

## **Statement**

By Prof. Dr. Rumiana Dimitrova Tzoneva

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on the materials submitted for participation in the competition

for the academic position "Professor"

at Sofia University "St. Kl. Ohridski "

**Faculty of Biology, Department of Biochemistry**

### **4.3. Biological Sciences (Biochemistry)**

#### **1. General presentation of the received materials**

In the competition for the academic position "Professor", announced in the State Gazette, issue 32 of 16.04.2021 as the only candidate participated Assoc. Prof. Dr. Yordan Atanasov Dumanov from the Department of Biochemistry, Faculty of Biology, Sofia University "St. Kl. Ohridski". The materials presented by Assoc. Prof. Dumanov include all the documents necessary for the competition, according to the requirements of the Regulations on the terms and conditions for acquiring scientific degrees and holding academic positions at Sofia University "St. Kl. Ohridski". All submitted documents are carefully described and arranged, which makes it possible to trace their compliance with the requirements for holding the academic position. The reference according to a sample for fulfillment of the minimum national requirements under art. 2b of ZRASRB for scientific field 4. Natural sciences, mathematics and informatics professional field 4.3. Biological sciences: Biochemistry and the additional requirements of Sofia University "St. Kl. Ohridski" is presented taking into account the requirements and proves that the applicant exceeds the minimum requirements. The publications included as equivalent to habilitation work (section B of the table for fulfillment of the minimum national requirements) are four, in quartile Q1 of journals. Section G7 presents 10 publications referenced and indexed in Web of Science and Scopus with quartiles Q1, Q2 and Q3, and in G8 - a chapter from a book. The candidate has submitted summaries of all these publications and a chapter from a book. According to the requirements, a reference to the

contributions to the scientific papers from section B4 and those from section D is presented. The reference of the citations has a complete bibliographic description of both the cited and the cited publications. Assoc. Prof. Dumanov participated in the competition for the academic position of "professor" with a total of 20 publications, 15 of which are in publications that are referenced and indexed in world-famous databases of scientific information (Web of Science and Scopus) with a total impact factor of 43,131. The presented list of citations includes 124 citations, of which 100 are found in publications referenced in Scopus and Web of Science. Assoc. Prof. Dumanov is a co-supervisor of two successfully defended doctoral students. He has participated in five national and one international project and has been the leader of two national projects. The funds raised for projects led by the applicant are worth BGN 250,000. As a university lecturer, Assoc. Prof. Dumanov has also published a university textbook, which is used in the school network. The candidate has participated in 46 scientific conferences and congresses.

## **2. General characteristics of the candidate's activity**

### ***2.1. Education and specializations***

Dr. Yordan Dumanov graduated from Sofia University "St. Kl. Ohridski" as a Master in Cell Biology and Developmental Biology. He defended his dissertation at the University of Hohenheim, Stuttgart, Germany on "Identification of the basolateral sorting signal in the cytoplasmic domain of the interleukin-6 signal transporter gp130". He has a post-doctoral specialization at the Institute of Vision at the Pierre and Marie Curie University, Paris, France and a specialization at CABIMER, Seville, Spain.

### ***2.2. Assessment of the educational and pedagogical activity of the candidate***

The teaching activity of Assoc. Prof. Dumanov began in 2006 as an assistant. From 2007 to 2011 he was a senior assistant, and from 2011 to 2015 - a senior assistant. From 2015 to the present he is an associate professor in the Department of Biochemistry at the Faculty of Biology, Sofia University. He holds six major courses in biochemistry and molecular biology. Conducts summer internship in Biochemistry for Bachelor's degree, Specialty Molecular Biology. He was the head of six successfully defended graduates. There are two successfully completed doctoral students and two in the defense procedure. All the above facts testify to the commitment and high responsibility associated with the training of young people and the transfer of knowledge

and scientific experience - one of the main requirements for any candidate for the academic position of "professor".

### ***2.3. Evaluation of the scientific and scientific-applied activity of the candidate***

The presented reference for the contribution character of the works of Dr. Dumanov shows the main directions of scientific activity of the candidate, namely they are in the field of biochemistry, biophysicochemistry, molecular and cell biology. Assoc. Prof. Dumanov's research is related to the study of the relationship between the structure and function of the transmembrane protein Bestrofin-1, research on newly synthesized nanoparticles and research on natural biologically active substances.

