

## **STATEMENT OF OPINION**

**by Prof. Anastas Batalov, MD**

**Head of the Department of Propaedeutics of Internal Medicine "Prof. Dr. Anton Mitov"  
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regarding a dissertation for the award of the educational and scientific degree of 'Doctor of  
Medical Sciences' professional field 7.1 Medicine  
Doctoral program "Medical Biology"

**Author: Prof. Maria Hristova Kazakova, PhD**

**Department of Medical Biology**

**Title: “ Molecular biological and immunological studies on the chitinase-like proteins  
CHI3L1 and CHI3L2 in processes of inflammation, tumorigenesis and neurodegeneration”**

### **General presentation of the procedure**

The set of materials presented on electronic media complies with Article 70 (1) of Section I. Acquisition of the educational and scientific degree "Doctor of Philosophy" at MU-Plovdiv; Regulations of MU-Plovdiv.

Maria Kazakova graduated as a bachelor in molecular biology (2005) and a master in cell biology (2006) from the Plovdiv University “Paissi Hilendarski”. From 2005 to 2007, she worked as a biologist in the Department of Developmental Biology of the same university. In 2007, she was appointed as an assistant professor in the Department of Medical Biology of the Medical University of Plovdiv. In 2013, she defended her doctoral thesis in immunology. In the same year, she also acquired a specialty in medical biology, and the following year she was appointed as a chief assistant professor. In 2015, M. Kazakova also graduated as a master - manager of applied research at the P. Hilendarski University. She conducted leadership training at Harvard University related to the creation of public value in 2023-2024. She successively held the academic positions of associate professor (since 2016) and professor (2024). In 2024, she was elected head of the Department of Medical Biology.

She is a member of the Union of Scientists in Bulgaria, the Bulgarian Society of Immunology, the European Federation of Immunological Societies (EFIS) and the Society of Medical Biology.

The study focuses on the role of chitinase-like proteins CHI3L1 and CHI3L2 in the processes of inflammation, tumorigenesis and neurodegeneration. Although they do not possess enzymatic activity, they actively participate in tissue remodeling and immune response. The possibility of the two molecules to assist in the diagnosis, stratification and monitoring of therapy of inflammatory or tumor processes makes the topic of the dissertation relevant and significant.

CHI3L1 (YKL-40) has been intensively studied as a biomarker in processes related to acute and chronic inflammation and tumorigenesis. CHI3L2 (YKL-39) has been less studied, the available literature is scarce. It is discussed as a potential marker in gliomas.

#### **Characteristics and evaluation of the dissertation work and contributions**

The dissertation work contains the following sections: introduction, literature review, goals and objectives, materials and methods, results, discussion, conclusions and contributions. The bibliography contains 213 titles, of which two in Cyrillic. 42 figures and 31 tables are included. At the end of the dissertation work, 4 appendices are systematized.

The statement of the problem, reflected in the literature review, is written on 34 pages, concerns chitinases and chitinase-like proteins. The role of CHI3L1 and CHI3L2 in several diseases of different etiology such as rheumatoid arthritis, systemic sclerosis, osteoarthritis is described in detail. Data on the levels of the two chitinase-like proteins in ischemic stroke, autism spectrum disorder and infections of the central nervous system are presented in a systematized manner. A separate chapter is dedicated to the importance of proteins in tumorigenesis, and more specifically in colorectal carcinoma and glioblastomas.

The aim of the dissertation is to investigate the complex expression and biological role of chitinase-like proteins (CHI3L1 and CHI3L2) in processes of inflammation, tumorigenesis and neurodegeneration. There are two tasks, one of which has three subtasks.

The section "Methods and Materials" is presented on 24 pages. Various molecular biological, immunological and cell biological analyses were used. The methods used are diverse from innovative to routinely used.

The part "Results" is the most extensive, written on 72 pages. The data are grouped into separate parts according to nosologies. 42 figures and 31 tables are used to illustrate the results. The discussion is analytical, balanced and related to the current scientific literature.

Seven conclusions are presented, which are clearly and specifically formulated. Three contributions are presented.

The results of the comprehensive study are presented in a total of 17 publications, of which 15 articles have been published in international journals with an impact factor and high quartile (Q1 and Q2). Two of the publications are under review.

The data have been presented at a total of 30 scientific forums, of which 15 are international congresses. The realization of the dissertation work was carried out with the financial support of several intra-university projects, two national and 1 European project.

The number of scientific papers and citations covers the quantitative criteria set out in the Regulations of MU-Plovdiv.

Table 1. Minimum required points by groups of indicators

<i>Group of indicators</i>	<i>Content</i>	<i>Doctor of Sciences</i>	<i>Maria Kazakova</i>
<i>A</i>	<i>Indicator 1</i>	<i>50</i>	<i>50</i>
<i>B</i>	<i>Indicator 2</i>	<i>100</i>	<i>100</i>
<i>Г</i>	<i>Summary of indicators from 5 to 9</i>	<i>100</i>	<i>133</i>
<i>Д</i>	<i>Summary of indicators from 10 to 12</i>	<i>100</i>	<i>166 x 15=2490</i>
	<i>Appendix of MU-Plovdiv</i>	<i>+</i> <i>100</i>	
	<b>Total</b>	<b>450</b>	<b>2 773</b>

The author's summary has been prepared in accordance with the established requirements for content and structure and is presented in a concise and logically consistent manner. Its content accurately reflects the scope and results achieved in the dissertation.

The dissertation presented to me is up-to-date, complete and with an applied focus. The contributions are of an original, substantial theoretical and scientific-practical nature. It is the embodiment of a meaningful long-term scientific research experience. The scientific publications and scientific communications made on the topic of the dissertation are undoubted proof that Prof. Maria Kazakova thoroughly researches the topic she is developing.

I believe that the dissertation meets all the requirements of the Law on the Development of Academic Staff in the Republic of Bulgaria and the regulations of MU-Plovdiv.

In conclusion, I give a positive assessment and will vote to award the educational and scientific degree of "Doctor of Medical Sciences" in the doctoral program "Medical Biology" Professional field 7.1. Medicine to prof. Maria Kazakova, and I would like to suggest that the other members of the scientific jury also vote positively.

Заличено на основание  
Чл.5 §1, б. "В" Регламент (ЕС)2016/679

06.04.2026

Prof. Anastas Batalov, MD