

REPORT

By Prof. Georgi Tsvetanov Momekov, DSc

Department of Pharmacology, Pharmacotherapy and Toxicology, Faculty of Pharmacy at the Medical University of Sofia, elected as a member of the Scientific Jury, pursuant to Order D RD 38-454 / 21.09.2021 of the Rector of Sofia University "St. Kliment Ohridski"

Regarding a competition for the academic position of "Associate Professor" at the Faculty of Chemistry and Pharmacy of Sofia University "St. Kliment Ohridski" in the field of higher education 7. Healthcare and sports, professional field 7.3. Pharmacy (Technology of Dosage Forms), announced in SG no. 63 of 30.07.2021

In the competition for the academic position "Associate Professor" documents have been applied by a single candidate - Ch. Assist. Prof. Dr. Zahari Vinarov - currently an academy member at the FChPh. The materials submitted by the candidate to meet the required quantitative criteria are in full compliance with the relevant regulatory framework and in particular the Law on the Development of Academic Staff in the Republic of Bulgaria (RASRB), the national and institutional regulations for the application of the law. The attached documents and materials are prepared in an exemplary manner and allow fast and adequate verification of the fulfillment of the quantitative criteria laid down in the relevant legislation.

Brief biographic report

The candidate Dr. Zahari Vinarov is a graduate of the Faculty of Pharmacy at the Medical University of Sofia, where in 2009 he obtained the master's degree in pharmacy. In the period from 2008 to 2011 he acquired the position of chemist in the Department of Chemical Engineering, Faculty of Chemistry, Sofia University Kl. Ohridski". In the period 2014 - 2016, after a competition procedure, he held the academic position of assistant professor at the Dept. "Chemical Engineering and Pharmaceutical Technology" at the Faculty of Chemistry and Pharmacy, Sofia University "St. Kl. Ohridski ", and since 2016 he has been a chief assistant professor in the same primary unit. The candidate has obtained two PhD degrees in the areas: 7.3. Pharmacy (Technology of dosage forms and biopharmacy, i.e in the professional field of the competition), Sofia University "St. Kl. Ohridski"; and in 4.2 Chemical Sciences (Theoretical Chemistry and Macrokinetics), Sofia University " St. Kl. Ohridski". He has been a visiting research fellow in the laboratories of Unilever R&D in Port Sunlight, UK (2008) and in Colworth Science Park (2011), and in the period 2019-2021 he was a postdoctoral fellow at the Catholic University of Leuven, Belgium.

Teaching activities

The candidate has been engaged in the teaching of Technology of Dosage Forms for students of pharmacy (including preparation of lectures; preparation and conduct of practical exercises), as well as in the lecture course on Dispersions in Pharmaceutical Technologies for masters in chemistry. He has also been involved in teaching Chemical Kinetics to Bachelors in Chemistry. In 2018, he was a lecturer in a colloid science training program held at the Unilever Research Center in Bangalore, India. Ch. Assist. Prof. Vinarov participated in the team that developed the doctoral program in Technology of Dosage Forms and Biopharmacy at the Faculty of Chemistry and Pharmacy of Sofia University "St. Kliment Ohridski". He has supervised four master's theses and one bachelor's thesis.

Scientometric indicators and scientific activity

For his participation in the competition for associate professor the candidate has provided a list of twenty real full-text publications in specialized, peer-reviewed scientific journals, 2 books and 2 popular science articles. The submitted scientific articles have been published exclusively in impact factor journals (Journal Citation Reports, Clarivate[®] ex. Thomson Reuters), with a cumulative impact factor of 113 and an individual impact factor of 18. It is important to note that most of the full-text publications are in the most prestigious publications in the scientific field of the competition, namely the first two quartiles according to the Clarivate[®] classification. According to the reference appended by the candidate, 319 independent citations have been identified at the time of submission of the documents, and his Hirsch index is 10. Apart from the large number of publications with high scientometric characteristics, it is very impressive that Ch. Assist. Prof. Vinarov is a leading or corresponding author in over two thirds of the articles submitted for evaluation, which makes his personal contribution to these works indubitable. In addition to the full-text publications, the candidate's scientific achievements have been also disseminated in the form of scientific communications and oral reports presented at 40 national and international conferences. All scientific communications and publications are on the topic and professional direction of the competition.

