

OPINION

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on: competition for the occupation of the academic position "Associate Professor" in the scientific specialty "Virology", professional field 4.3. Biological Sciences for the needs of the Department of Virology at the Stephan Angeloff Institute of Microbiology, BAS - Sofia

General presentation of the documents in the competition

In the announced in State Gazette No.93 of 26.11.2019 the competition submitted a precisely prepared and ordered set of documents of one candidate – Assoc. Prof. Ivanka Nikolova Nikolova, from the Department of Virology at the Stephan Angeloff Institute of Microbiology at the Bulgarian Academy of Sciences. The same is admitted to the competition. The documents presented show that the professional qualification of Dr. Nikolova corresponds to the specified habilitation in the specialty.

Career development and academic growth

Assoc. Prof. Ivanka Nikolova completed her secondary education at the Russian Language School, Burgas in 1990, and higher education at Sofia University "St. Kliment Ohridski", specialty biology and chemistry (master's degree) in 1995. For the period 1998-2001 she was a full-time doctoral student in virology under the scientific direction of Prof. Dr. AS Galabov at the Institute of Microbiology, Stephan Angeloff, Department of Virology. She has successfully defended the Doctor's PhD on "Resistant and dependent mutants of the Coxsackie B1 virus to the picornaviral inhibitor disoxaril" in 2004.

Dr. Nikolova began her professional career as a biologist-specialist at the Institute of Microbiology, BAS, Microbial Genetics Section (1995-1998). After acquiring a PhD in Virology, he subsequently took up the post of Specialist Biologist at the Institute of Microbiology of the Bulgarian Academy of Sciences (2001-2003), Department of Virology; Assistant Professor, Head of the Laboratory for Experimental Chemotherapy of Enterovirus Infections (from 2012 to the present) and Head of the same Department since 2016. In 2002, she participated in the Molecular Methods Course for the "Detection and typing of microorganisms" at the Pasteur Institute.

Dr. Nikolova's ascending career development testifies to a persistent and systematic upgrade of basic and specialized knowledge in the field of virology, as well as gaining considerable experience in the management and administration of research. She is a member of USB. Along with the described activities, Dr. Nikolova also exhibits organizational skills - from 2015 until now she is the secretary of the General Virology Seminar and the secretary of the Acad. Prof. Dr. Stephan Angeloff ".

EVALUATION OF LEARNING ACTIVITY

An important point in the job of Associate Professor for each candidate is the presentation of the teaching activity. From the notes presented, it is clear that Dr. Nikolova leads exercises in Molecular Virology, Faculty of Biology, Sofia University (2008-2010), and from 2014 until now also exercises in Virology at the New Bulgarian University. From 2016 until now he is a lecturer in Bacterial and viral infections of the eye (bachelors of part-time and full-time education) at the Faculty of Physics of Sofia

University. Since 2015, her workload has been running about 30 hours a year, with lectures reaching 90 hours a year.

II. EVALUATION OF RESEARCH ACTIVITIES

1. Scientometric indicators

Dr. Nikolova's scientific output includes 22 scientific publications beyond the scope of the Doctor's degree, 1 successfully defended Doctoral dissertation (50 points), 36 participation in scientific forums, participation in 9 scientific projects. In addition to the 22 publications, Dr. Nikolova provides a reference for 3 publications for the PhD degree, 2 of which are with an impact factor.

Of the actual 25 publications that the candidate has:

- 15 are in Impact factor magazines (total IF = 26.842), and 14 are included in reputable Quarterly Magazines (Q1-Q4) - Food Microbiol, Antiviral Res, Antivir. Chem. Chemother, Bioorganic and Medicinal Chemistry Letters, Drug Res, Fibers and Polymers Virus Disease, Bioorganic Chemistry, Biotechnol. & Biotechnol. Eq.;
- 4 are in non-IF scientific journals,
- 2 are book chapters;
- 1 is a collective monograph,
- and the remaining 4 are in compilations of national and international scientific forums with full-text articles.

In 7 publications Dr. Nikolova is the first author.

By indicator B - scientific publications equivalent to habilitation work in publications that have been referenced and indexed in world-famous scientific information databases (Web of Science and Scopus), Dr. Nikolova presents 6 publications with a total of 102 points with minimum requirements 100 t.

The total number of points in group "D" indicators (12 scientific publications were presented in publications that were referenced and indexed in world-famous scientific information databases (Web of Science and Scopus), outside the habilitation work) was 210 points with a minimum of 200 points.

