AP19678641 Evaluation of the polymorphism of the BoLA-DRB3 gene associated with leukemia resistance for the development of evidence-based approaches to marker-oriented cattle breeding

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Relevance: Bovine leukemia is a chronic, infectious disease of a tumor nature, manifested by an asymptomatic course, a violation of the maturation of blood cells, lymphocytosis, malignant formations in the organs of the circulatory system. The disease is registered in most countries of the world. Economic damage to livestock from leukemia consists not only of losses associated with the death and premature culling of animals, but also a decrease in productivity and quality of dairy and meat products, the cost of anti-leukemia measures, as well as a ban on the sale of breeding cattle from disadvantaged farms.

The project is aimed at assessing the genetic potential of resistance to leukemia based on DNA typing of animals using the polymorphic gene *BoLA-DRB3.*

Project goal. To determine the relationship of the polymorphism of the BoLA-DRB3 gene with the level of proviral load and with the course of the leukemia process and to develop recommendations for marker genomic selection aimed at resistance to the bovine leukemia virus.

Expected results:

- for the year 2023: The assessment of the level of spread of bovine leukemia and the features of the leukemic process in the territory of the Republic of Kazakhstan will be given; experimental groups of animals have been formed; leukemia has been diagnosed by serological, hematological and molecular genetic research methods; experimental animals have been ranked according to the clinical stage of the leukemic process; DNA has been isolated and a DNA database has been created for further sequencing; selection and determination homologous primers for alleles of the *BoLA-DRB3* gene to *BLV*; a PCR and PCR-RFLP protocol has been developed to identify allelic variants of the *BoLA-DRB3* resistance gene to *BLV*.

- for the year 2024: A laboratory research protocol will be developed and optimized to study the proviral load in animals with *BLV*; sequencing of short DNA sections isolated from the studied animals was carried out; the allelic polymorphism of the *BoLA-DRB3* gene in the cattle population of the Republic of Kazakhstan was studied; the frequency of occurrence of allelic variants of the *BoLA-DRB3* resistance gene to BLV was estimated; experimental animals were ranked according to the level of proviral load. As a result of the implementation of the scientific project, 1 (one) article or review will be published in a peer-reviewed foreign or domestic publication recommended by the KOKSNVO. 1 (one) article and (or) review will be published in a peer-reviewed scientific publication indexed in the Science Citation Index Expanded of the Web of Science database and (or) having a CiteScore percentile in the Scopus database of at least 35 (thirty-five).

- for the year 2025: Bioinformatic processing of sequenced short sections of DNA will be carried out; associative tests between allelic variants of the *BoLA-DRB3* gene, the stage of the leukemic process and the level of proviral load in bovine leukemia will be carried out; a recommendation on marker genomic selection aimed at resistance to the bovine leukemia virus will be given. As a result of the implementation of the scientific project, 1 (one) article or review will be published in a peer-reviewed foreign or domestic publication recommended by the KOKSNVO. 1 (one) article and (or) review will be published in a peer-reviewed scientific publication indexed in the Science Citation Index Expanded of the Web of Science database and (or) having a CiteScore percentile in the Scopus database of at least 35 (thirty-five). 1 thesis will be published in the collection of the international conference.

The results obtained for 2023:

The assessment of the level of spread of bovine leukemia and the features of the leukemic process in the territory of the Republic of Kazakhstan was given; experimental groups of animals were formed; leukemia was diagnosed by serological, hematological and molecular genetic research methods; experimental animals were ranked according to the clinical stage of the leukemic process; DNA was isolated and a DNA database was created for further sequencing; selection and determination of homologous primers for alleles of the *BoLA-DRB3* gene to *BLV*; a PCR and PCR-RFLP protocol has been developed to identify allelic variants of the *BoLA-DRB3* resistance gene to *BLV*.