

## OPINION

**By:** Albena Georgieva Jordanova, Professor of Biochemistry, Professional field: 4.3. Biological Sciences, Faculty of Medicine, Sofia University "St. Kliment Ohridski"

**On the documents in a competition for the academic position "Associate Professor"** in the field of higher education: 4. Natural sciences, mathematics and informatics, Professional field: 4.3. Biological Sciences, Scientific specialty: Biophysics, for the needs of the section "Electroinduced and adhesive properties" at the Institute of Biophysics and Biomedical Engineering, Bulgarian Academy of Sciences, announced in State Gazette, no. 27/24.03.2023.

**Only candidate for participation in the competition:** Assistant Professor Severina Yordanova Semkova, PhD

***1. Correspondence of the applicant's submitted documents with the required documents, according to the Regulations for occupying academic positions at the Institute of Biophysics and Biomedical Engineering, Bulgarian Academy of Sciences***

All documents, presented in electronic version by Assistant Professor Severina Semkova, PhD, fully meet the requirements of the Law on the Development of the Academic Staff in Republic of Bulgaria, the Regulations for its application and the Regulations for occupying academic positions at the Institute of Biophysics and Biomedical Engineering, Bulgarian Academy of Sciences (BAS).

***2. Brief biographical data about the candidate***

From the presented CV of Severina Semkova, it can be seen that after graduating of "Dr. Petar Beron" Secondary School, Topolovgrad, in 2007, she continued her education at the Faculty of Biology of Sofia University "St. Kliment Ohridski", where she obtained the educational and qualification degrees "Bachelor in Molecular Biology" (in 2011), and "Master in Biophysics" (in 2013). During this period, she acquired the post-graduate qualification "Teacher of Biology". From 2014 to 2017, Severina Semkova was a PhD student at Institute of Biophysics and Biomedical Engineering, BAS, where successfully defending her dissertation on the topic: "*Combined approach for in vitro and in vivo visualization of the penetration and localization of fluorescent nanoparticles in tumors after electroporation*" in professional field 4.3. Biological sciences, Scientific specialty: Biophysics, with scientific supervisors Prof. Romyana Bakalova, from the Faculty of Medicine, SU "St. Kliment Ohridski", and Assoc. Prof. Bilyana Nikolova from Institute of Biophysics and Biomedical Engineering, BAS. From the certificate attached to the documents, it can be seen that at the

present time Assistant Professor Severina Semkova, has worked in her specialty at the Institute of Biophysics and Biomedical Engineering, BAS, for more than 7 years. In addition, from 2014 until now, she is a part-time Assistant Professor of "Biophysics" for medical students in the 1<sup>st</sup> year of the Faculty of Medicine, Sofia University "St. Kliment Ohridski".

Until now, Assistant Professor Severina Semkova is a co-author of 26 scientific publications, of which 22 articles are in journals with an impact factor (total IF=73.371), 3 articles were published in journals with SJR and 1 publication - in conference proceedings. The distribution of articles by quartiles is as follows: 7 publications – in Q1 journals, 12 publications – in Q2 journals, 2 publications – in Q3 journals and 4 – in Q4 journals. She is first author on 9 of the publications.

### **3. Evaluation of the candidate's scientific, applied scientific and publication activities.**

The scientific research activity of Assistant Professor Severina Semkova was carried out mainly in the section "Electroinduced and adhesive properties" at the Institute of Biophysics and Biomedical Engineering, Bulgarian Academy of Sciences, as well as during her specializations abroad. The scientific publications of Severina Semkova, with which she participated in the current competition, are focused on the following 6 scientific topics:

- ***Investigation of a newly isolated extracellular polysaccharide from *Porphyridium sordidum****: the composition of the polysaccharide was determined and its antitumor properties were investigated using breast cancer tumor lines. It was found that the application of the polysaccharide in combination with electroporation significantly reduced the viability of cancer cells and changed their morphology.
- ***Analysis of trehalose lipid produced by *Rhodococcus wratislaviensis* strain***: its effect on cell viability and migration was determined and the ability of cells to form colonies was analyzed after treatment of two types of breast cancer cell lines. Molecular modeling has been performed detailing the structure of the neutral and anionic forms of the tetraester and a mechanism of action has been proposed in which the endosome is formed as a result of membrane asymmetry between the outer and inner monolayer of the bilayer.
- ***Investigation of the influence of the biosurfactant trehalose lipid on the isometric contractions of isolated mouse mesenteric arteries***. It was found that its administration did not affect the high K<sup>+</sup>-induced contractions of mesenteric arteries, but reduced the viability of cancer cells. The obtained results are encouraging for the application of trehalose lipid in clinical practice.
- ***In vitro analysis of the antitumor activity of mono- and di-Rhamnolipids (RL-1 and RL-2) against a panel of breast cancer cell lines, alone or in combination with cisplatin***. The cancer cells tested were found to show sensitivity to RL treatment, and it was hypothesized for the first time that autophagy was most likely induced.
- ***Two antitumor drugs with different mechanisms of action - miltefosine and cisplatin - were analyzed on two types of cancer cells*** (low metastatic (MCF-7) and highly metastatic (MDA-MB231) and control epithelial (MCF-10A) cell line. The calorimetric studies performed showed significant differences in the thermodynamic profile of cancer cell lines and healthy cells of the same origin



after treatment with both preparations and correlated with the change in the conformation of membrane and matrix proteins and DNA-containing structures.

