REVIEW

About the competition for "professor" by professional field 4.3. "Biological Sciences", specialty "Biochemistry", announced in SG no. 63 of 30.07.2021
for the needs of dept. "Chemistry and biochemistry, physiology and pathophysiology", Medical Faculty of Sofia University "St. Kliment Ohridski ”

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1. Common part

The competition for the academic position "professor" in the professional field 4.3. "Biological Sciences", specialty "Biochemistry" was announced in SG 63 of 30.07.2021 for the needs of cat. "Chemistry and biochemistry, physiology and pathophysiology", Medical Faculty of Sofia University "St. Kliment Ohridski ”. The only candidate in this competition is Assoc. Prof. Albena Georgieva Yordanova, PhD, working as a lecturer on a basic employment contract at the same department. The review of the documents shows that the competition procedure has been followed, as well as that the documents have been prepared in accordance with the requirements of the Law on the Development of the Academic Staff of the Republic of Bulgaria and the Regulations for its implementation.

2. Biographical data about the candidate

In 1991 Assoc. Prof. Dr. Albena Yordanova graduated from the Faculty of Biology at Sofia University “St. Kliment Ohridski ”, specialty“ Biochemistry and Microbiology ”with specialization“ Biochemistry ”. In 2007, the Higher Attestation Commission awarded her PhD degree in "Biophysics" for her dissertation "Surface properties and behavior of lipid liquid-crystalline phases". The professional career of Assoc. Prof. Dr. Albena Yordanova began in February 1995, when she was appointed as a biologist-specialist at the Department of Biochemistry, Faculty of Biology, Sofia University. After that she went to work at the Institute of Biophysics of the Bulgarian Academy of Sciences, where she was appointed as a biologist-specialist (1997-2002) at the section "Model Membranes". Subsequently, she held the academic positions of research associate I degree (2002-2011) and chief assistant (2011-2013) at the same

institute. Since 2013 she has been an associate professor of biochemistry at the Medical Faculty of Sofia University “St. Kliment Ohridski ”. I believe that Assoc. Prof. Albena Yordanova has spent enough time in each of the above academic positions, which ensures the mastery of the specific duties and responsibilities set out in their job descriptions. She also has serious organizational experience, which is based on her participation as a member of the National Commission for Organizing and Conducting the National Olympiad in Biology and Health Education (2008 - present), as head of the National Biology Team and member of the International jury of the International Biology Olympiad (IBO; 2010 - present), as a member and super-evaluator of other national commissions in the field of education and as head of department.

3. Scientific works

3. 1. Overview of scientific papers and their citation

Assoc. Prof. Dr. Albena Yordanova defended her PhD degree in 2007, which satisfies indicator A. Her monograph “Alveolar surfactant - normal metabolism and pathology. In vitro methods for assessment of its functional condition ", University Publishing House "St. Kliment Ohridski"(2021), is provided to cover the required 100 points according to indicator B. The total number of published works of Assoc. Prof. Albena Yordanova in this competition is 41. Of these, 12 publications are presented in indicator D, of which in journals with IF are 9, and those with SJR - 3. They provide 224 points. According to the criterion quartiles (Q) are divided as follows: with Q1 - 3, Q2 - 4, Q3 - 3 and with Q4 - 2. In one of them Assoc. Prof. Albena Yordanova is the first author, and in five - second. Some of these publications are in reputable scientific journals such as Amino Acids, Soft Matter, Journal of Membrane Biology, Heliyon, and Colloids and Surfaces A: Physicochemical and Engeneering Aspects. The total IF of the 9 publications is 15,876, and the total SJR of the remaining 3 - 1,302. The candidate in this competition has submitted 16 other scientific articles on the topic of the competition, of which 15 are in Bulgarian scientific journals without IF or SJR, of which 7 are in English and 8 - in Bulgarian. One of these publications is dedicated to the results of distance learning in biochemistry, and 4 - the Olympiads in biology and health education.

Indicator D presents 202 citations found in the databases of Scopus and ISI Web of Knowledge. The total number of citations published in Scopus is 184 (October 28, 2021) and 75 of them are from the last five years (2017 - present). Scopus h-index = 6.

The works include four handbooks for students of biochemistry in Bulgarian and two in English. These are the notebooks Biochemistry Protocol (2010, 2013), Practical Biochemistry Exercises for Medical Students (2016, 2020) and Practical Biochemistry for Medical Students (2016, 2020). This also includes a manual for prospective students in medicine, dentistry and pharmacy (2021) and six collections of assignments from regional and national rounds of the Olympiads in Biology and Health Education in the period 2011-2018.

