



## Actual and Important Problems of Microbiology

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In modern microbiology, there are a large number of fundamental and applied problems that are important both for biology and for solving special problems of science and practice. As a result of scientific and technological progress and an increasing penetration into various microbiological specialties of general microbiology methods, the involvement of other scientific research methods. (genetics, molecular biology, biochemistry, biophysics, etc.) in the development of modern microbiology, there has been a qualitative growth.

One of the main directions of microbiology, the successes in which will allow to solve many applied problems, is the biology and genetics of various systematic groups of microorganisms. Relevant and important for the solution of many issues of microbiology is the study of the ultrastructure of microorganisms in combination with the study of the functional activity of cell structures and organelles, as well as research in the field of biochemistry and physiology of microorganisms (constructive and energy metabolism, cell growth and division and the genetic regulation of these processes, the biochemical and genetic mechanisms of the biosynthesis and differentiation of the structural components of microorganisms).

The importance of studying the growth and development of the microbial population and the laws of their industrial cultivation, as well as secondary metabolism, applied genetics of microorganisms, has increased. The study of plasmids has a number of fundamental and applied aspects of the study: the molecular organization of plasmids, their genetics, and their role in the functional activity of microorganisms, in particular in biosynthetic activity and secondary metabolism. In medical terms, the most important is the study of patterns of plasmid distribution among bacteria, as well as plasmids that determine the pathogenic properties of bacteria, cell antigens.

In medical microbiology, important problems that cannot be studied without a deep understanding of the biology and genetics of microorganisms are the problems of infection, pathogenicity and virulence. Microbiology has made significant progress in addressing these issues, but an important area of research remains the study of the properties of pathogenic microorganisms, which impart pathogenicity, genetics, virulence, the structure of toxins and their mechanisms of action, the stages of bacteria interaction with sensitive tissues and cells; important is the problem of persistence of pathogens and bacteriocarrier.

One of the main problems of medical microbiology is the problem of obtaining new preventive and diagnostic drugs, and therefore the study of the antigenic structure of microorganisms, the study of antigens, their chemical structure, localization and genetic regulation are important. To obtain new prophylactic drugs, in particular, live vaccines, the study of various methods reduction of their virulence is required, including the use of genetic engineering methods.

Along with this, there is a tendency of ever wider and deeper study and production of chemical and molecular vaccines. Modern microbiology has reached such a level that the empirical approach to the design of vaccines and vaccine strains has been replaced by a scientifically based, arising from the full range of knowledge about microbiology and genetics of pathogenic microorganisms. The study of the immunogenicity of microorganisms and their individual components is closely related to immunochemistry and immunology.

Actual problems of microbiology are the study of many fundamental questions of the biology of microorganisms, the properties of pathogenic and conditionally pathogenic microorganisms, the study of biological and genetic patterns of change of pathogens in a

number of infectious diseases, the development of new methods of identification of microorganisms.

The problem of the normal microflora of a person, its role in health and pathology is important. In this regard, the problem of conditionally pathogenic microorganisms, their acquisition of drug resistance and the occurrence of nosocomial infections has acquired particular importance.

Studying the possibility of using phages to identify bacteria research in the field of phage conversion, as well as assessing the possibilities of using phage for the treatment and prevention of infectious diseases is important and necessary.

Thus, the solution of actual problems of modern microbiology will contribute both to the elimination and prevention of infectious diseases.

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