REVIEW

of the scientific consultant for the dissertation of A.N. Akimniyazova "The interaction of miRNAs with mRNAs of candidate genes of gastrointestinal tract cancer" presented for defense in the specialty "6D074000-Nanomaterials and nanotechnology" for the Doctor of Philosophy (PhD) degree

Akimniyazova Aigul Nurlankyzy received a Master's degree in Biotechnology at Al-Farabi Kazakh National University and then, in 2018 entered doctoral (PhD) studies in the specialty "Nanomaterials and Nanotechnology" (biological sciences). In this specialty at the Faculty of Biology and Biotechnology, the preparation of doctoral students is carried out for the first time, and therefore for A.N. Akimniyazova was tasked with completing a dissertation work corresponding to a new specialty and at a high level. With excellent theoretical training, A.N. Akimniyazova immediately identified the goal and objectives of the dissertation work. This was done taking into account the application of the results obtained in nanomedicine. The objects of the study were the organs of the gastrointestinal tract, neoplasms which are the cause of high mortality. The relevance of the fight against cancer in Kazakhstan and the world is relevant, which gives the dissertation work a high responsibility. The dependence of the expression of candidate genes for cancer of the esophagus, stomach, small intestine, and colon on miRNA has been studied in many studies, but almost always only correlations between changes in miRNA expression and candidate genes have been established. A.N. Akimniyazova set the task to establish quantitative characteristics of the interaction of these nanoscale objects. In addition to the well-known MirTarget program, A.N. Akimniyazova created and used a number of other programs that provide analysis of a huge amount of material. Due to this, it was possible to carry out a lot of computer studies and obtain original results. The novelty of A.N. Akimniyazova is to obtain quantitative characteristics of the interaction of miRNA with mRNA of candidate genes for oncological diseases of the organs of the gastrointestinal tract. Due to this, associations of miRNAs and candidate genes were established, which can be used to develop methods for early diagnosis of the studied diseases and subsequently recommend for personalized therapy. During her dissertation work, A.N. Akimniyazova proved to be a fully qualified specialist capable of independent work in the field of research on nanomaterials and nanotechnology. Possessing versatile knowledge, A.N. Akimniyazova has assisted other doctoral and master students in their research. As a result, she has so far published six articles in high-impact factor journals and has a Hirsch index of three. She has proven herself well in teaching subjects in English in the Higher School of Medicine of the Faculty of Medicine and Health care in Al-Farabi Kazakh National University. A.N. Akimniyazova is undoubtedly a promising scientist and teacher.

A.N. Akimniyazova at a high scientific level completed voluminous dissertation research, successfully solved all the problems, and achieved the set goal. I believe that A.N. Akimniyazova prepared a full-fledged dissertation for

defense, containing new results of practical and theoretical significance. All this gives me a reason to recommend her dissertation for the defense for a PhD in the specialty 6D074000-Nanomaterials and nanotechnology and assign A.N. Akimniyazova the PhD degree.

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