

STATEMENT

By Prof. Rossitza Konakchieva, Sofia University "St. Kliment Ohridski", elected as a Member of the Scientific Jury, appointed by order No. RD 38-595/31.10.2023 of the Rector of SU "St. Kliment Ohridski"

On Dissertation thesis entitled "Self-organization and surface properties of hBest1 in models of biological membranes" for the acquisition of the scientific degree "Doctor of Sciences" in the Professional direction 4.3. Biological Sciences (Molecular Biology)

The preparation of the current Statement on this dissertation work is based on Order No. RD 38-595/31.10.2023 of the Rector of SU "St. Kliment Ohridski" for the appointment of a Scientific Jury. The presented materials are in accordance with the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria (ZRASRB), the Regulations for the Implementation of the ZRASRB, the Regulations for the Terms and Procedures for Acquiring Scientific Degrees and Holding Academic Positions at SU "St. Kliment Ohridski" in the professional direction 4.3. "Biological Sciences" (Molecular Biology).

Professor Jordan Atanasov Doumanov - Professor at the Biochemistry Department of the Faculty of Biology, SU "St. Kliment Ohridski" presented an original dissertation on the topic "Self-organization and surface properties of hBest1 in models of biological membranes" as well as all necessary documents for evaluating the scientific activity related to the dissertation. I declare that I have no conflict of interest, incl. co-authorship in the candidate's publications.

Actuality of the scientific problem

The topic of the dissertation is related to in-depth scientific research on the structure and functions of the protein bestrophin-1 and its possible role in pathological conditions known as bestrophinopathies. Professor Doumanov specialized as a post-doctoral fellow for two years at the Institute of Vision, University Pierre and Marie Curie in Paris, France. During this period and on the same topic, Prof. Doumanov also completed a short four-month specialization at CABIMER, Seville, Spain. The elucidation of the structure and function of hBest1 is a main scientific topic and direction of the candidate, on which he has been working for more than 10 years.

General characteristics of the dissertation

The presented dissertation is structured and formatted according to the requirements. The dissertation is written on 196 pages. A short Introduction of 2 pages introduces the topic and contains the reasons for developing the dissertation. Followed by Chapter Literature review of 3 pages, Aim and tasks - 1 page, Materials and methods - 22 pages. The largest part of the work is occupied by the chapter Results - 81 pages, Conclusions - 3 pages, Contributions - 1 page. An advantage is a special section Future research of 1 page. The following is a list of publications related to the topic of the dissertation (16 publications with an impact factor and 2 without an impact factor), a list of participation in scientific forums where results related to the topic of the dissertation were presented (21 forums in the country and 1 abroad were cited), Appendices – 30, containing tables, graphs and photographs with original data. 294 literary sources were used, including contemporary publications on the subject incl. latest - after 2015 This is evidence of the relevance of the presented work and the candidate's desire to supplement and improve his professional experience.

Original contributions related to the dissertation

The main elements of the secondary structure of hBest1, the surface features and morphology of bestrophin-1 in Langmuir monolayers, and its visualization by atomic force microscopy were established. Images of "pure" hBest1 were obtained for the first time. The surface characteristics and morphology of mixed hBest1/POPC and hBest1/SM Langmuir monolayers, as well as the condensing effect of cholesterol on hBest1, hBest1/POPC and hBest1/SM films, were also determined.

Phosphatidylcholine, sphingomyelin and cholesterol are the main components of lipid rafts in biological membranes, therefore the interactions of hBest1 with these lipids are extremely important for its association with lipid microdomains, its activity and function. In this regard, the association of hBest1 with the Lo (65%) and with the Ld (35%) domains in the plasma membrane of living cells is shown for the first time. This contribution is fundamental to the structure, activity and functions of the transmembrane channel.

To achieve the goals of the dissertation work, a wide range of modern and classical methods of biochemistry and biophysics, cellular and molecular biology, incl. using cell cultures and biological membrane models, quantitative DNA analysis, cytometry, immunofluorescence, molecular sieve chromatography, affinity chromatography, Fourier-transform infrared spectroscopy, Brewster-angle microscopy, atomic force microscopy, etc.).

As a result of the conducted research, 18 conclusions and 7 contributions were formulated, which I fully accept. Overall, the obtained results give reason to consider the dissertation work as a comprehensive fundamental work with original scientific results and prospects for application in biomedicine.

In connection with the dissertation work, 18 articles were published with a total impact factor of 62,303, and their observed citations were 44. 9 of the publications with an impact factor were in journals with quartile Q1. In journals with Q2 there are 3 publications, in journals with Q3 there are 2 publications, and in journals with Q4 there are 2 publications. Scientific indicators of Prof. Jordan Doumanov - reflected in 390 points exceed the minimum required number of points for the degree "Doctor of Sciences" cited with ZRASB for the scientific field and professional direction 4.3 Biological Sciences.

Conclusion

The present dissertation reflects a thorough and original in design and implementation scientific work, realized with a wide arsenal of modern methods of molecular biology and biophysics, which allowed obtaining scientific results of high value and contribution to modern science. Bearing in mind the professional qualities of the candidate as the head of an original scientific field, as well as the scientific achievements in the present work, I express my positive assessment of the presented dissertation for the acquisition of the scientific degree "Doctor of Sciences" in professional field 4.3. "Biological Sciences" (Molecular Biology). I strongly recommend to the Honorable Members of the Scientific Jury appointed by order No. RD 38-595/31.10.2023 the Rector of SU "St. Kliment Ohridski" to award Professor Jordan Atanassov Doumanov the scientific degree "**Doctor of Sciences" in Professional Direction 4.3. Biological Sciences (Molecular Biology).**

15.12.2023

Signature:

/Prof. Rositsa Konakchieva, Dr. Habil)