

## STATEMENT

for the purpose on the competition for obtaining the academic position "Associate Professor" in the professional field 4.3. Biological Sciences (Biophysics), announced in the State Gazette, issue 69, August 16, 2024, for the needs of the Institute of Biophysics and Biomedical Engineering, Bulgarian Academy of Sciences, Department "Lipid-Protein Interactions".

**Candidate: Ch. Assistant Professor Rusina Lachezarova Hazarosova, PhD**

**Author of the statement: Assoc. Prof. Dessislava Anri Lazarova, PhD** – Department of Physics, Biophysics and Radiology, Faculty of Medicine, Sofia University "St. Kliment Ohridski"

The statement was prepared on the basis of the Law for Development of the Academic Staff in the Republic of Bulgaria (LDASRB), the Regulations for implementation of the law, Regulations for implementation of the law at Institute of Biophysics and Biomedical Engineering (IBPhBME), Bulgarian Academy of Sciences and and order № 1350/14.10.2024 of the Director of IBPhBME for appointing the scientific jury for the competition.

Documents for participation in the competition, within the legally regulated term, are submitted by the only candidate: Ch. Assistant Professor Rusina Lachezarova Hazarosova, PhD.

### 1. Biographical data

Rusina Lachezarova Hazarosova was born on May 21, 1978. She graduated with a bachelor's degree in Biology at the New Bulgarian University in 2000 and a master's program in Cell Biology and Pathology at the Faculty of Biology of Sofia University „St. Kliment Ohridski” in 2003.

She presented her doctoral dissertation in 2016 on professional field 4.3. Biological sciences (Biophysics) at the Bulgarian Academy of Sciences – Institute of Biophysics and Biomedical Engineering on the topic: "Effect of biologically active molecules on the membrane organization" with scientific supervisor Prof. Galya Staneva, PhD.

Since 2004 (with a break from 2012 to 2017) Rusina Hazarosova works at IBPhBME-BAS, successively as a specialist-biologist, Assistant and Chief Assistant Professor. For the period 2012-2014 Dr. Hazarosova has worked as a medical representative at Sadasa Tissue Bank.

### 2. Research activity

#### 3.1. Scient metric indicators and implementation of minimum national requirements

**(MNR) and requirements at IBPhBME-BAS.**

Ch. Assistant Professor Rusina Hazarosova has submitted for participation in the competition (outside the publications on the dissertation) 19 publications referenced and indexed in the scientific databases Web of Science and Scopus of which 14 with an impact factor and 4 with an impact rank (SJR). Dr. Hazarosova participated in 12 national and 2 international scientific projects. She was a leader one national project and presented her scientific works at 44 forums.

The reference, presented by Dr. Hazarosova for implementation of the minimum national requirements under Art. 2b of the Law on Scientific Research in the field of science 4. Natural sciences, mathematics and informatics, professional field 4.3. Biological Sciences on indicators, is prepared precisely and clearly. All presented data for the quartiles (Q), IF and JCR of the publications are correctly reflected for the respective years of publication, according to the data from Journal Citation Reports (JCR) of Web of Science and Scimago Journal Rank (SJR) for the metric of scientific publications referred in Scopus. The report shows that the candidate fully meets and exceeds in some groups of indicators, the minimum national requirements and additional ones at IBPhBME-BAS for Academic position „Associate Professor”.

| <b>Group of indicators</b> | <b>Minimum national requirements<br/>+ additional requirements at<br/>IBPhBME-BAS</b> | <b>Candidate data</b> |
|----------------------------|---|-----------------------|
| <b>A</b>                   | <b>50</b>   | <b>50</b>             |
| <b>V</b>                   | <b>100</b>  | <b>117</b>            |
| <b>G</b>                   | <b>220</b>  | <b>231</b>            |
| <b>D</b>                   | <b>60</b>   | <b>96</b>             |

The total impact factor of the candidate's publications is 56.108, and those submitted for participation in the competition – 41.019, H-index: 5 (Scopus).

