

Information on the scientific and technical program «Improvement of Measures to Ensure Biological Safety in Kazakhstan: Counteraction to Dangerous and Especially Dangerous Infections» (IRN BR218004/0223), implemented within the framework of the program-targeted funding of the Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan for 2023-2025

Name of the Program:

IRN BR218004/0223 “Improvement of Measures to Ensure Biological Safety in Kazakhstan: Counteraction to Dangerous and Especially Dangerous Infections” (hereinafter – the Program).

Implementation period: 2023–2025.

Customer: State Institution “Science Committee of the Ministry of Science and Higher Education of the Republic of Kazakhstan”.
Priority area of science: National security and defense, biological safety.
Specialized scientific area: Ensuring biological safety.
Field and type of research: Agricultural and veterinary sciences, medicine and healthcare, natural sciences; applied research.

Strategically Important State Tasks for Which the Program Has Been Developed:

The Program is aimed at developing scientific and practical foundations to address tasks defined by the State’s long-term strategic plan, Presidential Addresses to the People of Kazakhstan, the Law of the Republic of Kazakhstan “On Biological Safety of the Republic of Kazakhstan,” as well as the national Concepts for the development of science, healthcare, and the agro-industrial complex.

These strategic documents stipulate the protection of human and animal health from exotic and endemic biological threats, ensuring social stability, food security of the country, increasing the export potential of livestock production and the average life expectancy of the population, as well as the development of a competitive national science capable of transitioning from basic to complex production of high-tech products.

Relevance of the Program:

An important aspect of the development of the Republic of Kazakhstan is the provision of national security, including through reducing the risks of natural, accidental, and deliberate biological threats that may significantly affect humans,

animals, and the environment, and negatively impact public health, the economy, and society.

Effective monitoring of especially dangerous zoonotic diseases in humans, animals, and birds ensures prompt organization of localization and elimination measures. Research activities are aimed at developing diagnostic, preventive, and therapeutic medicines for the early detection of various pathogenic species during the incubation period, which enables earlier implementation of therapeutic and preventive measures for effective protection and prevention of disease development in humans and animals, their neutralization and elimination, thereby reducing socio-economic losses.

The development of domestic diagnostic tools, preventive preparations, and medicines to combat dangerous and especially dangerous infections and resistant microorganisms will help reduce both direct economic losses associated with morbidity in the population and agricultural animals, and indirect economic losses due to the introduction of quarantine measures.

The economic effect of the Program implementation is related to the development of the domestic biopharmaceutical industry and the reduction of import dependence on foreign diagnostic tools, biological and pharmaceutical products. Effective and safe vaccines developed on the basis of attenuated, inactivated, or recombinant strains will play an important role in ensuring biological safety.

The social effect is associated with the direct creation of new diagnostic and therapeutic-preventive preparations successfully used in humans and animals, improving public health and reducing social tension under pandemic conditions. The implementation of the research work will lead to the development of production capacities and, as a result, attract investments into the domestic pharmaceutical industry, create new jobs and increase tax revenues.

Target Consumers of the Results

The end-users of the obtained results may include virological and biotechnological laboratories specializing in the development of diagnostic and preventive tools, clinical and diagnostic laboratories, export-oriented organizations, as well as interested ministries and agencies such as the Ministry of Agriculture (MoA RK), the Ministry of Health (MoH RK), and others.

Purpose of the Program

Biological safety within the system of global threats: scientific and technical foundations of counteraction.

Objectives of the Program

1. Monitoring of the epidemiological and epizootiological situation, as well as external and priority internal sources of biological safety threats.
2. Development, testing, registration, and implementation of diagnostic tools for dangerous and especially dangerous infections.
3. Development, testing, registration, and implementation of immunobiological preparations against dangerous and especially dangerous infections to prevent biological threats.
4. Development, testing, registration, and implementation of pharmacological agents to prevent the spread of diseases caused by drug-resistant pathogens.

Research Team and Program Management

Program Leaders:

Abduraimov Y.O., Doctor of Veterinary Sciences, Professor;
Rsaliev A.S., Candidate of Agricultural Sciences, Professor.

Responsible Executive of the Program:

Kutumbetov L.B., Doctor of Veterinary Sciences, Professor.

Scientific research within the framework of the Program is carried out on the basis of a Consortium (Agreement on the Innovation and Educational Consortium “Biological Safety” dated July 10, 2023, No. 1) of scientific organizations, institutions of higher and postgraduate education, and an industrial partner enterprise (hereinafter – the Consortium).

