

To the Scientific Jury
determined by Order No P-109-276/04.07.2022
of the Rector of MU-Varna

STATEMENT

on procedure for obtaining an educational and scientific "PhD" degree

in the scientific specialty "Microbiology" by Denis Sunay Niyazi, MD with a dissertation on the topic: "Investigation of bacteremia and invasive fungal infections in patients following autologous and allogeneic hematopoietic stem cell transplantation".

by Assoc. Prof. Kalinka Dineva Bozhkova, MD, PhD

External member of the Scientific Jury, determined by Order No P-109-276/04.07.2022. of Rector of MU-Varna.

The submitted materials for the procedure meet the requirements of the Law on the Development of the Academic Staff of the Republic of Bulgaria and the Regulations for the Development of academic staff of the MU "Prof. Dr. P. Stoyanov" - Varna for the award of educational and scientific degree "Doctor".

Biographical information and career development

Denis Sunay Niyazi graduated with a degree in medicine from the Medical University of Varna in 2018. From 2019 he is currently a doctor-assistant at the Department of Microbiology and Virology of MU-Varna, as well as a microbiology resident in the Laboratory of Microbiology of UMHAT "St. Marina" - Varna.

Relevance of the topic

The current work is the first in Bulgaria to study and draw reasoned conclusions about the frequency, etiological spectrum and risk factors for bacterial and invasive fungal infections in patients after autologous and allogeneic hematopoietic stem cell transplantation, the resistance mechanisms of clinically significant microbial isolates, as well as the colonization status of the gastrointestinal tract with multiple-drug resistant bacteria and fungi. I appreciate the chosen topic by the PhD candidate and his scientific leaders as extremely relevant.

Structure of the dissertation

The dissertation is well structured, with all the main sections:

- **Literature review** (46 p.). The literature review is a contemporary, exposing the perceptions of the risk factors for the occurrence of infectious complications in hematopoietic stem cell transplantation, the pre-transplant screening of the donor and recipient, bacterial infections and their prevention, as well as the etiologic therapy of bacterial infections. Especially, thoroughly examined are the infectious complications and colonization, associated with bacteria with multiple-drug resistance and the possibilities of therapy. From the entire review, the in-depth interpretation of the literature data by the PhD candidate is evident, and the need for additional studies is clearly formulated. The literature review ends with a conclusion, which leads logically to the aim and tasks of the dissertation.

- **Aim and tasks** (2 p.). The eight main tasks, scientifically justified and fully consistent with the aim, are precisely and clearly defined.

- **Staging of the own studies** (17 p.) The presented scientific work includes 74 patients who underwent hematopoietic stem cell transplantation. Microbial isolates are 107 non-duplicate bacterial and fungal species. A large number of modern microbiological and molecular-genetic methods of identification, testing of sensitivity to antimicrobials, phenotypic methods for detecting producers of beta-lactamases and carbapenemases, DNA sequencing, methods for slime production, epidemiological and statistical analysis are used. All experimental settings have been conducted in accordance with the research requirements.

- **Results and discussion** (68 p.). Significant and various experimental work has been carried out. The candidate presented the results obtained in 20 tables and 19 figures. They are accompanied by an understandable text showing the author's competence. The sequence of the tasks assigned was respected by following precisely the design of the scientific work. Each result is followed by a logical scientific discussion, which ends with a conclusion. The discussion presents its own results in the light of an in-depth synthesis of the known data in case if they are available.

- **Conclusions, contributions and publications on the subject** (3 p.). In a consistent, clear way, Dr. Niyazi has formulated a total of 11 conclusions that are fully consistent with the assigned tasks and the obtained scientific results. All of them are original for both the microbiological community in Bulgaria and a wide range of clinical specialties. Based on the conclusions, 17 contributions are formulated, of which 7 are original. I accept the contributions without remarks.

The results of Dr. Niyazi's research are reflected in three publications with IF. The candidate also presents four announcements delivered at congresses and conferences in microbiology and hematology. In all publications and communications, Dr. Niyazi is a leading author, which is undeniable evidence that the dissertation is his personal work.

- **Reference list** (39 p.). The list consists of 430 sources, (8 in Cyrillic and 422 in Latin). The PhD candidate demonstrates a thorough knowledge of the developments of the Bulgarian researchers, which creates a good impression. A total of 253 (59%) publications are from the last 10 years, which makes the reference list extremely contemporary.

PhD dissertation summary

It is prepared according to the requirements, with quality illustrative material and gives a detailed idea of the overall dissertation.

Evaluation of the results

The results of this dissertation are scientifically sound, in-depth, fully applicable in practice and available for future research studies (e.g. for infection studies in patients with other clinical diagnoses). The PhD student presents his own competent assessment of the obtained results.

Evaluation of the contributions

The original contributions are of significant scientific and practical importance, especially for our science and practice. Analyzing the frequency and risk factors for bacteremia and invasive fungal infections in patients after autologous and allogeneic hematopoietic transplantation was established for the 4-month survival of the patient group, as well as the factors that influence it. The genes of different carbapenem-resistant isolates from fecal samples of a part of the patients have been identified and studied. Contributions of a scientifically applied nature are of great practical importance for each microbiological laboratory and define the dissertation as not only purely scientific.

Critical notes

I have no critical notes or recommendations to the conducted research and the presented materials.

The dissertation is written in clear and accurate language, in good scientific style, with logical consistency, which makes the material easy to read and understand. I hope Dr. Niyazi will continue his research with the same consistency, responsibility and depth as a post-doc.

Conclusion

The dissertation of Dr. Denis Niyazi is complete, extremely up-to-date, properly built, with excellent methodology and correct results. Contains scientific and applied results with original contribution to science. The dissertation is of an interdisciplinary nature and meets all the requirements of the Law on Development of Academic Staff in the Republic of Bulgaria, its Implementing Regulations and the

Regulations of MU-Varna. The submitted materials and dissertation results fully comply with the scientific requirements of the said regulations.

The dissertation shows that Dr. Niyazi possesses in-depth theoretical knowledge and professional skills, scientific thinking on the subject and shows qualities and skills for self-carrying scientific research.

All of this gives me reason to express my **positive opinion** and recommend to the esteemed Scientific Jury to award Denis Sunay Niyazi, MD the scientific and educational degree "Doctor" in the field of higher education 4. Natural sciences, Mathematics and Informatics, professional field 4.3. Biological sciences, PhD program Microbiology.



/Assoc. Prof. Kalinka Bozhkova, MD, PhD/

23.07.2022