In general, her publishing activity is intensive and of a high quality. All 12 scientific publications under item D (except one from 2012) are after the competition for "Associate Professor" of Albena Yordanova, which testifies to her intensive research work in the period before this competition. It is also worth noting that she participated in the competition for "associate professor" with 53 publications!

I have no joint publications with Assoc. Prof. Albena Yordanova.

The candidate has participated with a poster or report in 158 international and national scientific conferences.

These science metric indicators significantly exceed the minimum requirements for the academic position "Professor" according to the Regulations for application of the Law for development of the academic staff of the Republic of Bulgaria and the Regulations for the conditions for acquiring scientific degrees and holding academic positions at Sofia University. The research and works of Assoc. Prof. Dr. Albena Yordanova, as well as her contributions, are on the topic of the competition. A great advantage of the presented scientific papers is their caring focus on people due to their importance for clinical practice (diagnosis and therapy). This is the main characteristic of the scientific research activity of the laboratory of her teacher Prof. Zdravko Lalchev, which Assoc. Prof. Albena Yordanova continues to develop. The same applies to its educational contributions, which aim to improve the quality of education of students and pupils.

3.2. Evaluation of the scientific contributions of Assoc. Prof. Dr. Albena Yordanova

Assoc. Prof. Albena Yordanova has arranged the scientific contributions to this competition in four groups: 1) contributions related to habilitation work - monograph; 2) contributions with fundamental nature; 3) contributions, with applied nature; 4) other contributions. All contributions are in the professional direction of this competition and are formulated in detail.

1. Monograph

The habilitation treatise "Alveolar surfactant - normal metabolism and pathology. In vitro methods for assessment of its functional state " of 167 pages, contains many data on the composition, structure, properties and intermolecular interactions of lipid and protein components of alveolar surfactant in normal and pathology and their role in reducing the surface tension of the aqueous layer, which reduces the forces for the expansion of the large alveoli during inspiration and prevents the collapse of the small alveoli in exhalation. In addition, issues related to the symptoms and current therapeutic approaches to disorders in the normal composition of the alveolar surfactant in children (especially premature infants) and adults have been developed in detail. The book describes in detail seven biochemical and seven biophysical methods for determining the properties of alveolar surfactant. Many of the examples in this paper are result of many years of research conducted by the group of Prof. Zdravko Lalchev with the participation of the candidate in this competition. The adequate interpretation of the data obtained with different laboratory methods outlines this monograph as a valuable guide for the training of students and graduates, as well as as a guide for clinicians in the field of neotanology and pulmonology.

2. Contributions of a fundamental nature

Here, Assoc. Prof. Albena Yordanozha has included 13 contributions, which I have reduced to 4 by merging or transferring to scientific and applied contributions. These are:

For the first time, different isoforms of the specific surfactant proteins SP-A, SP-B and SP-C have been identified in gastric aspirates. Their presence depends on the stage of maturation of the alveolar surfactant (publ. 77, 81).

The interaction of synthetic peptides with lipids in membrane shelves has been confirmed. It has been found to be more pronounced in amidated methionine-enkephalin than in methionine-enkephalin (publ. 62). It has also been found that synthetic leucine-enkephalin and leucine-enkephalinamide affect the surface characteristics of lipid monolayers by increasing their surface density in loose packaging of lipid molecules. Enkephalinamide is more effective for this influence (publ. 68).

By the method of Sheludko and Exerova it was found that the increase in Na^+ concentration in thin liquid films stabilized with palmitoylisophosphatidylglycerol turns them

into ordinary black films. Similarly, in the presence higher concentrations of Ca^{2+} they form Newtonian black films (publ. 69).

Penetration of ammonium benzantrone (compound B) into monolayers of bacterial-like model membranes has been found, which may explain its antimicrobial activity through some weak chemical interactions with bacterial phospholipids (publ. 79).

3. Contributions of scientific and applied nature

These included 8 contributions, which I transformed into 9. These are:

It has been confirmed that Langmuir monolayers are a useful system for studying the molecular interactions and properties of biological membranes (publ. 54, 62, 68, 79).

It was found that the addition of hydrophilic polymers (polyethylene glycol, dextran, polyvinylpyrrolidone, hyaluronic acid) and the exogenous surfactant preparations *Curosurf* and *Survanta* used in the clinic prevents the inactivation of the alveolar surfactant due to the presence of plasma proteins by their removal from the surface due to osmotoc forces (publ. 54). In the presence of polyethylene glycol, polyvinylpyrrolidone and hyaluronic acid with *Survanta* low values of the minimum surface tension are achieved, and when applying *Curosurf* a similar positive trend is observed after the addition of dextran, polyvinylpyrrolidone and hyaluronic acid. These results may find application in clinical practice in the treatment of elderly people with acute respiratory distress syndrome (ARDS) caused by the presence of albumin in the lung (publ. 54).