- ***A detailed overview of the modern aspects and application of electrochemotherapy*** and the development and innovation of this methodology in the treatment of cancers in accordance with the modern concept of personalized medicine has been made.

The minimum requirements of the National Center for Information and Documentation and the Regulations for occupying the academic position "Associate Professor" at Institute of Biophysics and Biomedical Engineering, by groups of indicators in a professional direction: 4.3. Biological Sciences, are described in the table below. For comparison, the indicators of Assistant Professor Severina Semkova for the participation in the current competition also are shown.

Group of indicators	Content	Minimal National Requirements for an Associate Professor	Minimal Requirements of Institute of Biophysics and Biomedical Engineering, BAS for an Associate Professor	Scoring of Assistant Professor Severina Semkova, PhD
A	Indicator 1	50	50	50
B	Sum of indicator 4	100	100	112
Г	Sum of indicator 7	200	220	222
Д	Sum of indicator 11	50	60	146
<b>TOTAL NUMBER OF POINTS BY INDICATORS A-Д</b>		<b>400</b>	<b>430</b>	<b>530</b>

**In the current competition for the academic position "Associate Professor" Assistant Professor Severina Semkova participated with 17 scientific articles published in the period 2018-2023, of which 15 articles are in journals with an impact factor, and 2 - in journals with an impact rank (SJR) and Q4. Regarding the quartiles, the distribution of the articles is as follows: 4 publications in Q1 journals, 9 publications in Q2 journals, 2 publications in Q3 journals, 2 publications in Q4 journals. The total Impact factor of the publications presented in the contest is 50.233, and the number of citations (excluding self-citations) is 73. The citation h-index of Severina Semkova is 7.**

According to **indicator A: Dissertation work for the award of the educational and scientific PhD degree** Assistant Professor Severina Semkova presented an abstract and a diploma for obtaining the educational and scientific PhD degree for her dissertation work on the topic *"Combined approach for in vitro and in vivo visualization of the penetration and localization of fluorescent nanoparticles in tumors after electroporation"* in professional field: 4.3. Biological Sciences, Scientific spatiality: Biophysics. The dissertation was successfully defended in 2017, and the results were published in the period 2014-2016 in 4

scientific journals with quartiles (one – in Q1 journals, 2 – in Q2 journals and one publication – in Q4 journals).

Regarding **indicator B**: *Scientific publications in journals that are referenced and indexed in world-renowned databases with scientific information (Web of Science and Scopus)*, the candidate in the competition has submitted 6 scientific articles published in the period 2019-2022 (one of them is in a Q1 journals; three – in Q2 journals, and two publications are in Q3 and Q4 journals). The points from the publications under this indicator cover the necessary requirements – **112 points**, with a minimum required 100 points.

**11 scientific articles** published in the period 2018-2023 were presented by Assistant Professor Severina Semkova for meeting the requirements under **indicator Г.7**: *Scientific publication in journals that are referenced and indexed in world-famous databases with scientific information (Web of Science u Scopus)*. In four of them Semkova is the first author. Distributed by quartiles, these articles were published in scientific journals with quartiles as follows: Q1 – 3 scientific articles, Q2 – 6 scientific articles, Q3 and Q4 – 1 scientific article each. The total amount of points under indicator Г.7 is **222 points** with a required minimum of 220 points, according to the requirements of the Institute of Biophysics and Biomedical Engineering, BAS for the academic position "*Associate Professor*".

In addition, Assistant Professor Severina Semkova presented evidence for 73 citations to meet the requirements of **indicator Д**: *Citations in scientific publications, monographs, collective volumes and patents, referenced and indexed in world-famous databases with scientific information (Web of Science and Scopus)*. The total number of points for this indicator is 73 citations x 2 points = **146 points**, with a required minimum of 60 points.

#### ***4. Evaluation of the candidate's personal contribution***

After I got acquainted with the applied documents of assistant professor Severina Semkova in the competition for "Associate Professor" announced by Institute of Biophysics and Biomedical Engineering, BAS, I confidently confirm that the 17 scientific publications (with which she participated in the current competition), the results obtained, the formulated scientific contributions, the participation in 34 National and International scientific conferences, participation and management of 23 National and International scientific projects were carried out with her active participation and are her personal merit.

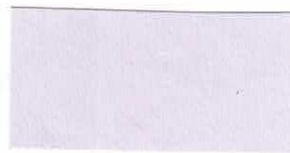
#### ***5. Conclusion***

After careful consideration of the submitted documents for participation in the announced competition for the academic position "*Associate Professor*", announced in the State Gazette – no. 27 of 03.24.2023, I confidently state that the only candidate Assistant



Professor Severina Semkova, PhD, meets the minimum national requirements of the National Center for Information and Documentation and complies with the terms and conditions defined by the Law on the Development of the Academic Staff in Republic of Bulgaria, the Regulations for its application and the Regulations for occupying academic positions at Institute of Biophysics and Biomedical Engineering, BAS.

**I CONVINCEDLY SUGGEST Assistant Professor Severina Yordanova Semkova, PhD, to occupy the academic position "Associate Professor"** in the field of higher education: 4. Natural sciences, mathematics and informatics, Professional field: 4.3. Biological Sciences, Scientific specialty: Biophysics, for the needs of the section "Electroinduced and adhesive properties" at the Institute of Biophysics and Biomedical Engineering, BAS.



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