The Consortium includes ten organizations, such as:

- LLP “Research Institute for Biological Safety Problems”,
- LLP “National Scientific Center for Especially Dangerous Infections named after M. Aikimbaev”,
- JSC “Scientific Center for Anti-Infectious Drugs”,
- LLP “National Center for Biotechnology”,
- LLP “Kazakh Research Veterinary Institute”,
- LLP “Republican Collection of Microorganisms”,
- LLP “Scientific and Analytical Center ‘Biomedpreparat’”,
- LLP “OtarBioPharm” Biopharmaceutical Plant,
- NJSC “L.N. Gumilyov Eurasian National University”.

Overall management and coordination of the Program are carried out by the leading organization – JSC “National Holding QazBioPharm”.

The research group includes more than 600 scientists and specialists (including core and additional personnel) in the fields of medicine and healthcare, agricultural and veterinary sciences, and natural sciences, including 26 Doctors of Science, 76 Candidates of Science, and 21 PhDs.

Expected Results

1. Scientifically substantiated information on the epidemiological and epizootiological situation of dangerous and especially dangerous human and animal diseases such as alveococcosis, Newcastle disease, brucellosis, bovine viral diarrhea, equine influenza, avian influenza, infectious agalactia of sheep and goats, infectious bovine rhinotracheitis, ram epididymitis, bluetongue disease, tick-borne encephalitis, Crimean-Congo hemorrhagic fever, bovine coronavirus, bovine leukemia, cowpox, sheep pox, rickettsioses, equine rhinopneumonitis, anthrax, camel glanders, equine trypanosomiasis, tuberculosis, tularemia, plague, epizootic lymphangitis of horses, cholera, and foot-and-mouth disease.
2. Electronic maps of epidemiological and epizootiological activity of pathogens of dangerous and especially dangerous infections by regions of Kazakhstan using geographic information system (GIS) software.
3. New isolates of pathogens of dangerous and especially dangerous diseases with studied phenotypic and genotypic characteristics.
4. Domestic diagnostic test systems for the detection of pathogens of dangerous and especially dangerous infectious diseases such as cowpox, anthrax, epizootic lymphangitis of horses, infectious bovine rhinotracheitis, tick-borne encephalitis, rickettsioses, bovine leukemia, babesiosis, pasteurellosis, and listeriosis.
5. National serum standards for the diagnosis of infectious bovine rhinotracheitis and bovine viral diarrhea.
6. A component of nutrient media for cultivation of microorganisms.
7. Mono- and polyvalent preventive preparations against cowpox, infectious bovine rhinotracheitis, foot-and-mouth disease, small ruminant brucellosis, tick-borne encephalitis, and salmonella-induced abortion in sheep.
8. New pharmacological agents based on modulators of pharmacological activity showing synergistic effects against drug-resistant pathogens such as extended-spectrum beta-lactamase-producing strains of *Enterobacteriaceae*, *Acinetobacter*, *Pseudomonas*, *Staphylococcus*, *Haemophilus*, *Streptococcus*, as well as strains resistant to carbapenems, fluoroquinolones, and cephalosporins.
9. New biological preparations based on bacteriophages to combat antimicrobial resistance of pathogens.
10. Scientific and technical documentation for the developed preparations and test systems.

11. Publication of at least 12 research articles in peer-reviewed scientific journals indexed in the first two quartiles (Q1, Q2) by impact factor in the Web of Science database and/or having a CiteScore percentile of at least 50 in the Scopus database.
12. Publication of at least 20 research articles in journals recommended by the Committee for Quality Assurance in Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan.
13. Obtaining at least one foreign or international patent included in the Derwent Innovations Index (Web of Science, Clarivate Analytics) or receiving an accreditation certificate for the type of activity performed by the applicant's center in accordance with the legislation of the Republic of Kazakhstan.
14. Obtaining at least one patent in the Kazakhstan Patent Office.
15. Graduation of at least five PhD doctors in the field of the Program's scientific and technical tasks.
16. At least one commercialized project related to the practical application of the obtained scientific and/or scientific-technical results, including intellectual property results, aimed at introducing new or improved goods, processes, or services to the market for profit generation.
17. Consulting, design, product development, testing, prototyping, and research services amounting to at least 10% of the funds allocated under the scientific and technical task.
18. Publication of at least one monograph.

