

REVIEW

by Prof. Dr. Zornitsa Zlatarova, DSc

scientific specialty – ophthalmology

Head of the Educational Sector of Optometry, Medical University - Varna

According to Order of the Rector of MU-Varna No P-109-166 / 14.04.2022

About: Announced competition for the academic position of ASSOCIATE PROFESSOR in the field of higher education 7. “Health and Sports”, professional field 7.1. “Medicine”, in the scientific specialty “Ophthalmology” for the needs of the Educational Sector “Medical Optician” at the Medical College - Varna, according to an announcement in SG No. 14 / 18.02.2022.

Dr. Dimitar Ivanov Grupchev, MD, is the only candidate in the competition. All documents specified in the regulations on the terms and conditions for obtaining scientific degrees and holding academic positions at the Medical University - Varna are presented.

Brief Biographical Information

Dr. Dimitar Ivanov Grupchev graduated Medicine at the Medical University - Varna in 2016. After winning a competition in 2017, he started working as an assistant at the Medical College of MU-Varna, and since 2018, he has been the head of the “Medical Optician” Educational Sector. In 2019 he started working at the Specialized Eye Hospital for Active Treatment – Varna EOOD. In January 2018, he enrolled as a full-time doctoral student in the Department of Ophthalmology and Visual Sciences at the Medical University of Varna. In the same year, he obtained a Master’s degree in health management at MU-Varna, receiving an award from the Scientific and Technical Societies for best thesis. Dr. Grupchev has participated in many courses and specializations such as: Post-graduate course in Salzburg - Austria, individual training in corneal transplantation and tissue bank at the University of Antwerp - Belgium, summer school in Venice, and many trainings in Bulgaria. He is a member of a number of organizations, like: European Society of Cataract and Refractive Surgery, Euroretina, Association for Research in Vision and Ophthalmology, Bulgarian Society of Ophthalmology, Bulgarian Medical Association, Union of Scientists Varna. In December 2020, Dr Grupchev acquired the specialty “eye diseases”. In 2021, the candidate acquired a doctoral

degree after defending a dissertation on “Cellular and Tissue Therapy of the Anterior Ocular Surface”.

Evaluation of quantitative and qualitative scientific indicators

I. Scientific research:

1. Total number of scientific developments

The total publishing activity of Dr. Grupchev contains 26 scientific papers. To participate in the competition, the candidate presented:

- **Dissertation** for the acquisition of doctoral degree “Cellular and Tissue Therapy of the Anterior Ocular Surface”;
- **Monograph** – “Evolution of Visualization in Ophthalmic Surgery“ – Publishing House of the Medical University - Varna ISBN 978-619-221-375-6
- **Full-text publications** in scientific journals and collections, covering the minimum scientometric requirements for acquiring the scientific position of Associate Professor – 18 (5 of which in journals with IF, referred and indexed in Scopus and Web of Science, 13 in non-referenced scientifically reviewed international and Bulgarian journals)
- Full-text publications in scientific journals and collections, outside the minimum scientometric requirements for acquiring the scientific position of Associate Professor – 3
- Full-text publications related to acquiring a doctoral degree - 3

The total number of points of the Γ5-9 indicators is 205.75, which covers the required minimum of 200 points.

2. Authorship

Of the full-text publications submitted for participation in the competition (21 articles after the doctoral degree), Dr. Grupchev is:

- leading author in 3 (14%).
- second author in 8 (38%).
- third and next author in 10 (48%).

Dr. Grupchev also provided information on abstracts from participations in scientific forums published in collections of abstracts other than those for the acquisition of a doctoral degree - 8, of which 5 abroad.

3. Citations

According to the information presented by the library of MU-Varna, **6 citations** of the scientific works of Dr. Grupchev in **foreign databases** have been found. Of which, four in scientific journals, referenced and indexed in world-famous databases of scientific information, one in monographs and collective volumes with scientific review and one in a non-referenced journal with scientific review. **The abovementioned citations on indicators D10-12 carry a total of 75 points, with a minimum requirement of 50 points.**

A reference in Google Scholar shows a total of 35 citations of Dr. Grupchev's publications in Bulgarian and foreign scientific journals.

Dr. Grupchev's research is focused on diseases of the anterior surface of the eye and cornea, and transplantation of tissues and cells as an opportunity for their treatment.

In his dissertation "Cellular and tissue therapy of the anterior ocular surface", Dr. Grupchev analyzes the possibilities of this type of treatment, studies the current Eye Banks in Bulgaria, the material they provide, existing legislation and opportunities for the production of organic products and medical devices for better personalized treatment of anterior ocular diseases through the application of innovative technologies and methodologies. Dr. Grupchev develops algorithms for cornea, amniotic membrane, and stem cell transplantation, as well as standard operating procedures for the collection, manipulation, processing, storage, labeling and distribution of cornea and limbal stem cells. An analysis of three-dimensional OCT-controlled surgery has been made, which shows a number of advantages of this technology, including more accurate visualization, fewer intraoperative complications, better postoperative results. The advantages and disadvantages related to the creation and application of a biological product and a medical device based on the current legislation are also analyzed. The results of the application of a developed prototype - amniotic membrane with multiplied stem cells in the treatment of patients with corneal dystrophies, inflammation, trauma, bullous keratopathy and threatening perforation are presented.

