

Project name: Development of an express test for the diagnosis of salmonella abortion of horses based on monoclonal antibodies

Relevance: horse breeding in the Republic of Kazakhstan is the most important branch of animal husbandry, currently the number of horses is more than 1,700,000 heads. Salmonella abortion of mares is an infectious disease accompanied by abortions and the birth of an unviable fetus. The economic damage consists of the loss of the reproductive ability of young horses, the loss of offspring, the decrease in the productivity of mares and the cost of veterinary drugs and disinfection. In this regard, the most important measures for the development of this direction of animal husbandry is to ensure the health of animals and increase the effectiveness of disease diagnosis. The main diagnostic method is bacteriological, but it is insufficiently sensitive, time-consuming and strongly depends on the quality of the material. According to the recommendations of the OIE, PCR can be used, however, the use of PCR is difficult due to the high cost of equipment and test systems. ELISA can be used in mass studies, but does not allow differentiating the pathogen. This project provides for the development of a domestic immunochromatographic test for the detection and simultaneous differentiation of the causative agent of salmonella abortion of horses. The test will allow the analysis to be carried out outside the laboratories, without the use of equipment and training of specialists and get the result within 15 minutes. It can be used for monitoring studies instead of time-consuming bacteriological analysis. The development may be in demand not only in Kazakhstan, but also in the CIS countries, where this infection is also widespread. Currently, there are no analogues in the Republic of Kazakhstan.

Goal: sampling from farms in the northern regions of the Republic of Kazakhstan, their study by ELISA and PCR, genotyping of isolated isolates and the development of a domestic rapid test based on monoclonal antibodies for the diagnosis of salmonella abortion of horses, which will quickly and accurately identify infected animals.

Expected and achieved results:

A simple, fast and effective test will be developed to identify the causative agent of salmonella abortion of horses in biological and pathological material, which will increase the effectiveness of diagnosis and prevent damage from this infection. The test can be used to assess the quality of meat products (horse meat) for contamination with microorganisms of the genus *Salmonella*;

- 3 articles will be published in peer-reviewed scientific publications, an article in publications recommended by COXON, 1 patent of the Republic of Kazakhstan will be obtained, the results of the research will be reported at national and international conferences;

- scientific and technical documentation will be developed for the production and application of the IHA test for rapid diagnosis of salmonella abortion of horses;

- the target consumers of scientific products will be: "Republican Veterinary Laboratory" of the Ministry of Agriculture of the Republic of Kazakhstan, regional and district laboratories; "National Reference Center for Veterinary Medicine; economic entities engaged in horse breeding.

Members of the research group:

Project manager: Borovikov S.N., Candidate of Biological Sciences, Acting Professor. Hirsch index (h-index)-2, profile (<http://orcid.org/0000-0002-9721-9732>).

Members of the research group:

Abdrakhmanov S.K., Doctor of Veterinary Sciences, position in the project - leading researcher. Hirsch Index (h-index)-4, profile (<http://orcid.org/0000-0003-3707-3767>)

Akibekov O.S. - Candidate of Veterinary Sciences, position in the project - senior researcher. Hirsch index (h-index)-1, profile (<http://orcid.org/0000-0002-8647-0083>).

Dyusenova G.T. - Candidate of Biological Sciences, position in the project - senior researcher, profile (<https://orcid.org/0000-0002-6638-6968>).

Zhumalin A.H. Master's degree, position in the project - researcher. Hirsch index (h-index) – 2, profile (<http://orcid.org/0000-0003-2057-4186>).

Koibagarov M.A., Candidate of Veterinary Sciences, position in the project - researcher. Hirsch index (h-index)-1, profile (<https://orcid.org/0000-0001-7428-7620>).

Shevtsova E.S., position in the project - researcher. Hirsch index (h-index)-5, profile (<https://orcid.org/0000-0002-7221-5866>).

Syzdykova A.S., Master's degree, position in the project - researcher. Profile (<http://orcid.org/0000-0002-8647-0083>).

Baibolin Zh.K., Master's degree, position in the project - junior researcher.

Karibzhanova A.A., master's student, position in the project - laboratory assistant.

Information for potential users:

A domestic rapid test for the diagnosis of salmonella abortion of horses will be developed, which allows analyzing biological and pathological material outside of laboratory conditions and obtaining reliable results within 15 minutes. The use of the test in veterinary practice will allow monitoring of this infection directly in farms and replace the long and time-consuming bacteriological analysis. In addition, the test can be used to quickly and reliably assess the quality of horse meat for contamination with microbes of the genus *Salmonella*.

Additional information:

In 2021, samples of material samples from farms in the northern regions of the Republic of Kazakhstan were taken, samples were examined by ELISA and PCR, genotyping of isolated isolates was carried out;

1) Samples of biological material were taken and laboratory studies were carried out using immunological and molecular genetic methods;

2) Bacterial isolates of *Salmonella abortus equi* have been isolated from biological material from animals;

3 Isolated DNA from bacterial isolates of *Salmonella abortus equi*

4) Genome-wide sequencing and genotyping of isolated isolates were carried out;