In at-risk pregnant women, the efficacy of corticosteroid prophylaxis (betamethasone) on the surface characteristics and biosynthesis of the components of the alveolar surfactant has been confirmed (pubs. 78, 81).

Phospholipid and protein concentrations in gastric aspirates (GA) from preterm infants with neonatal respiratory distress syndrome (NDS) have been found to be lower than in full-term infants. For the first time, a combination of modern innovative techniques of axially symmetrical hanging drop shape analysis (ADSA) and Brewster-angle microscopy (BAM) was used to analyze gastric aspirates to assess their lung maturity. In premature infants with NRS, the mean values of the minimum surface tension (γ_{min}) are significantly increased. The values of γ_{min} to the greatest extent, as well as the shape of the hysteresis curves and the mophology of the monolayers of gastric aspirates are reliable parameters for assessing the maturity of the alveolar surfactant in newborns. GAs obtained immediately after birth with a nasogastric tube

have been shown to have a similar phospholipid profile to tracheal aspirates. Therefore, GAs are suitable for rapid assessment of surfactant maturity and can successfully replace previously applied traumatic invasive procedures (publ. 55, 70, 78, 80, 66, 73, 74, 76).

It was found that the combination of ADSA, BAM and the thin liquid film method is a fast, convenient and safe laboratory approach to assess the functional status of the lung in adult patients with respiratory diseases (publ. 55, 70, 78, 80, 66, 73 , 76).

Studies of the surface properties of alveolar surfactant after pulmonary lavage (lavage) taken from patients with alveolar proteinosis and non-small cell lung cancer have demonstrated the effectiveness of the ADSA method for rapid diagnosis of lung function (publ. 63, 64, 58, 66, 73).

It has been confirmed that changes in the composition and properties of the alveolar surfactant occur in patients with lung cancer, and that hypoxia and inhalation anesthesia alter its biochemical and biophysical characteristics (publ. 64).

It has been confirmed that fluids obtained by pulmonary lavage for the treatment of pulmonary alveolar proteinosis show at each stage of the procedure a reduction in protein and phospholipid concentrations, and an increase in equilibrium surface tension, which takes into account the effectiveness of this procedure (publ. 63). This also led to the improvement of the complete pulmonary lavage procedure by reducing the amount of saline used from 20 l to 15 l, which accelerated it (pub. 63, 58, 73).

It has been found that the combination of the Langmuir monolayer model with Brewster-angle microscopy can be successfully used in preclinical studies testing the membrane permeability of newly developed drugs (pubs. 59, 62).

4. Other scientific and educational contributions

Other scientific contributions: (i) participation in the team that developed the human beststrophin-expressing cell line (MDSK) for study of its function (publ. 56); (ii) the effect of rhamnolipids secreted by pathogenic microorganisms of the genus Pseudomonas on the properties of the alveolar surfactant was studied. It was found that with increasing surface concentration of rhamnolipids in the mixed monolayers, changes their properties and surface characteristics into negative direction (publ. 60); iii) the first pilot study was conducted in Bulgaria to establish the link between cytomegalovirus (CMV) and Chlamydia pneumoniae, and the occurrence of heart disorders (ischemic heart disease, acute coronary syndrome and

atherosclerosis). Serum IgG levels against CMV and C. pneumoniae were determined in patients with various cardiovascular diseases and healthy people. Serum concentrations of IgG alone against C. pneumoniae were found to be associated with acute coronary events in smoking patients and with hypertension (publ. 61); (iv) a comparative analysis of clinical trials of tracheal and gastric aspirates from preterm infants with NRS and healthy full-term infants was performed. The results obtained show that the phospholipid profiles of tracheal and gastric aspirates in the two study groups differed significantly (publ. 74, 76).

Educational contributions.

These include research-related contributions to the performance and motivation of foreign medical students compared to their Bulgarian counterparts (publ. 71) and an assessment of the "hybrid training" conducted, where traditional training was complemented by shared web-based resources containing tasks, tests, terminological dictionary, etc. (publ. 75). The results of distance learning of Bulgarian and foreign students in biochemistry in pandemic conditions and the possibilities for its improvement are also studied.

