

OPINION

From Prof. Dr. Rumiana Dimitrova Tzoneva, Institute of Biophysics and Biomedical Engineering - BAS

regarding a competition for “Associate Professor” in a professional field 4.3. Biological sciences, scientific specialty "Biochemistry", announced in the state gazette, issue 30 from 15. 04. 2022, for the needs of the Faculty of Biology, SU "St. Kliment Ohridski”.

Assistant Professor Kirilka Stefanova Mladenova, is the only candidate in the announced competition. The documents provided by the candidate for holding the academic position "Associate Professor" are prepared in accordance with the requirements of the Law for the Development of the Academic Staff in the Republic of Bulgaria and the Regulations for its implementation.

Kirilka Stefanova Mladenova graduated from Sofia University "St. Kliment Ohridski", Faculty of Biology in 2013 with a master's degree in “Cell biology and pathology ”. In 2017 she successfully defended his doctoral dissertation in the professional field 4.3. Biological sciences, scientific specialty "Molecular Biology", scientific specialty "Molecular Biology-Cell polarization and membranes” on the topic „*Study of the interaction of the Bestrophin-1 with model membrane structures and its behavior in eukaryotic cells* ».

Dr. Kirilka Mladenova works as an assistant in biochemistry in the Department of Biochemistry, of the Faculty of Biology, Sofia University "St. Kl. Ohridski ” from 2015 to 2017. From 2017 until now she is an assistant professor at the same Department.

In the current competition, Assistant Professor Dr. Kirilka Mladenova participates with 17 publications outside the publications included in the doctoral dissertation, 15 of which were published in international journals with an impact factor. Kirilka Mladenova is the first author in three of the articles with an impact factor. One SJR article and one book chapter are entered into the current contest.

To date, Dr. Mladenova has a total of 18 publications in SCOPUS, which have been cited 33 times without self-citations of all authors (h-index = 4- according to SCOPUS).

THE RESEARCH ACTIVITY of Assistant Professor Dr. Mladenova is interdisciplinary and covers areas such as biochemistry, molecular biology, cell biology, biocatalysis and biophysical chemistry.

The main scientific directions are related to the physicochemical characterization of the transmembrane protein Bestrophin-1, biological properties of nanoparticles and study of the influence of biologically active substances on cells.

- I. The majority of the publications included in the competition are related to the study and physicochemical characterization of the transmembrane protein Bestrophin-1 (7

of the 17 publications included - 1, 2, 6, 7, 13, 15 and 16). Research has a fundamental and applied nature for clinical practice in finding and applying adequate methods for diagnosis and treatment of neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease, epilepsy, etc.

The acquisition and characterization of a cell line that stably expresses the Bestrophin-1 gene during the candidate's master's program enables further in-depth scientific work on the isolation, purification and physicochemical characterization of the Bestrophin-1 protein.

The following can be noted as **important contributions** in this direction:

- revealing the morphology and physicochemical characteristics of pure Bestrophin-1 by modeling Langmuir monolayers with the participation of the protein and lipids.
- revealing the influence of the expression of Bestrophin-1 in the cell, having established that hBest1 is preferentially located in the fluid-disordered regions of the cell membrane, thus its expression leads to a change in the physicochemical characteristics of the plasma membrane (increase in fluid-disordered membrane domains);
- Bestrophin-1 expression probably also affects cell polarization.

- II.** The second direction in the candidate's research is related to determining the biological activity of newly synthesized nanoparticles. Research in this area is highly applied and related to the use of synthetic polymer nanoparticles as drug delivery systems (publications 5, 11, 12 and 14).

As a contribution in this direction, we can note the establishment of the ways of entering the cells and the efficiency of delivery of an intact and functionally active DNA molecule by using different polymer nanoparticles or conjugates between polymer material and DNA.

- III.** The third direction in the candidate's research is related to the study of the effect of biologically active substances on cellular activity (publications 3, 4, 8, 9 and 10).

Contributions in this direction are related to:

- investigation of anticancer activity of secretory enzymes isolated and purified from snake venom of *Vipera ammodytes meridionalis*.
- research on *Haberlea rhodopensis*, *Lamium album L.* and the genus *Inula* extracts related to their potential use in dermatological diseases or the treatment of tumors.

CONTRIBUTIONS TO THE EDUCATIONAL ACTIVITY

1. The candidate participates in conducting practical classes/exercises on:

- a. Biocatalysis for Bachelor - specialization Molecular Biology/ specialization Biotechnologies

- b. Basics of biochemistry for Bachelor - speciality Optometry (to the Faculty of Physics)
- c. Biochemistry for Master - speciality Pharmacy (to the Faculty of Chemistry and Pharmacy)
- d. Biochemistry for Master's - speciality Optometry (to the Faculty of Physics)/ special Medical Physics (to the Faculty of Physics)
- e. Cell Polarization for Master - speciality Cell Biology (Elective) and Pathology and speciality Biochemistry

2. The candidate participates in conducting assigned lectures on:

- a. Biochemistry for Bachelor - specialization Agrobiotechnologies/ specialization Biology (Z.O.)
2. The candidate participates in conducting a summer internship in Biochemistry for Bachelor - special Molecular Biology

SCIENTIFIC GUIDELINES FOR GRADUATES AND SCHOLARS

1. Dr. Kirilka Mladenova is the supervisor of two graduates who has successfully defended their diplomas

2. Dr. Kirilka Mladenova is the head of four student clubs

Dr. Kirilka Mladenova participated in the implementation of 17 scientific research projects (6 - funded by the National Research Fund, 10 - under contracts with higher education institutions in the country) and 1 project under the OP "Human Resources". In two of the projects, Dr. Mladenova is the supervisor. Dr. Kirilka Mladenova has participated with a poster in 23 scientific conferences and in 22 sectional reports.

ADMINISTRATIVE ACTIVITY

Dr. Mladenova was a member of the Mandate Commission at the Faculty of Biology of SU "St. Kliment Ohridski" and has been a member of the Faculty Council since 2020.

Conclusion: From the presented scientific works of Assistant Professor Dr. Kirilka Mladenova shows that the overall scientific output of the candidate fully meets the requirements of the Law on Academic Development in the Republic of Bulgaria and the criteria for acquiring the scientific title "Associate Professor" at the Faculty of Biology of Sofia University for professional field "Biological Sciences", (Biochemistry).

The scientific contributions mentioned by Dr. Kirilka Mladenova have both fundamental and scientific-applied and clinical significance.

Taking into account all the above, I will confidently vote positively in the scientific jury for the award of Dr. Kirilka Mladenova to the scientific title "Associate Professor".

Question: What specific cellular responses does secreted phospholipase A isolated from the venom of *Vipera ammodytes meridionalis* elicit??

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Prof. Dr. Rumiana Tzoneva

София