

The unsatisfactory effectiveness of chemotherapy in the treatment of severe bacterial infections is one of the greatest challenges facing clinicians of various specialties today. An assessment of the effectiveness of antibiotic therapies against bacterial infections defines the situation in this respect as the post-antibiotic era. That dramatic state of affairs results from increasing microbial resistance, slow progress in the introduction of new and more effective chemotherapeutics for clinical use and decreased human immunity.

Pharmaceutical research preceding the launch of an innovative drug is a time-consuming and cost-intensive process with a risk of failure at any stage of clinical trials. An alternative to the development of novel medicines is a search for solutions based on drugs with a known profile of toxicological safety. Therefore, the proposed project involves preparation of biopolymer systems of chemotherapeutics in current clinical use characterized by the greatest antimicrobial potency.

The systems of chemotherapeutics and biopolymer modifiers selected for study in the project are expected to overcome limitations to effective antibiotherapy by enabling the following:

- treatment of infections induced by resistant bacterial strains against which antibacterial action is inhibited by the efflux effect
- formation of systems allowing antibiotics to be prolongedly released from the pharmaceutical matrix in order to ensure stable and effective bactericidal action and thus to permit optimization of the dosing algorithm
- improvement of bioavailability resulting in low-dose pharmaceutical formulations, reduction of gastrointestinal disturbances caused by the presence of unabsorbed chemotherapeutics and a diminished risk of gut colonization by resistant bacterial strains
- modification of those physico-chemical properties of chemotherapeutics which limit their oral administration and account for the short shelf life of infusion fluids in order to develop innovative drug forms with their participation.

Considering all of the above, the results of research conducted within the proposed project will contribute substantially to the greater effectiveness of chemotherapeutic management of severe bacterial infections.