The total number of citations of the scientific works of Ch. Assistant Professor Hazarosova, with excluded self-citations of all authors is 74 all of them in journals referred to in Web of Science and Scopus and presented for the competition are 48. Hirsch-index is 3 (Scopus и Web of Science).



### 3.2. Contributions to the scientific works of Ch. Assistant Professor Rusina Lachezarova Hazarosova, PhD.

In the publications presented as main habilitation work, the candidate has included 6 articles, categorized as follows: Q1 – 2 items, Q2 – 2 items, Q3 – 1 item and Q4 – 1 item with contributions related to the study and proof of new aspects in the mechanism of action of natural antioxidant agents. Two of the publications are focused on the study of the influence of the phenyl glycoside myconoside on normal canine kidney epithelial and human lung adenocarcinoma A549 cells. It has been found that myconoside interacts with the plasma membrane and changes its structural organization.

In the other publications included in the habilitation report, the influence of resveratrol on:

- sphingolipid metabolism in human lung adenocarcinoma A549 cells
- and
- the structural organization and biophysical properties of two PC-containing model lipid membranes, heterogeneous in the degree of fatty acid unsaturation at the *sn*-2 position of phosphatidylcholine.

Differences have been identified in the mechanisms by which changes in the levels of essential sphingolipids are induced, as well as in the ability of resveratrol to modulate membrane organization, which could affect the functions of some proteins.

Apart from the publications presented in group V as habilitation work, group G includes 13 publications with a quartile distribution: Q1 – 3 items, Q2 – 3 items, Q3 – 4 items. and Q4 – 3 items, with contributing moments related to:

- studies of the relationship between membrane-associated receptors (associated with lipid rafts) and specific lipid components of the rafts and the role of the receptors in the formation and stabilization of cholesterol-rich membrane domains;
- studies of the ultrastructural changes, proliferation and ability of human A549 alveolar cells to recover after treatment with the inhalational anesthetic halothane;
- studies of the effect of oxidized lipids on the membrane organization in mono- and polyunsaturated lipid matrices of model membranes, in which it was found for the first time that the oxidized lipid POVPC, depending on the nature of the lipid matrix – poly- or monounsaturated, affects to a different extent the lipid order, size and dynamics of rafts;
- elucidation of the molecular mechanism of interaction of chitosan nanoparticles with biological membranes, as a result of which it was found that cationic chitosan nanoparticles cause changes in lipid order and organization of zwitterion biomimetic membranes, concomitant with slightly negative zeta potential;

- studies of the effect of oxidized lipids on the lipid order and activity of secretory phospholipase A2;
- studies of the effect of biologically active valorphin and its analogues on the structural organization, mechanical and electrical properties of the lipid membrane, with which it was proved that some analogues of valorphin exhibit biological activity by blocking pain receptors and reducing convulsions in mice experiments;
- research of the effect of nanomaterials on pathogenic bacteria, which show that the studied particles show activity only against Gram-positive bacteria;
- biochemical and biophysical studies of structural and functional changes in lipid membranes of red blood cells in the diagnosis and therapy of coronary artery disease.

The detailed analyzes and summaries of literature data and own results are fundamental, but are also applicable and have the potential for clinical application in diagnostic protocols and/or therapeutic preparations.

### 3. Conclusion

The scientific papers and materials submitted for the competition comply and exceed the required scient metric indicators according to LDASRB, the Regulations for application of LDASRB and the Regulations for application of LDASRB at Institute of Biophysics and Biomedical Engineering, Bulgarian Academy of Sciences. The above analysis is ground to confidently give my **positive assessment** and recommend to the Scientific Jury to prepare a report-proposal to the Scientific Council of the IBPhBME for awarding the academic position „Associate Professor”, in professional field 4.3. Biological Sciences (Biophysics) of **Ch. Assistant Professor Rusina Lachezarova Hazarosova, PhD**.

Assoc. Prof. Dessislava Anri Lazarova, PhD

November 22, 2024

Sofia

Desislava Lazarova

