Title of the project topic:IRNAP14870972 «Development of enzyme immunoassay based on the recombinant antigen of *Trichinella spp*.»

Abstract: Trichinellosis is a foodborne zoonosis that can be transmitted to humans by ingestion of raw or undercooked meat from animals infected with nematode larvae belonging to the genus *Trichinella*. *Trichinella* is distributed throughout the world, and all monogastric mammalian species are potential hosts for the parasite.

The idea of the project is to develop an enzyme immunoassay based on the recombinant Tsp1 antigen of the excretory-secretory product (ESP, ES) of *Trichinella spp*. (53 kDa). ES antigen of muscle larva *Trichinella spp*. is the most widely used diagnostic antigen for Trichinellosis, but obtaining the ES antigen requires the collection of helminths from infected animals and the detection of specific IgG against the muscle larvae of Trichinella spp. However, the use of enzyme immunoassay based on recombinant antibodies will speed up the process of diagnosis without slaughtering the animal, reduce the production of antigens for diagnosis, standardize components, and obtain high quality and specificity of ELISA. Serological methods can be useful for the purposes of epidemiological survey and monitoring of trichinella-free farms.

The aim of the project is to develop an ELISA test system based on the recombinant protein of the excretory-secretory product of*Trichinella spp***.**

Expected and achieved results: During the implementation of the project, the following results were obtained:

- sequencing of the obtained *Trichinella* larvae and analysis of the DNA nucleotide sequence were carried out to select the coding gene for the excretory-secretory product of *Trichinella spp*.;
- the pET28a/Tsp1 genetic construct was created and the *E. coli* strain, a producer of recombinant Tsp1, was obtained;
- the obtained recombinant species-specific protein of the excretory-secretory product of *Trichinella spp*. was evaluated on immunogenicity and antigenicity to determine diagnostic value;
- ELISA test system based on the obtained recombinant *Trichinella spp*. antigen was developed;
- laboratory regulations for the manufacture of components "ELISA kit for serological diagnosis of *Trichinellosis*" and instructions for its use were developed.

Based on the results of scientific research, the following will be published and made:

- at least 1 (one) article or review in a peer-reviewed scientific publication that is included in the 1 (first) quartile by impact factor in the Web of Science database and (or) has a CiteScore percentile in the Scopus database of at least 80 (eighty), and also at least 1 (one) article or review in a peer-reviewed foreign or domestic publication recommended by Committee for Quality Assurance in

Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan;

- two reports at scientific forums, including one at an international conference of far-abroad countries with the publication of abstracts will be held;

- two dissertations for the academic degree "Master of Technical Sciences" in the specialty "Biotechnology" (direction "Veterinary Biotechnology") and two theses in the same specialty will be defended;

- a certificate of copyright for the research results will be received.

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List of publications and patents published within the framework of this project for 2023

1. Gubaidullin N.N., Askarova N.N., Gadzhimuradova A.M., Akibekov O.S. Bioinformatics analysis of the selection of oligonucleotides for sequencing of various Trichinella species" // Materials of the international scientific-practical conference "Seifullinskie chtenia - 19" dedicated to 110 – years to Handelman M.A. " - 2023.- T.I, Ч.II.- Б.210-212.

2. Akibekov O.S., Gajimuradova A. M., Zhumalin A. Kh., Duisenov S.M., Gubaidullin N.N., Askarova N.A. «Serine protease of Trichinella spiralis and possible application in the early diagnosis of trichinellosis in animals» // Вестник науки КАТИУ им.С.Сейфуллина секция «Ветеринарные науки» in the press

Information for potential users: An enzyme immunoassay system based on the recombinant protein of the excretory-secretory product Trichinella spp will be developed. for early diagnosis of trichinosis in animals and humans.