

Opinion

prepared by Prof. Galya Marcheva Staneva, PhD, IBPhBME-BAS,

related to a competition for the Academic position of "**Professor**" in the area 4. "Natural Sciences, Mathematics and Informatics", professional direction 4.3. "Biological Sciences", specialty "Biophysics", for "Electro-induced and adhesive properties" Department at IBPhBME-BAS, published in the Gazette State, issue 63 / 30.07.2021

The only candidate in the competition for "Professor" is Associate Professor Dr. Biliana Pancheva Nikolova-Lefterova.

The review of the submitted documents shows that the procedure for opening and conducting the competition has been followed as the documents have been prepared in accordance with the requirements of the Academic Staff Development Act in the Republic of Bulgaria, the Regulations for its implementation and the Regulations for scientific staff positions in IBPhBME-BAS. The candidate has attached in a very diligent and logical form the full set of required documents.

Scientific profile of Assoc. Prof. Biliana Nikolova-Lefterova

Professional Development

Biliana Nikolova graduated her master's degree in Biochemistry and Microbiology from the Faculty of Biology at Sofia University St. Kl. Ohridski in 1992. Biliana Nikolova-Lefterova obtained her PhD in 2001 in Biophysics on the topic "Electrical transmission of DNA. Role of adsorption and mechanism of electroporation in low-frequency/low-amplitude pulses". Since 2001-present Dr. Biliana Nikolova-Lefterova has been working as a research associate II degree (2001-2005), Senior assistant (2005-2013) and Associate professor (2013 - present) at the Institute of Biophysics, later merged with the Central Laboratory of Biomedical Engineering "Prof. Ivan Daskalov" and renamed to IBPhBME-BAS. In 2019, Assoc. Prof. Nikolova-Lefterova took over the management of the "Electro-induced and adhesive properties" Department and was elected a member of the Scientific Council of IBPhBME-BAS. The candidate has many years of experience in the specialty amounted to 28 years, 10 months referred to 27.07.2021.

Research activity

The scientific achievements of Assoc. Prof. Biliana Nikolova-Lefterova are in the field of cell survival, redox state and other cell parameters after treatment with classical antitumor agents and / or those of newly synthesized ones or from natural origin. The main approach in the treatment of the respective cancer cell lines is the facilitated internalization of the tested substances by means of electroporation. The candidate participates in the competition for "Professor" with a total of 47 scientific papers, of which 25 are published after acquiring the academic position "Associate Professor". Of these 25 publications, 16 are with impact factor (IF) (total impact factor 37,601), 5 publications are in journals with SJR, 4 without IF and impact rank. The distribution of articles by quartiles is as follows: 3 fall into journals in category Q1, 9 fall into Q2, 6 fall into Q3, 3 fall into Q4. The reference for fulfillment of the minimum requirements shows that in the part "Habilitation work" 6 scientific papers are included. According to indicators C, D, E and E, the candidate exceeds the required number of points determined by IBPhBME-BAS, as well as the minimum number of 15 publications in journals

with IF, according to the specific requirements of the Institute for the academic position "Professor". The candidate participates in the competition with 163 independent citations, mainly from foreign authors, for which supportive material was provided. The scientific activity of Assoc. Prof. Biliiana Nikolova-Lefterova, measured by the Hirsch index so far amounts to 8.

Assoc. Prof. Nikolova-Lefterova has participated in 8 and led 2 research projects from the National Research Fund (NSF) and 2 from the Bulgarian Academy of Sciences. The motivation of the candidate to participate and coordinate international projects (9), of which 4 are international COST actions, and 5 are bilateral agreements with Germany and France, makes an extremely good impression. This fact clearly demonstrates that Assoc. Prof. Nikolova-Lefterova and the scientific group in which she works are recognized in the international scientific community and sought for joint work by international scientific teams.

The candidate has successfully managed 1 doctoral student and 3 master degree's students, as well as students under the Operational Program "Human Resources Development" - "Student Internships".

Assoc. Prof. Nikolova-Lefterova is a member of an authoritative professional organization such as the Union of Scientists in Bulgaria. The participation in 13 different specializations over the years makes an extremely good impression, which defines the candidate as an enterprising scientist, mastering and integrating in his scientific activity new and state of the art research methods. She has participated in 28 international and 15 national scientific congresses.

