OPINION

on a dissertation

for the acquisition of the educational and scientific degree "doctor"

in professional direction 4.1 Physical Sciences,

by defense procedure at the Faculty of Physics (FzF)

of Sofia University "St. Kliment Ohridski" (SU)

The opinion was prepared by Prof. Asen Enev Pashov, Sofia University "St. Kliment Ohridski", Faculty of Physics, in his capacity as a member of the scientific jury according to Order RD 38-575/27.07.2022 of the Rector of Sofia University.

Dissertation topic: "**In vitro and in vivo Contact Lens Dewetting Investigations using Placido Ring based Videokeratoscopy"**

Author of the dissertation: Sebastian Marx

Applicant data

Sebastian Marks was born in Halle, Germany. After completing secondary education, he attended a vocational school in ophthalmic optics and obtained a professional qualification as an ophthalmic optician. From 2001 to 2005, he was a student at the University of Applied Sciences in Jena, where he successfully graduated with a bachelor's degree in Optometry. From 2012 to 2015, at the same University, he became a Master of Science in Optometry.

In parallel with his studies, since 1998, Mr. Marks has worked in companies, institutes, and universities in the field of ophthalmic optics. The list is long and impressive, it is given in the CV supplied by the candidate. Sebastian Marks is currently a lecturer at the University of Jena and simultaneously works at the JENAVIS research institute. Since 2019, Sebastian Marks is a part-time doctoral student at the Faculty of Physics of SU St. Kliment Ohridski in biophysics. In the beginning, he worked with Assoc. prof. G. Georgiev, but he prepared the final version of the dissertation under the guidance of Assoc. prof. Stanislav Balushev.

A Scopus reference shows that Sebastian Marx has co-authored 14 scientific publications, the first of which was in 2013 when the candidate was a Master's student at the University of Jena. All articles are in the field of contact lenses. The works are cited about 150 times, the h-index (excluding self-citations) is 5. In 7 of the articles, Sebastian Marks is the first and corresponding co-author. The attached curriculum vitae shows that two more publications in peer-reviewed journals are pending. The list of presentations at scientific and special conferences takes up more than 6 pages of the CV.

Obviously, Sebastian Marx is a highly qualified scientist, a sought-after specialist, recognized by his colleagues in Europe and North America. The presented doctoral dissertation is a significant, 10-year, but far from complete part of his work as a scientist and researcher.

General description of the candidate's scientific achievements

The presented dissertation is devoted to the evaluation of contact lens wetting in vivo and in vitro using videokeratoscopy based on Placido rings. The dissertation is written on 135 pages and contains 270 bibliographic sources. The material is divided into 7 chapters, and the seven appendices at the end of the dissertation are also important. The dissertation presents a brief historical overview of the method used, types of tear films, types of contact lenses and methods for assessing the degree of wetting of contact lenses. Chapter 3 details the method used in the thesis (videokeratoscopy based on Placido rings). The main in vivo results are described in ch. 4 being divided into 3 studies. Each study is accompanied by a description of the research objectives, methods, results obtained, discussion and conclusions. In Ch. 5 an in vitro study of contact lens wetting is presented.

In the dissertation, the Keratograph 5M of the OCULUS company was used. Initially, a subjective, manual method was developed to estimate the degree of wetting based on observations of the anterior ocular surface. Subsequently, a package was added to the software of the instrument, Oculus NIK-BU, allowing the evaluation to be done automatically by analyzing in an objective way a significantly larger volume of data. In addition to software improvements, within the framework of the dissertation, a hardware modification of the device is also proposed, allowing the study of the correlation between the wetting disorder of the contact lens and the reduction of visual acuity.

The study combined both in vivo and in vitro studies, and an attempt was made to find a correlation between the results. Thus, the results of in vitro contact lens wetting studies can be used to predict expected in vivo behavior. This is one of the essential contributions of the dissertation.

Critical notes and recommendations

I don't have any

Conclusion.

Sebastian Marx's dissertation, author's abstract and scientific publications meet the minimum scientific requirements of ZRAS and its Regulations, as well as the requirements of the Faculty of Physics of SU St. Kliment Ohridski. I strongly support the awarding of the educational and scientific degree "Doctor".

28.11.2022

Sofia

Asen Pashov

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