In 2022, a monograph by Dr. Grupchev was published: - "Evolution of visualization in ophthalmic surgery", which traces historically the possibilities for visualization in eye surgery

from the application of telescopic glasses to the present day. The main characteristics determining the properties of surgical microscopes are described in detail, such as optical and lighting systems, magnification, aberration control, focusing. Attention is drawn to the fact that modern microscopes for ophthalmic surgery are necessarily coaxial, which means that light is “directed” along the visual axis and thus allows observation of details on highly reflective structures, as well as visualization of optical blanks (cavities), where one of the most important features of the operating microscope is the maintenance of constant brightness of the lighting, regardless of the working distance and magnification. The development of technology has led to the development of digital microscopes, enabling three-dimensional surgery and the application of intraoperative optical coherence tomography (iOCT) in real time. This leads to a new level of surgery in both the anterior and posterior segment of the eye. Dr. Grupchev shares his own experience with the use of three-dimensional surgery and iOCT in amniotic membrane and corneal transplantation. Three-dimensional technology with iOCT opens up new opportunities for training and integration of the entire team in the operational process. The author also discusses the advantages of training young ophthalmic surgeons with simulators, taking into account the unique opportunity to learn surgical or diagnostic movements in a digital environment, using software that monitors them and evaluates their progress. The monograph ends with a reference to the future - the attempt to create artificial intelligence and develop autonomous robotic machines for surgery.

The contributions of the scientific works of Dr. Grupchev are related to:

- **Study of the effect of UV rays on the anterior ocular surface** – study with confocal microscopy of the microstructural changes of anterior eye caused by UV rays – acute sunburn has been found to be associated with microstructural damage to the anterior ocular surface (AOS), and although short-term microstructural change appears to be reversible, the long-term effect may lead to chronic ocular disease; personalized dosimetry for the impact of UV rays on the AOS - an easy, applicable method and device for individual UV dosimetry, which measures both the instantaneous and cumulative UV load of the human eye. (1, 2, 3, 4, 13)

- **Diseases of the anterior eye segment** – examination of mucin balls and the condition of the anterior corneal surface established that the main predisposing factor for the formation of mucin balls is the irregularity of the cornea. Since the structural changes in the cornea are transient, mucin balls may be useful for corneal repair due to mechanical and / or biochemical stimulation; in vivo study of keratocytes in the human cornea; Effect of sleep apnea on the

anterior surface of the eye - it was found that 66.67% of the studied patients with sleep apnea had dry eye; diagnostic approach in keratoconus, effect of drugs on AOS (5, 9, 15, 17, 18)

- **Cell and tissue transplantation in anterior ocular surface diseases** – Possibilities and organization of amniotic membrane, cornea and stem cell transplantation in Bulgaria - a survey was conducted on the application of transplantation in ophthalmology in Bulgaria in order to establish the experience of surgeons, the type of transplants, the geographical distribution of this key to ophthalmic practice treatment and source of tissue nationwide, development of algorithms and operating procedures (dissertation, 8)

- **Cataract surgery** - Cataract is the leading cause of blindness worldwide, morphological changes in the cornea after cataract surgery, as well as visual and perceptual comfort in patients with bilateral cataract, before and after surgery; It was found that 49.9% of all surgical interventions performed over a period of one year in a regional specialized medical institution were due to cataracts, which confirms the data from the scientific literature. (10, 11, 12)

II. Teaching activities

Dr. Grupchev is a lecturer at the Educational sector Medical Optics at the Medical College of the Medical University of Varna and actively participates in the training of students majoring in Medical Optics, Dental Medicine and Medicine ELT and BLT, as well as trainee residents. His academic employment is as follows: - for academic year 2018/2019 the total employment is 520 hours; - for academic year 2019/2020 the total employment is 336 hours; - for academic year 2020/2021 the total employment is 382 hours.

Dr. Grupchev is a co-author of a textbook on eye diseases for medical students.

II. Medical-diagnostic activity

Dr. Dimitar Grupchev actively participates in the consulting and surgical work in the Specialized Eye Hospital -Varna, has acquired a number of postgraduate qualifications and skills. He is an ophthalmologist dedicated to the introduction and development of modern vitreoretinal surgery as a routine activity in the hospital. In addition, his surgical work is aimed at treating cataracts and glaucoma. Dr. Grupchev actively participates in the development of algorithms for work in the eye bank at the Specialized Eye Hospital, as well as in the transplantation of stem cells and amniotic membrane in the treatment of diseases of the anterior

eye surface. He is able to work well in a team and shows a constant desire to implement new technologies in ophthalmic practice.

I have known Dr. Grupchev since the beginning of his specialization and doctoral studies. I can confidently say that he is an enthusiastic, dedicated to his work, both clinical and scientific, doctor, with a desire for continuous development and improvement. He is an established teacher who skillfully passes on his knowledge to students and graduates.

Conclusion

The scientometric indicators presented by Dr. Grupchev meet the minimum requirements for acquiring the academic position of Associate Professor set in the Law for the Development of Academic Staff and the Regulations for its application at the Medical University of Varna. This gives me reason to give my positive vote and recommend to the esteemed scientific jury to award Dr. Dimitar Ivanov Grupchev, MD, the academic position of Associate Professor in the scientific specialty "Ophthalmology" for the needs of the Training Sector "Medical Optician" at the Medical College-Varna.

10.06.2022

Varna

Respectfully,

Prof. Dr. Zornitsa Zlatarova, DSc