In addition, the tasks from the National Olympiads in Biology and Health Education were analyzed in order to select new and more interesting tasks that meet the latest trends (publ. 57, 67). In this regard, the changes in the International Biology Olympiad (IBO) and the problems of the Bulgarian participants in it, including their motivation, overcoming crisis moments, etc. are analyzed for the purpose of their successful presentation (publ. 65, 72). The best possible preparation of the Bulgarian students for their participation in the International Biology Olympiads is undoubtedly a mission for Assoc. Prof. Albena Yordanova, which she has been diligently fulfilling for many years. Since 2010 he has been the head of the National Biology Team and a member of the IBO jury. It is difficult to assess the satisfaction and prestige that the successful performance of our Olympians brings to the country and to Sofia University as the main institution inolved in training the team.

I have a few recommendations for shaping the contributions:

1. They are too many. Therefore, e.g. I have combined contributions 1, 2 and 3 with 15, 18; and 31 with 32 and 33.

2. Some of them as contributions 1 and 12, etc. contain many results.

3. I have transferred some of the fundamental contributions and combined them with scientific and applied contributions.

4. It is not always noted which contributions are confirmatory and which are new.

3.3. Participation in research projects

Assoc. Prof. Albena Yordanova has participated in a total of 28 research and educational projects, which are funded by the Ministry of Education and Science, Sofia University and the Medical University - Sofia. She has managed 10 of these projects, one of which is funded by the Research Fund of the Ministry of Education - DN03/16 from 19.12.2016, which is entitled "Development of modern methods for early and rapid diagnosis of neonatal respiratory distress syndrome in at-risk newborns". The project was successfully completed with an evaluation of the implementation "Very good". All these facts gives me reason to believe that the candidate in this competition has significant experience in preparing, conducting research and reporting on research projects.

4. Teaching experience and classroom employment of Assoc. Prof. Albena Yordanova

The teaching experience of Assoc. Prof. Albena Yordanova is intensive and diverse. The report from the last five school years shows a load invariably above the required norm of classroom and extracurricular employment, as on average for the period there are 708 hours of classroom employment. In the last four of the last five years, it has produced more than twice as much as the norm for classroom employment established for Sofia University.

Assoc. Prof. Albena Yordanova is the holder of the courses in "Biochemistry" and "Peculiarities of metabolism in norm and pathology", "Phytoproducts and their application in medicine", held at the Medical Faculty of Sofia University for students of "Medicine" and "Medicine in English", as well as the course "Clinical Laboratory, Biochemistry and Immunology" for students "Nurse" at the same faculty of Sofia University. In addition, she is the holder of the elective courses in "Peculiarities of metabolism in norm and pathology" and "Phytoproducts and their application in medicine" for students of "Medicine" and "Medicine in English".

Since 2019 he has been the head of the Department of Chemistry and Biochemistry, Physiology and Pathophysiology at the Medical Faculty of Sofia University.

She is member of the Union of Scientists in Bulgaria. She was awarded by the Minister of Education, Youth and Science Sergey Ignatov for achievements at the International Olympiad in 2012.

I have known Assoc. Prof. Dr. Albena Yordanova for more than ten years. I would characterize her as an enthusiastic, warm-hearted, responsible, very hard-working and well-prepared teacher with significant research experience. I believe that she will continue to work hard as a lecturer and researcher at the Medical Faculty of Sofia University "St. Kliment Ohridski" and in training the students for succesful participation in the International Biology Olympiads.

Conclusion

Scientific creativity, participation in projects, established citations, significant scientific contributions, participation in national and international conferences, as well as the availability of a monograph and several notebooks by Assoc. Prof. Dr. Albena Georgieva Yordanova fully meet the criteria for "Professor" of the Law for Development of the Academic Staff of the Republic of Bulgaria, the Regulations for Application of the Law for Development of the Academic Staff of the Republic of Bulgaria and the Regulations for the conditions and procedure for acquiring scientific degrees and holding academic positions of Sofia University "St. Kliment Ohridski". Her teaching activity is intensive and is entirely in the specialty of the competition. All this gives me the reason to convincingly recommend to the esteemed Scientific Jury to vote FOR the proposal to the Faculty of Medicine for the election of Assoc. Prof. Albena Georgieva Yordanova, PhD for professor in the professional field 4.3. "Biological Sciences", specialty "Biochemistry" for the needs of the Department of "Chemistry and Biochemistry, Physiology and Pathophysiology" at the Medical Faculty of Sofia University "St. Kliment Ohridski ".

November 1, 2021. Reviewer:

/ prof. Dr. Hristo Gagov /