

STATEMENT

by Prof. Elena Stephanova, DSc, PhD

with reference 4.3 Biological Sciences (Biochemistry), issued in State newspaper/SG no. 32 on 16.04.2021, Sofia University "St. Kl. Ohridski" regarding academic competition for the position Professor of Biochemistry.

Biographical data: Dr. Yordan Atanasov Dumanov, Associate Professor of Biochemistry in the Faculty of Biology at Sofia University "St. Kliment Ohridski", is the only candidate in the competition to be appointed as a professor, for the needs of the Department of Biochemistry. In 1999, Dr. Y. Dumanov graduated from Sofia University. "St. Kl. Ohridski" with a Degree in Biology, followed by Master's specialization course in Cell and Developmental Biology. In the period 1999 to 2001 he worked as a researcher at the Institute of Human Genetics, the University of Greifswald, and then at the Institute of Biochemistry, RWTH - Aachen Germany. In 2001, he registered as a doctoral student at the University of Hohenheim, Stuttgart where in 2006 he successfully passed his [Ph.D. viva](#) and was awarded the scientific and educational degree "doctor"/Ph.D. From 2006 to 2014 Assoc. Prof. Y. Dumanov had been successively assistant, senior assistant and chief assistant in the Biochemistry Department, Faculty of Biology, Sofia University "St. Kl. Ohridski". In 2015 he was elected Associate Professor in Biochemistry, working in the Biochemistry Department, Faculty of Biology, Sofia University "St. Kliment Ohridski". During the period 2008-2010, Assoc. Prof. Dumanov had conducted two postdoctoral fellow specializations, the longest lasting 23 months, at the Pierre and Marie Curie University in Paris, France, followed by 4 months at CABIMER, Seville Spain. While obtaining his qualifications, his interests were focused on a modern biomedical field, related to degenerative diseases of the retina in humans. The focus was initially related to the research of bestrophin mutants in patients with pathological inherited diseases, the construction of vectors, stable cell lines, application of current and the modern methods for cloning and sequencing. Assoc. Prof. Dumanov further developed this topic, which continues to this day to be within the scope of his broad scientific interests, giving a new perspective and a new focus in this type of ophthalmological research.

Scientific activity: While competing for the professorial position, Dr. Dumanov presented a total of 47 scientific publications in full text, with a total impact factor of 80,408, 4 of which are in renowned international journals with an impact factor for awarding the educational and scientific degree "Doctor"/Ph.D., 18 are in journals with an impact factor presented while his participation at the competition for "Associate Professor" in Biochemistry, 10 are in Bulgarian journals and conference reports in full text, and 34 are presented in scientific national and international forums. 20 of the scientific works of Assoc. Prof. Dumanov were published after his habilitation and are in addition to those presented, while competing for the scientific title "Associate Professor". 15 publications are in renowned international journals, 6 are in Bulgarian journals and conference papers in full text, and 46 are participation in scientific national and international forums. The total impact factor of these scientific papers is 43,131, which are cited a total of 75 times in Scopus and Web of Science and 21 times in scientific journals that are not referenced and indexed in Web of Science and Scopus. According to the reference provided by the Scopus database, all publications were cited a total of 124 times, with 100 citations in Scopus and Web of Science and 24 outside the databases, which shows a significantly high quality of scientific developments, evaluated for the priority achievements in his scientific works. These data define him as a leading researcher in the modern current biomedical field. The qualifications, expertise and ambitions of Assoc. Prof. Dumanov as a researcher are an important prerequisite for him, to be a holder or participant in 18 competitive research projects in the field of Biochemistry, Biophysicochemistry and Molecular biology, funded by Bulgarian institutions and successfully completed.

The publishing activity of Assoc. Prof. Dumanov fully fits the criteria of the announced competition, as the priority areas in which the scientific interests are focused are Biochemistry, Biophysicochemistry, Cell and molecular biology. Thematically, the main contributions in the areas in which the scientific interests of Assoc. Prof. Dumanov are directed are:

1. Contributions to the study of the transmembrane protein bestrophin-1 (hBest1). These are related to the main scientific topic of the candidate, on which he not only works for more than 10 years, but also seeks and successfully develops

research to elucidate the molecular mechanisms, responsible for severe degenerative diseases of the retina, bestrophinopathies, etc with an emphasis on the classic viteliform dystrophy of the macula of Best - a disease, associated with damage to the retinal pigment epithelium. In this aspect, original results for the structure and surface characteristics of bestrophin -1 are presented, the secondary structure of the protein is specified and the surface physicochemical characteristics are established, in addition to the morphology of Langmuir monolayers of purified hBest, with or without the participation of Ca^{2+} , Glu and GABA. hBest1 was visualized by atomic force microscopy and for the first time in the world, an AFM image of a "pure" hBest1 protein was obtained and the size of the protein, which can be changed by the presence of Glu and GABA, was presented. Of particular contribution and fundamental importance are the data from the study of the surface characteristics of mixed hBest1/POPC, hBest1/SM Langmuir monolayers, as well as the effect of cholesterol on them. These intermolecular interactions of the protein with essential lipids, which are key components of the lipid rafts in biological membranes, as well as the proven condensing effect of cholesterol, are extremely important for the association of the protein with the domains of the cell membrane and they are mostly reliably indicative of the functions and role in the pathogenesis of bestrophinopathies. Another important contribution is related to determining the association of hBest1 in the membrane domains of eukaryotic cells, i.e. the association of hBest1 with L_o and or L_d domains is fundamental, not only for its structure and conformation, but also for its biological function as a transmembrane channel. The significance of these studies leads to the general conclusion, that the structure and biological functions of a protein, depend not only on its interaction with different types of molecules, but also on changes in the physicochemical characteristics of the lipid environment.

