

BIO-COMMUNICATION OF MICROORGANISMS: CHANGING PARADIGMS IN MICROBIOLOGY

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The modern concepts in the biology demonstrate the integrity and coherence of microbial populations as peculiar “superorganisms”. The first studies in this field date from the 1950s belong to Jerusalemkiy I.D. He considered the colony of microorganisms as a “space-time continuum,” in which the constituent cells has several advantages: increased resistance to antibiotics, more effective use of nutrient substrates. Further research has laid the foundation for the evolution of scientific understanding of the microorganisms: from the image of independent single-cell organisms to the complex interaction of a single system of organized functionally and morphologically different types of cells. The closest analogue of a biological system can be an organization of “social insects” - bees, ants, termites.

Special attention is given to such relevant phenomena as apoptosis, bacterial altruism, quorum-effects, collective differentiation of microbial cells, and formation of population-level structures such as extracellular matrix. Emphasis is placed on the channels and agents of intercellular communication in a microbial population. Much attention is also given to the role of colony organization and intercellular communication in “parasite/commensale/symbiont-multicellular host organism systems. The row of survey thoughtful pieces of work is the last years published on microbial colonial organization and bio-communication, however enough it is developed in literature there is a question about a role evolutionary-conservative (chemically identical or homological at the different forms of living) alarm molecules, salient as factors of intercellular communication and social conduct, and for multicellular animals and plants also and in more specialized roles (hormones, neyromediators). In the last decade steadily broadens list of the studied microbial processes, realized only at presence of sufficient closeness of populations (quorum). Mechanisms are exposed many of the processes a quorum and communication for microorganisms; the chemical factors of intercellular communication, responsible for closeness-dependent processes, are certain. Bio-communications are the article of new biological science under the name a biosemiotica. Three channels of communication are most evolutionary-conservative: direct (physical) contact between organisms; making chemical agents, which penetrable in an environment; generation of one or another physical field. All three channels of communication are present in a population of organisms.