

REVIEW

Under the competition for the academic position of "Professor" in the professional field 4.3. Biological Sciences (Cell Biology) for the needs of the Department of Cell Biology and Developmental Biology BF, announced in State Gazette No. 32 of 09.04.2024, with a disclosed Scientific Committee by Order No. RD-38-258/29.05.2024

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Analysis of the candidate's career profile

Assoc. Prof. Tanya Ivanova Topuzova-Hristova is the only candidate in the competition. She graduated from the Master's program in Biology with a specialization in Cell Biology and Developmental Biology at the Faculty of Biology of Sofia University "St. Kliment Ohridski" in 1994. The main part of her career has been spent at the Faculty of Biology of Sofia University, where she successively held the following positions: Assistant Professor (1996-2000), Senior Assistant (2000-2004), Chief Assistant (2004-2014), and Associate Professor (2014-present). In 2008, Assoc. Prof. Topuzova defended her PhD thesis on the topic "Influence of halogenated inhalation anesthetics on the integrity and reparative abilities of lung cells."

Evaluation of the candidate's scientific works for overall academic development

1 abstract of a dissertation and 17 scientific articles have been submitted for participation in the competition, all of which are published in English and have an impact factor or rank. In addition, 7 publications in non-refereed scientific journals have been submitted. 9 textbooks have also been presented, in 2 of which she is a leading author. All but one (Q3) are Q1 and Q2 ranked, with 9 in Q1 rank journals and 7 in Q2 rank journals. The publications are in a number of prestigious journals with an IF of more than 4, such as "Molecules," "Pharmaceutics," "Polymers," "Langmuir," and others.

The scientific production is very good and is recognized in the scientific community through publications, citations, books, and scientific aids, as well as through presentations at numerous scientific forums. Assoc. Prof. Topuzova is a participant in 63 refereed and peer-reviewed scientific publications with a total impact factor of 94.095 and 9 articles in conference proceedings. Data on participation in 68 scientific forums in the country and abroad are presented. She is a co-author of 15 textbooks and one book. According to a reference made in SCOPUS, Assoc. Prof. Topuzova has an h-index of 8, and 38 scientific papers have been cited 161 times. The high scientific activity of Assoc. Prof. Topuzova in the last 5 years is demonstrated by the publication of more than half of the articles with which she

applied for the competition. Also, these articles have an impact factor and rank. Assoc. Prof. Topuzova has successfully participated in 28 projects, of which 21 are scientific and 7 are scientific and educational, with her being a leader in two. She has a strong teaching activity, starting as a biology teacher (1993-1995) and continuing as a member of the National Commission of the Olympiad in Biology and Health Education for over 20 years, as well as a supervisor of 14 graduate students and 2 PhD students.

Contributions of the candidate to the submitted scientific papers for habilitation

Assoc. Prof. Dr. Tanya Topuzova-Hristova has made significant scientific contributions in the field of cell biology, focusing her research on two main areas. The first area is the study of the biological effects of plant secondary metabolites on cultured bacterial and eukaryotic cells, with potential for phytopharmacological preparations. In these studies, she and her colleagues were able to demonstrate that metabolites such as myconoside from *Haberlea rhodopensis* affect the arrangement of lipids in the membranes of cancer and non-cancer cells, impacting their vitality and proliferative activity. Additionally, they found that extracts of *Lamium album* L. and other species of the genus *Inula* have potential antitumor and antimicrobial activity.

The second main direction of Assoc. Prof. Topuzova's scientific work is the development of new polymer nanoscale drug carriers and the study of the mechanisms of internalization and release of biologically active material in cells. Research in this area includes the development of microfungi and collagen/zinc titanate nanocomposites, as well as polymer micelles and polyplexes. These studies show that the new carriers are effective for controlled drug release, have low toxicity to human cells, and possess significant antimicrobial activity. For example, collagen-RGO nanocomposites are proving promising for biomedical applications, including tissue engineering.

In addition, Assoc. Prof. Topuzova has achieved important results in the optimization of methods for microscopic evaluation of lipid domains in living cells and the internalization of newly synthesized polymer nanoparticles. These optimizations include the use of specific fluorescent probes to determine membrane fluidity and monitor cellular internalization. The applied methods and new materials developed by her and her colleagues provide a basis for future research and development in the fields of nanomedicine and biomaterials.

Overall assessment of the candidate's compliance with the mandatory minimum scientometric indicators for the academic position "Professor"

Scientometric data are presented under the procedure in accordance with the Law for the Development of the Academic Staff in the Republic of Bulgaria (LDASRB) and the Regulations for the Implementation of the Law for the Development of the Academic Staff in the Republic of Bulgaria (RIDASRB), as well as the minimum criteria of Sofia University in Area 4: Natural Sciences, Mathematics, and Informatics, Professional Field 4.3: Biological Sciences, in the following sub-categories:

- By group of indicators "A" – 1. Successfully defended dissertation for awarding the degree of "Doctor" – presented Abstract (50 out of 50 points)

- By indicator group "B" – Habilitation work or scientific publications in journals – 7 publications with rank Q1 – 1; Q2 – 5; Q3 – 1 (140 out of 100 points)

- By indicator group "D" – Scientific publication in journals that are refereed and indexed in world-famous databases – 10 publications (rank Q1 – 8, Q2 – 2) (240 points out of 200 points)

- By indicator group "D" - Citations in scientific journals, monographs, collective volumes, and patents refereed and indexed in world-famous databases with scientific information - 166 citations without autocitations (332 points out of 100 points)

- By group of indicators "E" – Leadership of PhD students (E13, 50 points), management (E16, 40 points), or participation in international (E15, 20 points), national scientific and scientific-educational projects (E14, 250 points), attracted funds (E18, 31.779), authorship of textbooks and aids (E20, 70.1 points) - (461.9 out of 150 points)

The current application exceeds the required points according to the criteria (1223.9 points out of the required 600 points).

Conclusion

Assoc. Prof. Dr. Tanya Topuzova-Hristova is an established scientist with significant scientific contributions in cell and tumor biology, focusing on the study of the biological effects of plant metabolites and the development of polymer nanoscale drug carriers. Her research has been published in prestigious international journals with a high impact factor, and her scientific output is recognized through numerous citations and participation in scientific forums. Her candidacy for professor exceeds the required scientometric criteria by more than twice. In addition, Assoc. Prof. Topuzova has made a significant contribution to educational activities as an author of textbooks, a supervisor of doctoral students, and an active participant in educational projects, which further confirms her qualification and competence for the academic position of "Professor". This application fully meets the mandatory and specific conditions and scientometric criteria, which is why I confidently vote "FOR" and recommend to the Scientific Jury of this competition the awarding of the academic position of "Professor" to Assoc. Prof. Dr. Tanya Topuzova-Hristova.

Sofia

29.07.2024

Reviewer:

(Prof. K. Todorova-Hayrabedyan DSc)