Achieved Results

1. Scientifically substantiated information on the epidemiological and epizootiological situation regarding dangerous and especially dangerous human and animal diseases has been prepared, including alveococcosis, Newcastle disease, brucellosis, bovine viral diarrhea, equine influenza, avian influenza, infectious agalactia of sheep and goats, infectious bovine rhinotracheitis, ram epididymitis, bluetongue, tick-borne encephalitis, Crimean-Congo hemorrhagic fever, bovine coronavirus, bovine leukemia, cowpox, sheep pox, rickettsioses, equine rhinopneumonitis, anthrax, camel glanders, equine trypanosomiasis, tuberculosis, tularemia, plague, epizootic lymphangitis of horses, cholera, and foot-and-mouth disease. Monitoring of the epidemiological and epizootiological situation for 27 human and animal infections was conducted. More than 150,000 samples from agricultural animals, domestic and wild birds, and environmental objects were collected and studied. Based on identified risks, recommendations were developed for the prevention and control of the 27 studied infections.
2. 137 electronic maps of epidemiological and epizootiological activity were developed for the studied infections across Kazakhstan's regions.

3. More than 223 pathogen isolates were obtained and their phenotypic characteristics were studied. Twenty-two infection agents were genotyped, and 28 isolates were passportized and deposited.
4. Eleven domestic diagnostic test systems were developed for the detection of dangerous and especially dangerous infections such as cowpox, anthrax, epizootic lymphangitis of horses, infectious bovine rhinotracheitis, tick-borne encephalitis, rickettsioses, bovine leukemia, babesiosis, pasteurellosis, and listeriosis.
5. Panels of standard sera for diagnosing infectious bovine rhinotracheitis and bovine viral diarrhea were developed and internationally validated for compliance with established requirements.
6. A nutrient medium component was developed, with an organizational standard prepared and a veterinary certificate obtained.
7. Six immunobiological preparations were created for the prevention of cowpox, small ruminant brucellosis, foot-and-mouth disease, infectious bovine rhinotracheitis, bovine viral diarrhea, salmonella-induced abortion in sheep, and tick-borne encephalitis.
8. New pharmacological agents based on modulators of pharmacological activity were developed, showing synergistic effects against drug-resistant pathogens such as extended-spectrum beta-lactamase-producing strains of *Enterobacteriaceae*, *Acinetobacter*, *Pseudomonas*, *Staphylococcus*, *Haemophilus*, and *Streptococcus*, as well as strains resistant to carbapenems, fluoroquinolones, and cephalosporins (including bacterial lysate-based substance, topical solution “Novostron”, throat spray “Effexan”, and nasal drops “Synerin”). Preclinical trials of three pharmaceutical forms were conducted, pilot industrial batches were produced, and registration dossiers were prepared.
9. New biological preparations based on bacteriophages for combating antimicrobial resistance of pathogens were developed. Preclinical studies were carried out and pilot industrial batches were released.
10. Sixteen sets of scientific and technical documentation for immunobiological and diagnostic preparations, seventy-five regulatory documents for pharmacological products were prepared, and fifteen registration certificates for preparations and test systems were obtained.
11. A total of 162 scientific papers were published by the Program’s performers, including 24 articles in peer-reviewed scientific journals indexed in the first two quartiles (Q1, Q2) of the Web of Science and/or having a CiteScore percentile of at least 50 in the Scopus database.
12. Seventy-four articles were published in journals recommended by the Committee for Quality Assurance in Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan, one methodological guideline, twenty-one articles in specialized journals in the field of biological safety, and eighteen abstracts in the proceedings of international scientific conferences.

13. Two applications for foreign or international patents included in the Derwent Innovations Index (Web of Science, Clarivate Analytics) were submitted. Three accreditation certificates for the type of activity carried out by the applicant's center in accordance with the legislation of the Republic of Kazakhstan were obtained.
14. Eighteen patents were obtained, and six applications for patents were submitted to the Kazakhstan Patent Office.
15. Twelve PhD doctors graduated within the scope of the Program.
16. Within the framework of research commercialization, four contracts were concluded, including two licensing agreements for patents and two product sales contracts; results of scientific and/or scientific-technical activities were prepared and registered with JSC "National Center for State Scientific and Technical Expertise", and five acts of implementation of research results into practice were obtained.
17. The total volume of provided consulting, design, product development, testing, prototyping, and research services amounted to at least 10% of the allocated funds.
18. Six monographs were published, including three atlases on infectious diseases of humans, bacterial, parasitic, and fungal diseases of animals, and viral diseases of animals.

List of Publications and Patents

in peer-reviewed scientific journals indexed in the first two quartiles (Q1, Q2) by impact factor in the Web of Science database and/or having a CiteScore percentile of at least 50 (fifty) in the Scopus database:

1. Sultankulova K., Argimbayeva T., Aubakir N., Bopi A., Omarova Z., Melisbek A., Karamendin K., Kydyrmanov A., Chervyakova O., Kerimbayev A., Burashev Y., Kasymbekov Y., Orynbayev M. Reassortants of the Highly Pathogenic Influenza Virus A/H5N1 Causing Mass Swan Mortality in Kazakhstan from 2023 to 2024 // *Animals*. 2024; 14(22), 3211; <https://doi.org/10.3390/ani14223211> (квартиль по базе Web of Science – Q1, процентиль по базе Scopus – 95%).