In a considerable part of the presented papers, Dr. Nikolova is a co-author, which clearly proves her ability to work in multidisciplinary teams. Her citations are 133, mostly from foreign authors. H-index

3. Total number of points in group "D" (citations) - 266 points with a minimum of 50 points.

The journals she has published, as well as the dozens of citations, are proof that her scientific results have become available to the scientific community both at home and abroad.

Participation in scientific forums is 36, of which more than half (20) are abroad.

Dr. Nikolova has participated in 9 research projects - 3 of them are international (jointly with Israel, the Serbian Academy of Sciences and the Macedonian Academy of Sciences and Arts), 4 are funded by the National Science Institute of the Ministry of Education and Science, and 2 by the BAS.

Acknowledgment of Dr. Nikolova's research activity is the award "Best young scientist in Bulgaria in the field of microbiology for 2003." The award received reflects the positive evaluation of the academic community for its activity.

When comparing Dr. Nikolova's scientometric indicators with the additional requirements of BAS for the Associate Professor, it is found that it covers and even exceeds 4 of them (Table 1). The only lower H-index can be offset by a higher number of publications, citations, project participation and higher IF.

2. Main scientific areas and contributions

The main areas of scientific interest and contributions of Dr. Nikolova are:

I. Experimental work on chemotherapy for enterovirus infections

1. The development of resistant enterovirus mutants *in vivo* and *in vitro* for one of the most effective inhibitors of enteroviruses has been demonstrated for the first time
2. Introducing a package of phenotypic markers (MIC50 value, size and agar plate form, 50°C resistance, pathogenicity in mice) to characterize viral drug mutants (resistant and dependent) as an important step in the study of enterovirus inhibitors
3. A WIN-dependent (disoxaryl) mutant of model was obtained enterovirus (Coxsackie B1 virus).
4. As a result of RNA sequencing performed on the model of the coxsackie B1 disoxaryl mutants, the molecular bases of their drug resistance were determined.
5. For the first time, the study of the combined effects of selective inhibitors of enterovirus replication with different mechanisms of action was introduced in studies for anti-enterovirus agents under the sequential alternative route (CAA) scheme, which prevents the development of drug resistance, in accordance providing clear antiviral activity. A genomic analysis of isolates taken from CAA-bearing mice with RMO was observed, which showed a lack of drug resistance and increased sensitivity to antiviral drugs and RNA mutations were detected in the 5'UTR, 2A and 2B regions and amino acid substitutions in the region. VP3.
6. *In vitro* synthesis and screening for anti-enterovirus activity (against PV1, CVB1 and CVB3) of over 70 novel analogues of MDL-860 (a key compound for the construction of a triple anti-enterovirus combination) has been performed;

II. Broad-based screening aimed at finding promising inhibitors of the replication of enteroviruses, herpes viruses, adenoviruses and respiratory syncytial virus.

1. Test of silanes (organosilicones) for *in vitro* anti-viral activity against 8 model virus strains
2. Testing of merocyanins and violoric acid salts for Herpes simplex type 1 replication in cell cultures
3. Testing for the antiviral activity of monoterpene alcohol geraniol against a wide variety of viruses in cell cultures
4. Testing of ellagitans (isolated from plant source and synthetic derivatives) on the replication of Herpes simplex type 1 in cell cultures
5. Test of an ethanol extract of the plant vortex (*Tanacetum vulgare* L.) against viral strains of different taxonomic groups (Picornaviridae, Herpesviridae and Orthomyxoviridae)

III. Detection, genotyping and genetic analysis of various DNA viruses (cytomegalovirus and papilloma viruses) in samples from Bulgarian patients.

1. Detection of cytomegalovirus DNA in patients with unidentified eye disease
2. Genotyping of HPV DNA in samples from patients with throat cancer
3. For the first time, genomic changes in cervical precancerous lesions and tumors induced by different types of human papillomaviruses in Bulgarian patients were examined by microarray CGH analysis.

I would recommend Dr. Nikolova to take over the management of graduate students and/or PhD students, as I believe she has the competence and skills for this activity.

In conclusion, after analyzing the submitted materials for the competition, I believe that Dr. Ivanka Nikolova has established scientific skills for being a leading virology researcher, teamwork skills and considerable experience. Undoubtedly, the team in which she works - the Institute of BAS with a well-established image and contribution to the development of virology in the country, is of significance to this. Reasons to apply for the Virology Assistant Professor competition give her coverage and even exceed the scientometric criteria for this academic position. At the same time, she has learning activity and teaching skills at Sofia University and NBU. On this basis, I will confidently vote for the acquisition of the academic position of Associated Professor Dr. Ivanka Nikolova.

Prof. Mariana Murdzhieva