Main areas of research and scientific contributions

The most important contributions of the candidate can be summarized in three main areas: (1) optimization of aqueous solubility of hydrophobic drugs by solubilization in colloidal aggregates of surfactants, (2) development and biopharmaceutical characterization of lipid dosage forms and (3) development and validation of biopharmaceutical models and analytical approaches.

Studies on the possibilities for optimizing the water solubility of hydrophobic drugs by solubilization in surfactant aggregates comprise a paramount paradigm in the candidate's original contributions. The influences of the structural features of surfactants on their solubilizing capacity have been evaluated. The possibilities for interactions between oppositely charged ionic surfactants and drugs, the formation of mixed micelles and the use of natural triterpene saponins as excipients for the formulation of drugs

with problematic biopharmaceutical and pharmacokinetic characteristics such as fenofibrate and danazol were investigated as well.

In the original monograph of the candidate, entitled "Solubilization: fundamental principles and biopharmaceutical applications" the above studies have been summarized and upgraded, and a correlation was found between the solubilizing capacity for the active pharmaceutical ingredient in micelles of nonionic surfactants and the LogP of the drug.

Another major area of interest is the development of lipid carriers, exploring new excipients, and innovative drug delivery systems to optimize the oral bioavailability of exemplar model drugs, using a successful *in vitro* model to predict pharmacokinetic behavior. The possibilities of using phospholipids, lysophospholipids, fatty acids, monoglycerides and bile salts to optimize the solubilization of hydrophobic substances have been studied.

A conceptually new method for the preparation of unconventional nanoemulsions has been developed, which have significant potential as dosage forms, incl. for systemic administration.

Another important area of the candidate's research is focused on the development and validation of biopharmaceutical models and analytical protocols for studying the mechanisms related to the release, dissolution and membrane permeability of active substances in the gastrointestinal tract.

A complex model for *in vitro* characterization of the biopharmaceutical features of IBD has been developed, and it has been exploited to study the influence of various factors regarding the bioaccessibility of cholesterol as a model substance. This complex algorithm has been applied to characterize the effects of surfactants and their interactions with bile salts in the small intestine with respect to the solubility of the active pharmaceutical ingredient. In these studies, it was found that nonionic surfactants do not form mixed micelles with bile salts and their solubilizing capacity decreases with increasing content of bile salts in the mixture. On the other hand, the solubilization capacity of the micelles of the ionic surfactants decreases significantly with the addition of a small part of bile salts, which is due to the formation of mixed micelles with a low capacity for solubilization of the drug substance.

Participation in the implementation of projects, specializations and expert activities

Ch. Assist. Prof. Vinarov has participated in the implementation of 19 research projects and has been the research supervisor of 5 students, including two foreign students in the Erasmus program. For the past two years, the candidate has held the position of postdoctoral fellow in the group "Drug delivery & disposition", led by Prof. Patrick Augustijns at the Catholic University of Leuven, Belgium. The research carried out during this period focused on the development of robotic methods for biopharmaceutical research, in collaboration with the pharmaceutical concern Janssen Pharmaceutica and with the financial support of the Flemish Fund for Innovation and Entrepreneurship.

Ch. Assist. Prof. Vinarov is a member of the executive management and co-leader of a working group on a project of COST CA16205 "European Network for Understanding the processes related to resorption in the gastrointestinal tract", including over 500 members from 32 countries. Zahari Vinarov

is a member of the 13H expert group at the European Pharmacopoeia (EDQM) and the American Association of Pharmaceutical Scientists (AAPS).

Personal impressions

I have known Zahari Vinarov since his student years and I have had the pleasure of teaching him in the courses of pharmacology and pharmacotherapy, and over the years I have had the opportunity to follow his development as a scientist, to evaluate his academic career and to strengthen my excellent initial impressions. I do not have joint publications with the candidate.

Conclusion

The materials and documents presented in connection with the competition give me reason to conclude that beyond any doubt Ch. Assist. Prof. Dr. Zahari Vinarov covers the formal quantitative criteria required by the regulations for acquiring the academic degree of "Associate Professor", and in some of the indicators even drastically exceeds them. The presented publications, study materials and references show that Ch. Assist. Prof. Dr. Zahari Vinarov is an ambitious, productive and internationally recognized researcher and at the same time an erudite and experienced teacher. All these considerations give me reason to positively evaluate the candidate and convincingly recommend to the esteemed members of the Scientific Jury to award Ch. Assist. Prof. Dr. Zahari Vinarov the academic position "Associate Professor" in the field of higher education 7. "Healthcare and Sports", professional field 7.3 "Pharmacy".

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