2. Contributions related to the research of newly synthesized nanoparticles. Sequencing of the human genome initiates new approaches to the study of a number of genetic diseases, through gene therapy methods, with modulation of gene expression. New technologies using nanoparticles to deliver genes, targeting cells of eukaryotic organisms, are a reliable modern approach in gene therapy. This direction is extremely relevant in light of the growing interest, in the use of

pathways for internalization of nanoparticles of different composition and structure, to deliver biological macromolecules in eukaryotic cells. The contributions in this direction in the scientific works of Assoc. Prof. Dumanov are determined by the research on the internalization and transfection efficiency of comb-like polyplexes, based on polyethyleneamine and polyplexes containing POEGMA-b-PLL diblock copolymer. Original results with promising application for the second type of nanoparticles are presented, as a very good non-viral vector, a candidate for delivering genetic information. The prospects for the use of the modified method, for the study of cytotoxicity and internalization of nanoparticles of spherical nucleic acids, which can be traced to the penetration of nanoparticles loaded with DNA in different cell cultures, are highlighted.

3. Contributions to the study of biologically active substances

The applied contributions of Assoc. Prof. Dumanov related to the role of vipoxin, a toxic component of the Viper venom, are indisputable and research is a leading topic in the Department of Biochemistry itself. Interest in this neurotoxin is justified due to cytotoxic effects, cytoskeletal modeling, induction of apoptosis, high degree of genotoxicity with generation of double-stranded DNA breaks, which is particularly important for the metabolism and proliferation of retinal pigment epithelial cells, with a key role in light absorption and in the visual cycle. In addition to the contributions of an applied nature, I must mention those from the study of plant extracts of *Harberlea rhodopensis* - the so-called immortelle, due to the ability to recover and develop after drying the stem for many months. The results of the impact of the extracts shed new light on the biological activity and identify the extracts of this endemic species, as a good candidate for use in the treatment of pathological dermatological conditions. The interest in the study of plant secondary metabolites used in traditional medical practice is constantly increasing, due to the rich biological spectrum of action and the fact that many of them have potential antitumor effects, which is confirmed by the research of Assoc. Prof. Dumanov for extracts of the genus *Inula* and *Lamium album L*, which are directly related to promising application in clinical practice. I am convinced that the contributions of all scientific research are not only fundamental, but also methodical and scientifically applied.

Assoc. Prof. Dumanov has a broad, active and significant teaching experience in the Department of Biochemistry. He is the lead of compulsory Biochemistry lecture courses, that are part of BSc curriculum delivered to full-time undergraduate students, enrolled to study Biology, EEA and Optometry. He is also the lead of the Biological membranes course, delivered to part-time undergraduate students enrolled to be awarded BSc in Molecular biology. In addition Dr Dumanov, leads the course Fundamentals of Biochemistry which is part of the curriculum of part-time students, enrolled to be awarded an MSc studying Optometry and Medical Physics. In addition, he leads the Protein Sorting specialized courses to Biochemistry and Cell Biology and Pathology students, as well as the Model Membranes course. Moreover, Assoc. Prof. Dumanov actively participates in conducting a summer Biochemistry internship to Molecular Biology students, as extracurricular activities. Between 2015-2021, under his supervision, 7 students successfully passed their viva to be awarded MSc degree. He is also a co-supervisor of 2 successfully doctoral dissertations and 2, which are in the process of be awarded in the Department of Biochemistry.

I agree with the reference to implementation of the minimum national requirements under Art. 2b of LDASRP - Law on the Development of the Academic Staff in the Republic of Bulgaria, related to the scientific and the professional fields 4.3 Biological sciences: Biochemistry as Assoc. Prof. Dumanov exceeds the points in a group of indicators G, D and E.

In conclusion: As a lecturer in Cell biology I have known Assoc. Prof. Dumanov since his student years and I have followed his development, qualifications and growth as a master in the scientific topics developed by him, after his graduation in our department,. His ambitions, expertise and initiative are qualities that undoubtedly define him as a scientist with broad and quality scientific output, appreciated in the international scientific community, which is a sufficient argument to recommend to the distinguished members of the scientific jury, to award Assoc. Yordan Dumanov the academic position "Professor", for which I will vote convincingly.

Prof. Elena Stephanova