Assoc. Prof. Nikolova-Lefterova has repeatedly reviewed PhD dissertations, research projects, articles and monographies in prestigious scientific journals. Given the increased and published research activity in recent years in international journals with a high IF such as Redox Biology (7.793), Polymers (4.329), Anticancer Res. (2.5), Assoc. Prof. Nikolova-Lefterova has been invited as a guest editor of the international journal "Separations" -MDPI, IF 2.77 (Q2).

The main scientific contributions of Assoc. Prof. Biliiana Nikolova-Lefterova are formulated as contributions with fundamental and applied character in the field of electrochemotherapy, theranostics, redox status and cancer by raising and proving new hypotheses, new facts are obtained, new approaches and personalized protocols for the treatment of tumors are created, new mechanisms of action of different types of active substances with cytostatic effect on different types of cancer cell lines are proposed.

(1) Scientific contributions from the habilitation work are presented, based on publications in indicator B4 of the detailed document for fulfillment of the requirements for the academic position "Professor". Contributions are related to the determination of the cytotoxic effect of different types of polysaccharides and rhamnolipids on cancer cell lines. The most effective combination of rhamnolipid with a conventional cytostatic such as cisplatin has been found. An original molecular mechanism of action based on synergism between rhamnolipid and cisplatin has been proposed.

(2) Scientific contributions from publications outside the habilitation work are presented (publications in indicator G7). These scientific contributions are formulated in four directions: a) application of electroporation for the treatment of skin tumors in humans. Personalized protocols for the treatment of skin tumors suitable for patients with diabetes, skin cancer in difficult-to-operate locations, or after recurrence of lesions have been established; b) theranostic approach by using mouse models and cell lines. Different types of "smart" drug carriers have been developed and validated, which can be internalized into tumors through passive targeting. Polymersomes modified with chitosan, nanohydrogels and others were

tested to increase the local concentration of drugs, to prolong their stay in the tumor formation and thus reduce the side effects on other organs of the human body; c) study on the redox status and its relation to the treatment of cancer. It has been found that colon cancer is characterized by a vicious circle that ensures the permanent dominance of "oncogenic" ROS (such as superoxide) over "onco-suppressive" ROS (such as hydrogen peroxide). The anti-cancer effect of the triple combination SN38/ EF24/ melatonin is accompanied by a decrease in "oncogenic" and an increase in "onco-suppressive" ROS. The relationship between the two types of ROS was assessed as a new onco-target for combination therapy; (d) testing of new antitumor substances such as thienopyrimidine derivatives.

Based on the above-cited contributions, it is clear that Assoc. Prof. Nikolova-Lefterova works in an extremely promising scientific field related to the treatment of cancer and aging. The scientific group of Assoc. Prof. Nikolova-Lefterova is a leader group in the field of the transmission of drugs to the skin tumors by electroporation. The scientific product, generated by the work of Assoc. Prof. Nikolova-Lefterova, has proven fundamental and applied contributions, whose originality lies in the priority areas of development of both Bulgaria and the European Union, which outlines an extremely positive forecast for the future scientific activity of the candidate.

Personal impressions

Over the years, Assoc. Prof. Nikolova-Lefterova has proven to be an extremely tolerant, fair, responsible colleague who is always ready to share all the acquired knowledge and skills as a scientist and as a person. She always demonstrates a desire and readiness to participate in joint projects with colleagues from the country and abroad with his scientific expertise acquired over the years.

Conclusions

Based on what has been described here above, I conclude that the significant contributions of the scientific papers presented in the competition, their repercussions in the scientific literature and the well-defined scientific profile describe Assoc. Prof. Nikolova-Lefterova as a dedicated, highly qualified and established scientist in the field of electrochemotherapy of tumors and the discovery of new anti-cancer drugs and vectors.

The candidate meets all requirements for achieving the academic position "Professor", in the area 4. "Natural Sciences, Mathematics and Informatics", professional direction 4.3. "Biological Sciences", specialty "Biophysics", for "Electro-induced and adhesive properties" Department in IBPhBME-BAS.

Therefore, I strongly recommend to the esteemed members of the Scientific Jury to recommend to the esteemed members of the Scientific Council of IBPhBME-BAS the election of Assoc. Prof. Biliiana Pancheva Nikolova-Lefterova for the academic position "Professor".

25.11.2021

/Prof. Galya Staneva, PhD/