2. Rametov N., Abdel Z., Zhumadilova Z., Yessimseit D., Abdeliyev B., Mussagaliyeva R., Issaeva S., Althuwaynee O., Baygurin Zh., Tabynov K. Historical Assessment and Mapping of Human Plague, Kazakhstan, 1926–2003 // *Emerging Infectious Diseases*, 2024;30(12):2483-2493. <https://doi.org/10.3201/eid3012.231659> (квартиль по базе Web of Science – Q1, процентиль по базе Scopus – 92%).

3. Kulpiisova A., Aitpayeva Z., Maimatayeva A., Ussenova L., Paritova A., Zhanabayev A., Bakishev T., Tursunkulov S., Kitapbay T., Abutalip A., Mussayeva A., Ospanov Y., Omarbekova U., Turalin B., Sapa V., Aisin V., Bizhanov A., Baikadamova G., Chylbak-ool S., Pakhomova E., Rametov N., Issimov A., Burambayeva N. Knowledge, attitude and practice related to anthrax among livestock farmers in West Kazakhstan // *Veterinary Medicine and Science*. 2024;10:e1553. <https://doi.org/10.1002/vms3.1553> (квартиль по базе Web of Science – Q2, процентиль по базе Scopus – 78%).

4. Abutalip A., Suchshikh V., Aitzhanov B., Ospanov Y., Kanatov B. Current State of Animal Anthrax Problems in the Republic of Kazakhstan and Ways to Solve it // International Journal of Veterinary Science. 2024; 13(6): 922-930. <https://doi.org/10.47278/journal.ijvs/2024.198>. (квартиль по базе Web of Science – Q2, процентиль по базе Scopus – 76%).

5. Abutalip A., Ospanov Y., Mussayeva A., Berdikulov M., Bizhanov A. Phenotypic and Genotypic Characteristics of *Brucella* Strains Isolated from Animals on the Territory of the Republic of Kazakhstan // International Journal of Veterinary Science 14(1): 131-137. <https://doi.org/10.47278/journal.ijvs/2024.223>. (квартиль по базе Web of Science – Q2, процентиль по базе Scopus – 76%).

6. Turganbay S., Kenesheva S., Jumagazyeva A., Ilin A., Askarova D., Azembayev A., Kurmanaliyeva A. Synthesis, physicochemical properties and antimicrobial activity of a di-aminopropionic acid hydrogen tri-iodide coordination compound // BMC Research Notes. 2024; 17:384 (квартиль по базе Web of Science – Q2, процентиль по базе Scopus – 70%).

7. Abutalip A., Bizhanov A., Matikhan N., Karabassova A., Orynbayeva B. Regional epidemiology of brucellosis infection in modern conditions of animal husbandry technology in Kazakhstan (by the degree of spread and incidence) // Scientific Horizons. 2024; 27(5), 20-31. <https://doi.org/10.48077/scihor5.2024.20>. (процентиль по базе Scopus – 58%).

8. Zauatbayeva G., Kulatay T., Ingirbay B., Shakhmanova Z., Keyer V., Zaripov M., Zhumabekova M., Shustov AV. Application of Pseudoinfectious Viruses in Transient Gene Expression in Mammalian Cells: Combining Efficient Expression with Regulatory Compliance // Biomolecules. 2025; 15(2):274. <https://doi.org/10.3390/biom15020274> (квартиль по базе Web of Science – Q1, процентиль по базе Scopus – 81%).

9. Bulatov Y., Kurmasheva A., Amanova Z., Abitaev R., Sametova Z., Kyrgyzbayeva A., Kondybaeva Z., Turyskeldi S., Ussembay A., Toktyrova D., Mazbayeva D., Shayakhmetov Y., Kerimbayev A., Khussainov D., Wentao M., Rsaliyev A., Abduraimov Y. The Influence of the Associated Inactivated Vaccine Against Infectious Rhinotracheitis and Bovine Viral Diarrhea on the Formation and Duration of Colostral Immunity in Kazakh Whiteheaded Calves // Vaccines. 2025; 13(4):408. <https://doi.org/10.3390/vaccines13040408> (квартиль по базе Web of Science – Q1, процентиль по базе Scopus – 90%).

