OPINION

by: Prof. Nina Dimitrova Ivanovska, the Institute of Microbiology "Stephan Angeloff" - BAS, member of the scientific jury, according to the decision of the FC of Faculty of Biology, Plovdiv University "P. Hilendarski ", protocols № 254/16.07.2020 and №255/11.09.2020

ON THE COMPETITION FOR THE ACADEMIC POSITION "ASSOCIATE PROFESSOR "

In the field of higher education 4. Natural sciences, mathematics and informatics, professional field 4.3. Biological Sciences, scientific specialty Cell Biology, announced in the State Gazette, issue no. 57 of 26.06.2020

I. Analysis of the candidate's career profile

Dr. Tsvetelina Batsalova has a master's degree from the Plovdiv University "P. Hilendarski », specialization molecular biology. From 2001 to 2005 he developed and defended a PhD thesis on "The role of MHC class II and post-translational modifications of collagen type II for intercellular communication in rheumatoid arthritis." She has worked as an assistant and chief assistant at the Department of Developmental Biology, Faculty of Biology, Plovdiv University. She has been a visiting researcher at the Karolinska Institute, Stockholm and Lund, Sweden. Ts. Batsalova is a member of SUB, sections Immunology, Biochemistry, Biophysics and Molecular Biology and BAC (Bulgarian Association of Cytometry).

II. General description of the submitted materials in the competition

The presented materials from ch. asist. prof. are extremely well arranged and very detailed, including digital copies of the publications related to the participation in this competition, as well as their summaries in Bulgarian and English.

III. CHARACTERISTICS OF RESEARCH ACTIVITY

The presented publications are in the field of fundamental theoretical and applied problems, which can be thematically divided into several areas:

1. Study on the cellular-molecular mechanisms in rheumatoid arthritis, development of methods and tools for treatment and diagnosis of RA

Rheumatoid arthritis (RA) is a widespread autoimmune disease - the result of an interaction between genotype, environment and risk factors. Early diagnosis and monitoring of the disease are serious problems for the treatment of RA. Animal models are used extensively to study the pathogenesis of RA. Despite their limitations, collagen-induced arthritis (CIA) in mice contributes significantly to the current understanding of the fundamental mechanisms in the development of RA and plays a significant role in the testing and introduction of various treatments for this disease. In this model, it has been shown in the present works that some epitope-specific anti-CII antibodies and the posttranslationally modified immunodominant T-cell CII epitope may be involved in the induction and / or maintenance of the autoimmune humoral response in RA. This epitope is important for T-cell recognition and induction of immunological tolerance to CII, as is the Ncf1

gene, which encodes one of the subunits of the phagocytic NADPH oxidase complex NOX2 **(Publications № 1, 2).** A methodology has been developed to study the interactions between glycosylated peptides and receptors by combining structural-based virtual screening, ligand-based statistical molecular design and biological research. As a result, glycopeptides with high affinity for binding to MHC II proteins have been identified and a strong response is elicited in T-cell hybridomas. Biological analysis determines differences in the T-cell response, which are particularly important in conducting vaccination studies in CIA. **(Publication № 3)**. For the first time, the CII-specific humoral immune response in Bulgarian patients with rheumatoid arthritis was analyzed (**Publication № 15**).

With the rapid development of nanotechnology and the widespread use of nanoparticles, the creation of multifunctional nanoparticles has enormous potential for biomedical applications. In this regard, the candidate presents publications concerning the application of iron oxide nanoparticles (II, III) for the development and enhancement of the specificity of diagnostic tests for the detection of biomarkers for RA (**Publications №18, 19**). These results are extremely promising for the development of gene therapies, methods for marking and tracing cells, in therapies for targeted drug delivery, for the development of vaccines and antibodies.

2. Determination of biological activity

Plants have been used since ancient times not only as a means of food, but also to treat a large number of bacterial, viral, neoplastic, metabolic and other diseases. Those of them that contain pharmacologically active substances arouse explicable research interest against the background of increasing antimicrobial resistance, recurrent cases of chronic infections, inflammatory processes and cancer. The application of active substances from medicinal plants is constantly increasing and is supplemented with newly discovered ones, thanks to the in-depth study of these plants and the possibilities for synthesizing analogous or even more effective compounds. Studies have been conducted to establish the biological activity of extracts, essential oils and purified new molecules of various plant species and microalgae with the prospect of finding new drugs and their application as dietary supplements to strengthen the immune system and the general condition of the body. The composition of essential oils in the fruits of *Vitex agnus-castus* was determined, and antioxidant activity was established for the first time **(Publication №6).** The immunomodulatory properties of pectins isolated from silver linden, purslane and lavender have been proven **(Publications №7, 8).** The lipophilic extract of Clinopodium and the cytotoxic activity of newly isolated furostanol saponins from Smilax were also studied **(Publications №9, 11)**, and the biological activity of Fischerella major extracts **(Publication №13)** was demonstrated for the first time.

