

Study of human and animal microbiome as genetic and pharmacological resources for the development of innovative biotechnologies for medicine, animal husbandry and agro-industrial complex

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Key words: pharmacobiotics, antioxidant potential, probiotic potential, microbiota

Today, everyone is familiar with the stages of development of antibacterial drugs, the successes and problems of their use in medicine. Initially, the efforts of scientists around the world helped to create antibiotics based on natural producers of soil origin. However, the large-scale and sometimes irrational use of antibacterial drugs has contributed to the emergence and wide spread of pathogens resistant to most antibiotics. A similar situation occurred in the development of antiviral and immunomodulatory drugs. It became obvious that humans are losing the race to diseases and pathogens. Today, new approaches and paradigms are needed in the development technologies as well as in the search for new pharmaceutical substances. The advances of the past decade in the field of human microbiota have opened up many opportunities for us. Contemporary ideas about the structure and functions of the human intestinal microbiota and the conceptual integration of knowledge about commensal microorganisms, including probiotics obtained using molecular genetics, transcriptomic, proteomic, and metabolomic techniques, made it possible to forge the concept of "pharmabiotics". The creation of pharmabiotics based on microorganisms inhabiting various cavities of the human body, including the intestines, is a new and rapidly developing area of pharmacological science. The tasks set in this area can be solved if a number of fundamental tasks are integrated to ensure the creation of effective and safe pharmaceuticals and ingredients for them. The role of the microbiome and pharmabiotics as selective modulators of the human immune system, primarily cellular immunity, as well as the antioxidant system, is becoming increasingly clear. Over the past decade, Russia and the Republic of Belarus have been intensively studying the human intestinal microbiome and developing probiotics and pharmabiotics with neuromodulatory, immunomodulatory, antioxidant and pro-inflammatory potential.