10. Azanbekova M., Mambetaliyev M., Valiyeva A., Kozhabergenov N., Aldayarov N., Kilibayev S., Ussebayev B., Tuyskanova M., Kadyrova B., Myrzakhmetova B., Kutumbetov L., Chervyakova O., Nurabayev S., Berdikulov M., Kerimbayev A., Rsaliyev A., Abduraimov Y and Zhugunissov K. Phylogenetic analysis of a 2024 Sheeppox virus isolate from the Almaty region of Kazakhstan and investigation of its pathogenicity in merino sheep // Frontiers in Veterinary Science. 2025; 12:1623187 <https://doi.org/10.3389/fvets.2025.1623187> (квартиль по базе Web of Science – Q1, процентиль по базе Scopus – 94%).

11. Abay Z., Kudaibergenova Z., Bizhanov A., Serikov M., Berdiakhmetkyzy S., Arysbekova A., Aitlessova R., Smadil T., Kadyrov S., Lessov B., Sattarova R., Kanatbayev S., Shalabayev B., Shynybayev K., Rametov N., Akhmetsadykov N., Yoo HS, Sikhayeva N., Rsaliyev A., Abduraimov Y., Kassenov M and Nurpeisova A. Serological surveillance of *Trypanosoma evansi* in Kazakhstani camels by complement fixation and formalin gel tests // Frontiers in Veterinary Science. 2025; 12:1661387. <https://doi.org/10.3389/fvets.2025.1661387> (квартиль по базе Web of Science – Q1, процентиль по базе Scopus – 94%).

12. Bulatov Y., Sametova Z., Abitayev R., Kyrgyzbayeva A., Ussembay A., Kondibaeva Z., Amanova Z., Turyskeldy S., Toktyrova D., Mazbayeva D., Shorayeva K., Jekebekov K., Zhugunissov K., Barakbayev K., Kerimbayev A., Rsaliyev A., Abduraimov Y and Kurmasheva A. Duration of immunity against infectious rhinotracheitis and bovine viral diarrhea after vaccination in calves in southern region of Kazakhstan // Frontiers in Veterinary Science. 2025; 12:1681624. <https://doi.org/10.3389/fvets.2025.1681624> (квартиль по базе Web of Science – Q1, процентиль по базе Scopus – 94%).

13. Mambetaliyev M., Alieva A., Abduraimov Y., Rsaliyev A., Zhugunissov K. Determination of the minimal level of neutralizing antibodies elicited following vaccination able to protect rabbits against virulent cowpox virus // *Frontiers in Immunology*. 2025; 16:1640056. doi: 10.3389/fimmu.2025.1640056 (квартиль по базе Web of Science – Q1, проценти́ль по базе Scopus – 85%).

14. Izbanova U., Rysbekova A., Zhumadilova Z., Kovaleva G., Tokmurziyeva G., Abdeliyev B., Yessimseit D., Begimbayeva E., Umarova S., Zarkymanova A., Sabitova M., Yussupov A., Shevtsov A., Isaeva S., Tukhanova N. Epidemiological and molecular analysis of anthrax cases of the Zhambyl region Kazakhstan in 2023 // *Frontiers in Public Health*. 2025; 13:1620930. <https://doi.org/10.3389/fpubh.2025.1620930> (квартиль по базе Web of Science – Q1, проценти́ль по базе Scopus – 76%).

15. Perfilyeva Y. V., Zhigailov A. V., Malysheva A.A., Cherusheva A.S., Ivanova K.R., Berdygulova Z.A., Bissenbay A.O., Kuatbekova S.A., Dosmagambet Z.M., Lushova A., Kan S.A., Kuligin A. V., Kuatbek M.M., Abdolla N., Dinara A., Naizabayeva A., Nizkorodova A.S., Akshalova, P.B., Abdybekova A.M., Rsaliyev A.S., Abduraimov Y.O., Mamadaliyev S.M., Skiba Y.A., Ostapchuk Y.O. Occurrence and epidemiology of bovine coronavirus in cattle in Kazakhstan // *Veterinary Journal* 313 (2025) 106371. <https://doi.org/10.1016/j.tvjl.2025.106371> (квартиль по базе Web of Science – Q1, проценти́ль по базе Scopus – 81%).

16. Zhigailov, A. V., Perfilyeva, Y. V., Malysheva, A. A., Cherusheva, A. S., Berdygulova, Z. A., Naizabayeva, D. A., Ivanova, K. R., Kuatbekova, S. A., Dosmagambet, Z. M., Lushova, A. V., Kan, S. A., Kuligin, A. V., Bissenbay, A. O., Kuatbek, M. M., Mashzhan, A. S., Abdolla, N., Nizkorodova, A. S., Maltseva, E. R., Rsaliyev, A. S., ... Ostapchuk, Y. O. Survey and Associated Risk Factors for the Presence of Ruminant Pestiviruses in Domestic Ovine and Caprine Populations from Kazakhstan // *Viruses*. 2025; 17(5), 676. <https://doi.org/10.3390/v17050676> (квартиль по базе Web of Science – Q2, проценти́ль по базе Scopus – 83%).