#### **Studies of the transmembrane protein Bestrofin-1**

Research to elucidate the mechanisms of action of Bestrofin-1, which underlie retinal degeneration and manifest a large number of diseases, is the main scientific topic of the candidate, on which he worked for more than 10 years and these studies are included in 6 publications (10B-№1,2,3,4,14 and 15). The research was financially supported by two contracts: by the NSF and the Ministry of Education, which provided an opportunity for training and work of students under contracts, as well as for the modernization of the existing scientific infrastructure in the Department of Biochemistry. An original contribution in this direction is that with the study of the structure, the interaction with membrane lipids and the association with the lipid rafts of Bestrofin-1 are performed in both cells and model systems. An original method for purification of functionally active recombinant protein Bestrofin-1 has been developed, which is the only one in the world. The main contributions in this direction include: Establishment of the structure and surface characteristics of Bestrofin-1 in Langmuir monolayers, which determined the elements of the secondary structure of Bestrofin and the role of  $\text{Ca}^{2+}$ , Glu and GABA for their formation. For the first time in the world, an AFM image of a "pure" hBest1 was found, as well as its shape and size. The surface characteristics of mixed hBest1/POPC Langmuir monolayers were established. The resulting phase separation between hBest1 and POPC shows that the relationship between the levels of physiologically expressed hBest1 and/or lipid biosynthesis in cell membranes affects both lipid-protein interactions, which in turn determine surface dynamics, conformation, stability and stability, and hence its influence on the lateral organization of biological membranes. The surface characteristics of mixed hBest1/SM langmuir

monolayers were established, as well as the changes in these characteristics under the influence of  $\text{Ca}^{2+}$ , Glu and GABA during the interaction with the binary monolayers. The condensing effect of cholesterol on both 'pure' hBest1 and hBest1/POPC and hBest1/SM Langmuir monolayers has also been established. The expression of hBest1 in cells was found to lead to an increase in fluid disordered membrane domains compared to control cells that did not express the protein.

**In general, the studies in this section prove that the interactions of hBest1 with POPC, SM, Chol, lead to a change in the physicochemical characteristics of the lipid environment, which also determine the biological functions of the protein.**

### **Research on newly synthesized nanoparticles**

Various types of newly synthesized polymeric materials have been studied for their ability to be used as gene transfection systems. The pathways of internalization in the cell are established and the possibility of penetration of a functional plasmid into the cell is shown. Studies on newly synthesized spherical nucleic acid nanoparticles show biocompatibility and good cellular digestibility.

### **Research of natural biological substances**

**Studies on vipoxin** (a major toxic component in the poison of the Bulgarian Viper) show a different effect on the integrity and viability of eukaryotic cells. For example, a single PLA2 subunit induces cytotoxicity, cytoskeletal rearrangement, and early apoptosis, while VAC does not affect cell viability but exhibits a high degree of genotoxicity.

за използването им в медицинската практика като анти-алергични и анти-туморни агенти.

**Studies on plant extracts** isolated from *Haberlea rhodopensis*, *Lamium album L* and species of the genus *Inula* show promising results for their use in medical practice as anti-allergic and anti-tumor agents.

The candidate also contributes to the creation of a textbook "Protocol Notebook in Biochemistry" for students of all specialties of BF, SU 10B (B1).

The candidate has presented clearly and comprehensively the contributions in the scientific works beyond those from the habilitation reference.

The condition to submitting the summaries of the peer-reviewed publications in Bulgarian and English is fulfilled.

### **3. Comprehensive assessment of the candidate**

The documents presented in this competition emphatically present Assoc. Prof. Dumanov as an established university lecturer and researcher. The presented scientific papers bring significant new knowledge, as a significant part of them have been published in scientific journals indexed and referenced by Scopus and Web of Science. His contribution to the research field in terms of studying the structure and function of hBest1 in order to elucidate the mechanisms of diseases associated with retinal degeneration is significant. In his research, Assoc. Prof. Dumanov has achieved a balance between fundamental and applied research related to the use of nanoparticles for gene transfer and the study of the cytotoxicity of natural extracts. As a lecturer in the Department of Biochemistry, he has made a great contribution to the preparation of students and young researchers. Assoc. Prof. Dumanov has a clearly recognizable scientific profile, as evidenced by his scientific publications mainly in indexed and referenced by Scopus and Web of Science publications. A very good impression is made by the consistency and in-depth analysis in his research and the placement of new and interesting scientific perspectives for work.

### **4. Critical notes**

Given the documents presented in this way in the competition in terms of form and content, I have no critical remarks.

### **CONCLUSION**

In conclusion, as a member of the scientific jury, appointed by order of the Rector of Sofia University "St. Kl. Ohridski" (№ RD 38-246 / 19.05.2021) I express my convinced opinion that the candidate Assoc. Prof. Dr. Yordan Atanasov Dumanov, participating in a competition for a professor in the professional field 4.3. Biological Sciences (Biochemistry), announced in SG no. 32 from 16.04.2021 meets the mandatory and specific conditions and scientometric criteria for the academic position "Professor"

31.07.2021

Prepared the statement:

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