OPINION

on the competition for the academic position "Professor", scientific specialty "Biophysics", professional field 4.3. "Biological Sciences", field of higher education 4. "Natural Sciences, Mathematics and Informatics", announced in SG no. 94 / 12.11.2021 for the needs of the section "Biomacromolecules and biomolecular interactions" at IBFBMI-BAS

by Prof. Albena Momchilova, DSc, from IBFBMI, member of the Scientific Jury according to order № 13 / 06.01.2022. of the Director of IBFBMI - BAS.

At the announced competition, the only candidate who submitted documents was Associate Professor Dr. Svetla Zhelyazkova Todinova. The materials presented by the candidate are precisely prepared and completed in accordance with the legal requirements. I declare that I have no common publications with the candidate.

Brief biographical data about the candidate

Svetla Todinova graduated from the Technical University of Sofia. In 1988 she entered the Institute of Biophysics, transformed in 2010 into Institute of Biophysics and Biomedical Engineering, where she worked as a senior assistant in the period 1988-2018. Since 2018 she has been working as an associate professor at IBFBMI. In 2013 she defended her dissertation on "THERMODYNAMIC PROFILE OF PLASMA PROTEOM IN MALIGNANT DISEASES".

Analysis of the scientific production and scientometric data

The scientific production presented by Assoc. Prof. Todinova includes 57 publications and 45 participations with reports and posters in national and international scientific forums. The citation reference lists 350 titles without auto-citations. According to the data from Scopus, the Hirsch index of Assoc. Prof. Todinova is 12. In this competition Assoc. Prof. Svetla Todinova participates with 26 works that have not been reviewed in previous competitions for scientific degrees or academic positions. They make up 45.6% of its total scientific output. Of the articles in this competition, 7 are in magazines with Q1, 11 in - Q2, 7 in - Q3. This distribution shows not only the intensity but also the good quality of the research conducted by Assoc. Prof. Todinova. The presented scientific production and the achieved scientometric data fully cover, and in many of the indicators significantly exceed the minimum requirements for awarding the academic position "Professor", defined in the Regulations on the terms and conditions for obtaining scientific degrees and holding academic positions at BAS. Data are presented to meet the requirements for indicators from group B for required 100 points, achieved 170 points, from group D for required 220 points - achieved 335 points, from group D for required 120 points - 342 points, and from group E for required 150 - documented 239 points. From the points collected by the individual indicators it can be seen that in addition to research, Assoc. Prof.

can be seen that in addition to research, Assoc. Prof. Todinova also has an active project activity, as both a manager (1 project) and a participant in projects (18 projects).

Analysis of scientific contributions

The research interests of Assoc. Prof. Todinova and the published scientific results are entirely in the field of the announced competition, focusing on thermal stability and properties of proteins from biological objects and model systems, calorimetric parameters of pathological cells treated with functionally active metabolites of various origins, blood cells in normal and pathological condition, as well as structural and functional characteristics of pigment-protein complexes, components of the photosynthetic apparatus in cyanobacteria and higher plants.

I will briefly review the articles presented as distributed in the attached reference.

- Based on a significant number of studies, it has been established that the parameters of differential scanning calorimetry (DSC) can be used as biomarkers, both in assessing the general status of the organism and to refine the diagnosis of some species as malignant, and non-malignant diseases. In this respect, interesting results have been obtained for multiple myeloma (MM) and Waldenstrom's macroglobulinemia (WM). MM is a disease of the lymphatic tissue in which there is a malignant transformation of B cells, as a result of which normal hematopoiesis is suppressed. This myeloma represents about 10% of hematological malignancies, which determines its relative social significance and emphasizes the expansion of opportunities for its diagnosis and follow-up therapy. Waldenström's macroglobulinemia is a rare disease (4 in 1 million) in which bone marrow involvement and accumulation of monoclonal protein IgM in the blood and a number of organs are observed. The published results show that DSC parameters can serve as biomarkers in these diseases. It was found that the combination of immunological and calorimetric tests significantly improves the sensitivity and specificity of the assessment of the clinical condition of patients.
- In support of the possibilities of using DSC for diagnostic refinement are the data obtained from the analysis of the thermodynamic behavior of erythrocytes, in some neurodegenerative diseases, in aging and others.
- Four of the publications presented in the competition are dedicated to the interaction of two types of hemicianins with organic acids and analysis of temperature and conformational changes associated with the respective structural reorganizations in protein molecules. For two of the conjugates studied specifically with folic acid, a cytotoxic effect was found on hormone-dependent and hormone-independent breast cancer cell lines.
- An interesting study on insulin stability also deserves attention due to the great social significance of diabetes in modern society. Results with potential for application in pharmaceutical practice are presented, which show that certain ionic liquids stabilize insulin molecules and inhibit their aggregation, but the fact that changes in the secondary structure of insulin are observed would require a possible study of its functional activity in specific conditions.
- Results that would also have the potential to be used in clinical practice at a later stage have been obtained with two different cancer cell lines - stronger and less metastatic cells from breast tumors.

They showed different thermodynamic behavior before and after treatment with therapeutic agents, as on the basis of the obtained thermograms the effects of conducted can be analyzed therapeutic procedures.

- Atomic force microscopy has shown that platelets in women with early pregnancy loss are significantly more activated and with cytoskeletal rearrangement compared to control groups, which include both non-pregnant women and women with normal pregnancies.
- Platelets from patients with deep vein thrombosis (DVT), carriers and non-carriers of the mutant PlA2 allele have also been shown to be in a more advanced phase of activation than those of healthy individuals carrying the same allele and healthy -carriers. By analogy with the above-described contributions, this result can also be used in the analysis of the factors underlying the initiation and development of thrombosis processes.

Conclusion: Based on all outlined above, I believe that Assoc. Prof. Svetla Todinova is an established specialist with a clearly defined research profile in the field of application of differential scanning calorimetry in the field of biomedicine. Her scientific output is significant in volume and quality and exceeds the requirements for the award of the academic position "professor", referred to in the regulations. There is extensive experience in leadership and teamwork, competencies and skills for concept development and implementation of scientific publications and projects, with potential for application in clinical practice. This gives me reason to confidently give my positive assessment and recommend to the Scientific Juri to vote for the award of the academic position "professor" in a professional field 4.3. "Biological Sciences", scientific specialty "Biophysics" to Assoc. Prof. Svetla Zhelyazkova Todinova.

Sofia, 22/02/2022 Prof. Albena Momchilova, DSc.