17. Bashenova E, Nissanova R, Kirpichenko V, Akshalova P, Malysheva A, Ikramkulova F, Cherusheva A, Abduraimov Y, Rsaliyev A, Zakarya K, et al. Bovine Viral Diarrhea in Kazakhstan // *Viruses*. 2025; 17(10):1341. <https://doi.org/10.3390/v17101341> (квартиль по базе Web of Science – Q2, проценти́ль по базе Scopus – 83%).

18. Bekshin Z, Askarov A, Abduraimov Y, Rsaliyev A, Bissenova G, Amirkhanova N, Nurbekova Z, Temirbekova A. Tuberculosis and Impact of COVID-19 on Spread of Epidemics in Kazakhstan // *Pathogens*. 2025; 14(6):559. <https://doi.org/10.3390/pathogens14060559> (квартиль по базе Web of Science – Q2, проценти́ль по базе Scopus – 78%).

19. Mukantayev K, Adish Z, Kanayev D, Tokhtarova L, Abirbekov B, Abduraimov Y, Rsaliyev A, and Tursunov K. Development and validation of a recombinant Rap1-based lateral flow immunoassay for rapid serodiagnosis of bovine babesiosis in Kazakhstan // *Veterinary World*. 2025; 18(7):1881-1890. <https://doi.org/10.14202/vetworld.2025.1881-1890> (квартиль по базе Web of Science – Q2, проценти́ль по базе Scopus – 87%).

20. Ostrovskii A, Shevtsov A, Kuibagarov M, Kamalova D, Dauletov A, Rsaliyev A, Abduraimov Y, and Mukanov K. Development and application of a quantitative polymerase chain reaction assay for the detection and genotyping of bovine leukemia virus in cattle from Kazakhstan // *Veterinary World*. 2025; 18(8): 2320-2331 <https://doi.org/10.14202/vetworld.2025.2320-2331> (квартиль по базе Web of Science – Q2, проценти́ль по базе Scopus – 87%).

21. Anuarbekova S, Sadykov A, Amangeldinova D, Kanafina M, Sharova D, Alzhanova G, Nurgaliyeva R, Jumagazyeva A, Tynybayeva I, Zhumakaeva A, et al. Development of a Bacterial Lysate from Antibiotic-Resistant Pathogens Causing Hospital Infections // *Microorganisms*. 2025; 13(8):1831. <https://doi.org/10.3390/microorganisms13081831> (квартиль по базе Web of Science – Q2, проценти́ль по базе Scopus – 78%).

22. Ibragimova N, Kabdraisova A, Lyu M, Iskakbayeva Zh, Krasnoshtanov A, Tin Y, Sakhipov Y, Turganbay S, Karzhaubayeva R, Ilin A, Azembayev A, Mombekov S, and Raheem S.

Evaluation of the Therapeutic Efficacy of the Newly Formulated Drug “Novostron” as an Experimental Basis for Clinical Trials // ACS Omega. 2025; 10 (33), 36946-36959. <https://doi.org/10.1021/acsomega.4c11017> (квартиль по базе Web of Science – Q2, процентиль по базе Scopus – 77%).

23. Nissanova R, Molla W, Orynbayev M, Serikov M, Kirpichenko V, Ragatova A, Kassenov M, Bizhanov A, Kassymbekova L, Zhanabayev A, Baikadamova G, Abutalip A, Mussayeva A, Omarbekova U, Ospanov Y, Tlegenova Z, Borsynbayeva A, Turgenbayev K, Mussoev A, Berdikulov M, Aheti B and Alymov I. Applications and advancements of animal cell cultures in virology: Insights from lumpy skin disease virus research // International Journal of Veterinary Science. 2025; 14(5): 846-853. <https://doi.org/10.47278/journal.ijvs/2025.044> (квартиль по базе Web of Science – Q2, процентиль по базе Scopus – 76%).

