristics of the microorganism, biocompatibility to achieve the maximum effect of restoration of microsymbiocenosis. Undoubtedly, there is a high fundamental importance and applied value of researches devoted to the issues of microorganisms persistence and symbiosis.

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