One of the stable immunomodulators are probiotics and prebiotics, in particular different species of the genus Lactobacillus. Their action is associated with modulation of the composition and activities of the intestinal microbiota, as well as changes in the immune response in autoimmune disorders. The results related to the role of metabolic products isolated from Lactobacillus brevis strains, as well as those related to the changes in the adhesion properties of probiotic species of lactobacilli **(Publications №14, 17)** should be noted.

3. Studies on the pollen allergies

Pollen allergy is the most common and most sensitive form of allergy, especially for our country, given the good weather conditions and meteorological factors. Currently, 500 million people worldwide and about 20 to 30% of Europeans are affected by allergic rhinitis. Chemokines are one of the main participants in the immune response in the development of allergic processes. Most of the research is carried out during the pollen season and data are very scarce outside this period. The candidate presents an analysis of serum levels of a large set of chemokines to two agents - ragweed and birch pollen, outside the active pollen season **(Publications №5, 16).** The results allow their use as biomarkers for accurate assessment of the allergic status of patients with pollen allergy, to study the mechanisms of allergic responses and to develop new therapeutic approaches.

4. Determining the taxonomic status of cyanobacterial species

Phylogenetic analyzes based on the amino acid sequences of the outer membrane efflux protein (OMER) and DNA sequences of the 16S rRNA gene of 86 cyanobacterial species are presented, which can be used to elucidate the phylogenetic and taxonomic status of closely related cyanobacteria. 12).

5. Teaching activity

Two practical guides are presented for students from different biological specialties of Plovdiv University "Paisii Hilendarski", which can be used by students in related specialties from other universities **(Papers №20 and 21).** Through classical and new methods, the main structural elements of the cell and their functions are considered and basic techniques for maintaining animal and human cell cultures are selected.

Dr. Batsalova conducts laboratory exercises in "Cell Biology", "Ecology and Environmental Protection", "Biology", "Medical Biology", "Bioinformatics" and "Molecular Biology". She was the supervisor of 7 graduates and co-supervisor of one PhD student.

MATERIALS SUBMITTED FOR REVIEW AND COMPLIANCE WITH THE REQUIREMENTS

The scientific works of assistant prof. Ts. Batsalova can be distributed in accordance with the Law on the Development of Academic Staff in the Republic of Bulgaria, the Regulations thereto, as well as the Regulations on the terms and conditions for obtaining degrees and holding academic positions at Faculty of Biology, Plovdiv University.

1. Criteria "A" - an abstract of a dissertation for awarding the educational and scientific degree "Doctor" - 50 points

2. Criteria "B" - 4 articles are presented (equivalent to a monographic work), which do not repeat the ones presented for acquiring the educational and scientific degree "Doctor", and for holding the academic position "Chief Assistant". (100 points). All of them are in specialized journals with impact factor, referenced and indexed in world databases and fall into category Q1.

3. Criteria "D" includes 12 publications in publications that are referenced and indexed in world-famous databases of scientific information (Web of Science and Scopus), which are in categories Q1 - Q4 (214 points).

4. Criteria "E" includes 76 citations in scientific journals, monographs, collective volumes and patents, referenced and indexed in world-famous databases of scientific information (Web of Science and Scopus) (152 points).

According to the additional requirements of FB, 19 articles are presented, 14 of them with IF and in 10 Ts. Batsalova is a leading author (for required 14 with impact factor, 10 of them as a leading). Attached is a list of 76 citations for the required 10, defended graduates 7 (required 5), 11 participations in projects (required 2). To these must be added participation in Commissions, reviews for international journals, participation in editorial boards and participation in international scientific forums (which are not included in the total number of papers).

CRITICAL NOTES AND RECOMMENDATIONS

I have no critical remarks to the materials presented by assistant prof. Ts. Batsalova. They correspond to the theme of the competition, both in volume and quality. In addition, the documentation is designed precisely and allows to get a complete picture of all areas of the applicant's activity.

CONCLUSION

The documents and materials submitted by assistant prof. Ts. Batsalova, meet all the requirements of ZRASRB, the Regulations for application of ZRASRB and the relevant Rules of the Faculty of Biology at Plovdiv University "Paisii Hilendarski". She is already an established scientist in the field of cell biology, has the ability to focus on current issues and to present innovative ideas for specific therapy of severe, socially significant diseases such as osteoarthritis and allergies. From the analysis it is clear that ch. assistant professor Ts. Batsalova participated in the competition with scientific production, which in terms of scientometric indicators exceeds the requirements for the academic position of "Associate Professor": publications in journals with high IF (falling into categories Q1 and Q2) and citations in renowned international journals. To these must be added the educational activity: defended graduates, teaching activities, as well as participation in numerous projects.

I strongly recommend to the members of the esteemed scientific jury, formed by a decision of the FC of the Faculty of Biology, protocols № 254 / 16.07.2020 and №255 / 11.09.2020 to propose to the FC to elect ch. assistant professor TSVETELINA GEORGIEVA BATSALOVA as a "ASSOCIATE PROFESSOR" in the professional field 4. Natural Sciences, Mathematics and Informatics, 4.3. Biological sciences, scientific specialty Cell biology.

12.11.2020

(Prof. Nina Ivanovska)