24. Bekshin Zh., Temirbekova A., Nurbekova Zh., Amirkhanova N., Satenova A.M., Askarov A., Zakarya K., Abduraimov Ye., Rsaliyev A. Epidemiology, Virology, and Control of Highly Pathogenic Avian Influenza in Kazakhstan // Pathogens 2025, 14, 1084. <https://doi.org/10.3390/pathogens14111084> (квартиль по базе Web of Science – Q2, процентиль по базе Scopus – 78%).

in journals recommended by the Committee for Quality Assurance in Science and Higher Education (CQASHE):

1 Mukantayev K.N., Tursunov K.A., Adish Zh.B., Kanayev D.B., Tokhtarova L.A., Abirbekov B.E. Monoclonal antibodies against the *Babesia bovis* RAP1 antigen: obtaining and characterization // Eurasian Journal of Applied Biotechnology. - 2024. - № 2. - P.16-23. <https://doi.org/10.11134/btp.2.2024.2>.

2 Ануарбекова С.С., Джумагазиева А.Б., Амангельдинова Д.К., Шарова Д.Е., Канафина М.А., Нургалиева Р.К., Альжанова Г.С., Тыныбаева И.К., Садыков А.М. Оценка биотехнологического потенциала культур микроорганизмов, перспективных для получения лизата, подавляющего антибиотикорезистентные штаммы // Eurasian Journal of Applied Biotechnology. - 2024. - № 2. - С.40-48. <https://doi.org/10.11134/btp.2.2024.5>.

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1. **Utility Model Patent of the Republic of Kazakhstan №9597.** IPC C12Q 1/6876, C12Q 1/6888.
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Authors: Nizkorodova A.S., Maltseva E.R., Berdygulova Zh.A., Naizabaeva D.A., Kuatbekova S.A., Perfilieva Yu.V., Ostapchuk E.O., Skiba Yu.A., Mamadaliev S.M.
Applicant and patent holder: LLP "National Center for Biotechnology" (KZ).
Filed: 17.05.2024; Published: 27.09.2024. – Bulletin №39. – 1 p.
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Bacterial strain *Escherichia coli* ArcticExpress (DE3)/Lmp60 — producer of recombinant murein hydrolase *Listeria monocytogenes*.
Authors: Turgimbayeva A.M., Kaukabayeva G.K., Mukhlis Sh.E., Abeldenov S.K., Eskendirova S.Z.
Applicant and patent holder: LLP "National Center for Biotechnology" (KZ).
Filed: 08.10.2024; Published: 20.12.2024. – Bulletin №51.
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Strain *Bacillus pumilis* B-RKM 1131 exhibiting pronounced antagonism to multidrug-resistant strains of *E. coli*, *S. aureus*, *P. aeruginosa*.
Authors: Urazova M.S., Tuyakova A.K., Bissenova G.N., Bekshin Zh.M.
Applicant and patent holder: LLP "Republican Collection of Microorganisms" (KZ).
Filed: 24.09.2024; Published: 27.12.2024. – Bulletin №52.
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Inactivated vaccine against ovine salmonellosis abortion.
Authors: Musayeva A.K., Kasenov M.M., Egorova N.N., Nurpeisova A.S.
Applicant and patent holder: LLP "Kazakh Research Veterinary Institute" (KZ).
Filed: 23.09.2024; Published: 24.01.2025. – Bulletin №4.
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Set of primers and TaqMan probes for the identification of *Rickettsia spp.* by real-time PCR.
Authors: Rysbekova A.K., Zhumadilova Z.B., Yesimseit D.T., Abdeliev B.Z., Abdirasilova A.A., Kasenova A.K., Turebekov N.A.
Applicant and patent holder: LLP "National Scientific Center for Especially Dangerous Infections named after Masgut Aikimbayev" (KZ).
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6. **Utility Model Patent of the Republic of Kazakhstan №10300.** IPC G01N 33/58, C12N 15/11 (2006.01), C12Q 1/68 (2018.01), C12Q 1/6876 (2018.01).
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Authors: Rysbekova A.K., Zhumadilova Z.B., Yesimseit D.T., Abdeliev B.Z., Abdirasilova

