

OFFICIAL STATEMENT

by **Assoc. Prof. Elenka Stoilova Georgieva, PhD**

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Regarding a dissertation for the nomination of the scientific degree "**Doctor of Sciences**"
in the field of higher education 4 "**Natural Sciences, Mathematics and Informatics**"
professional field **4.3. Biological Sciences (Molecular Biology)**

Author: Ch. Assistant Professor Dr. Tihomir Iliev Vachev - Plovdiv Paisii Hilendarski
University

Topic: "Comparative genomic, transcriptomic and proteomic studies in
neurodevelopmental disorders"

1. General presentation of the procedure and the dissertation

By order № P33-5262 of 29.10.2020 of the Rector of Plovdiv University I was appointed as a member of the scientific jury to provide a procedure for the defense of a dissertation on "Comparative genomic, transcriptome and proteomic studies in neurodevelopmental disorders" for acquiring the degree "doctor of science" in higher education 4 "Natural science, Mathematics and Informatics", professional field 4.3. "Biological sciences" (Molecular biology). Author of the dissertation is Tihomir Iliev Vachev, Phd, currently working as an assistant professor at the department "Plant Physiology and Molecular Biology" at the Faculty of Biology, University of Plovdiv "Paisii Hilendarski".

The presented set of materials by Dr. Tihomir Iliev Vachev is in accordance with Article 45 (4) of the Regulations for development of the academic staff of PU and include the following documents:

- application to the Rector of the University of Plovdiv for disclosure of the procedure for defense of the dissertation;
- CV in European format;
- a copy of the diploma for the educational and scientific degree "Doctor";
- protocols of departmental councils related to the opening of the procedure and with the preliminary discussion of the dissertation;
- dissertation work;
- summary of the dissertation;
- list of scientific publications on the topic of the dissertation;
- copies of scientific publications (a total of 9, 8 of which are indexed in Scopus);
- declaration of originality and authenticity of the attached documents;
- reference for compliance with the minimum national requirements;

Brief biographical data

Tihomir Vachev was born on 09.01.1981, has a bachelor's degree in "Biology" and a master's degree in "Molecular Biology and Biotechnology" (2008) at the University of Plovdiv". Until 2011 he was a full-time PhD student at the Department of Plant Physiology and Molecular Biology at the same university, successfully defending his doctoral dissertation in Molecular Biology. He earned a second doctorate degree on "Genetics" that he defended in

2016 at the Medical University - Plovdiv. Dr. T. Vachev is currently working at the Department "Plant Physiology and Molecular Biology" since 2007, and since 2013 until today he is chief assistant professor at the same department.

2. Relevance of the topic

Schizophrenia and autism spectrum disorder (ASD) are serious diseases with negative socio-economic impact that affect many people worldwide. Reduced working capacity and social adaptability transform the individual problem into socially significant. These diseases are difficult to diagnose, so the detection of markers from accessible sources, such as peripheral blood, for early diagnosis is of particular importance to society. Therefore, the current study, related to early detection and assessment of disease development, is extremely relevant essential. The set goal and the related tasks are formulated clearly and correctly.

3. Knowledge of the problem

In the chapter "Literature Review" the the author shows that he is well acquainted with the literature on the developed topic. Also included is the etiology of schizophrenia and diseases autistic spectrum, with an emphasis on the molecular-genetic basics of their pathology, alleged factors associated with these diseases and major pathogenetic hypothesis for their nascence. Along with this, the molecular-genetic findings related to the studied disorders are presented. Considered are some epigenetic factors related to schizophrenia and autism. The author pays special attention to the dysregulation of gene expression under the influence of small RNAs (siRNAs), which are the basis of the applied experiments in the dissertation. From extensive literature review and detailed bibliography, it can be concluded that the doctoral student knows the problem in detail, which is an indicator of high level of knowledge, as a specialist in the field.

4. Research methodology

The materials and methods in the dissertation are presented in details. Included are the criteria for selecting patients, the methods for the analysis of samples - genomic, transcriptomic and proteomic with opportunities for diagnostics of neurodevelopmental disorders, and statistical analyzes for the assessment of data.

5. Characteristics and evaluation of the dissertation and contributions

In this dissertation the results presented include more than 70 standard pages and illustrated with 58 figures and 15 tables, which visualize data they survey. Various molecular approaches, with possibilities for diagnosing neurodevelopmental disorders, are presented as well. Isolated nucleic acids are used to administer complete exomic sequencing of protein-coding DNA sequences. They are also used for comparative quantitative analysis (ITRAQ) of differentially expressed proteins, as well as for expression analysis of miRNA molecules. The dissertation is extensive and covers a large number of results. However, there is a certain disproportion between the different sections, most of which are related to the chapters "Literature Review" and "Material and Methods".

The author has not formed a separate chapter on the objectives and task, which could give more clarity about the objectives and tasks of the given study. The dissertation ends with a conclusion without drawing separate conclusions from the obtained results. The main contribution with a scientific-fundamental character of the dissertation is the identification of candidate siRNA molecules and protein-coding genes with potential characteristics of biomarkers in PAS and schizophrenia. Regarding the contribution of the dissertation of an applied nature,

a DNA bank was created from patients diagnosed with ASD and schizophrenia, as well as from healthy individuals.

6. Evaluation of the publications and the personal contribution of the dissertation

The list of publications that the author applied related to the procedure for acquiring scientific degree "Doctor of Science" includes nine publications. The articles are on the topic of the dissertation and are in Bulgarian and international journals. Four of Dr. Vachev's publications are in journals with an impact factor. Regarding the presentation of scientific journals by district in relation to the four quartiles, Dr. T. Vachev's articles are distributed as follows: two with quartile Q2, four with Q3 and two with Q4 and one without quartile. There are a total of 56 citations, 54 of which are indexed in Scopus and 2 in Web of Science. It is noteworthy that some of the articles have been cited more than once, which is an indicator of the relevance and interest in the published results.

The candidate has complied with the requirements regarding the groups of indicators for the scientific degree "Doctor of Science". Out of the required total, 350 represent 436 points. Given that in all these publications related to the dissertation Dr. T. Vachev is a leading author, I believe that the dissertation has a major personal contribution.

7. Abstract

The abstract presented in Bulgarian and English is made according to the requirements and reflects the main results achieved in the dissertation.

8. Recommendations for future use of dissertation contributions and results

Dr. T. Vachev has successfully applied a variety of molecular methods and approaches which allow deepening, expansion of his professional searches, as well as upgrading them. Based on this T. Vachev could expand his studies with more patients, as well as enhance the capacity for dissemination of research with participation in national and international projects and programs.

CONCLUSION

The dissertation contains scientific, scientific-applied and applied results, which represent an original contribution to science and meet all the requirements of the Law for development of the academic staff in the Republic of Bulgaria (ZRASRB), the Regulations for application of ZRASRB and the respective Regulations of the University of Plovdiv. The presented materials and dissertation results fully comply with the specific requirements of the Faculty of Biology.

The presented materials shows that Dr. Tihomir Iliev Vachev has in-depth theoretical knowledge and professional skills in the scientific specialty "Molecular Biology" and has the capacity to conduct research with original and significant scientific contributions.

Due to the above, **I confidently give my positive assessment** of the research presented by the above reviewed dissertation, summary, results and contributions, and I propose to the esteemed scientific jury to award the degree of "Doctor of Science" to Tihomir Iliev Vachev in the area of higher education: 4. Natural Sciences, Mathematics and Informatics; professional field: 4. 3. Biological Sciences (Molecular Biology).

06.02.2021
Plovdiv

Issued by:
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