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Method for obtaining a bacterial lysate.
Authors: Dzhumagazieva A.B., Iskakbayeva Zh.A., Leonova S.I., Sadykov A.M., Anuarbekova S.S., Alzhanova G.S., Dzhunusova D.A.
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Method for obtaining standard positive and negative sera for serological studies of bovine viral diarrhea.
Authors: Bashenova E.E., Kirpichenko V.V., Mamanova S.B., Nisanova R.K., Akshalova P.B., Zharmukhametova A.Zh.
Applicant and patent holder: LLP "Kazakh Research Veterinary Institute" (KZ).
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Method for producing an associated inactivated vaccine against infectious bovine rhinotracheitis and bovine viral diarrhea.
Authors: Bulatov E.A., Koshemetov Zh.K., Zhugunisov K.D., Kondibaeva Zh.B., Amanova Zh.T., Sametova Zh.Zh., Abitaev R.T., Azanbekova M.A., Turyskeldi Sh.S., Usembay A.K., Kurmasheva A.K., Toktyrova D.S., Mazbayeva D.M., Kyrgyzbaeva A.S., Kadyrova B.B.
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Iodine-containing complex with antimicrobial and antifungal properties, and method of its production.
Authors: Turganbay S., Sabitov A.N., Ilyin A.I., Askarova D.A., Dzhumagazieva A.B.
Applicant and patent holder: JSC "Scientific Center for Anti-Infective Preparations" (KZ).
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Method for the diagnosis of infectious bovine rhinotracheitis by real-time PCR.
Authors: Sultankulova K.T., Kozhabergenov N.S., Kerimbaev A.A., Chervyakova O.V., Shynybekova G.O., Bopi A.K., Isabek A.U., Abaeva M.R., Almezhanova M.D.
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Method for the diagnosis of bovine smallpox by real-time PCR.
Authors: Sultankulova K.T., Kozhabergenov N.S., Kerimbaev A.A., Chervyakova O.V., Shynybekova G.O., Bopi A.K., Isabek A.U., Abaeva M.R., Almezhanova M.D.
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Method for obtaining a specific antigen for the diagnosis of equine epizootic lymphangitis.
 Authors: Isakhan A.A., Kaukabayeva M.Zh., Umuraliev B.K., Seysenbayeva M.S., Zhakypbek A.S., Orazymbetova N.K., Koshemetov Zh.K., Adalbekova A.K., Abeuov Kh.B., Chervyakova O.V., Espembetov B.A., Zinina N.N., Kerimbaev A.A.
 Applicant and patent holder: LLP "Research Institute of Biological Safety Problems" (KZ).
 Filed: 13.11.2024; Published: 14.11.2025.

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 Method for obtaining diagnostic antisera against *Bacillus anthracis*.
 Authors: Seysenbayeva M.S., Zhakypbek A.S., Orazymbetova N.K., Koshemetov Zh.K., Umuraliev B.K., Kaukabayeva M.Zh., Adalbekova A.K., Isakhan A.A., Abeuov Kh.B., Chervyakova O.V., Kerimbaev A.A.
 Applicant and patent holder: LLP "Research Institute of Biological Safety Problems" (KZ).
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 Method for detecting the antigen of *Bacillus anthracis* by enzyme-linked immunosorbent assay (ELISA).
 Authors: Seysenbayeva M.S., Zhakypbek A.S., Orazymbetova N.K., Koshemetov Zh.K., Umuraliev B.K., Kaukabayeva M.Zh., Adalbekova A.K., Isakhan A.A., Abeuov Kh.B., Chervyakova O.V., Kerimbaev A.A.
 Applicant and patent holder: LLP "Research Institute of Biological Safety Problems" (KZ).
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 Method for obtaining specific serum for the diagnosis of equine epizootic lymphangitis.
 Authors: Isakhan A.A., Kaukabayeva M.Zh., Umuraliev B.K., Seysenbayeva M.S., Zhakypbek A.S., Orazymbetova N.K., Koshemetov Zh.K., Adalbekova A.K., Abeuov Kh.B., Chervyakova O.V., Espembetov B.A., Zinina N.N., Kerimbaev A.A.
 Applicant and patent holder: LLP "Research Institute of Biological Safety Problems" (KZ).
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 Method for obtaining the antigen of the causative agent of equine epizootic lymphangitis.
 Authors: Kaukabayeva M.Zh., Isakhan A.A., Orazymbetova N.K., Seysenbayeva M.S., Umuraliev B.K., Zhakypbek A.S., Adalbekova A.K., Kerimbaev A.A., Nakhanov A.K., Abduraymov A.K., Rsaliev A.S., Koshemetov Zh.K.
 Applicant and patent holder: LLP "Research Institute of Biological Safety Problems" (KZ).
 Filed: 01.04.2025; Published: 03.04.2026.
18. **Utility Model Patent of the Republic of Kazakhstan №11336.** IPC A61B 10/00 (2006.01), A61K 39/21 (2006.01), A61K 39/395 (2006.01).
 Method for obtaining standard positive and negative sera for serological studies of infectious bovine rhinotracheitis.
 Authors: Kasenov M.M., Kirpichenko V.V., Bashenova E.E., Nisanova R.K., Mamanova S.B., Karabasova A.S., Akylbai A.K., Zhapbar A.P., Ikramkulova F.R., Tulepov B.S., Turkeev M.K., Kasen A.Zh.
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