



## STATEMENT

on thesis for the award of educational and scientific degree "Doctor" in the field of higher education "6. Agricultural sciences and veterinary medicine", professional field "6.4. Veterinary medicine", scientific specialty "Surgery, Radiology and Physiotherapy of animals".

**Author of the thesis:** Seven Ruzhdi Mustafa, PhD student in self-study at the Department of Surgery, Radiology, Obstetrics and Gynecology of Faculty of Veterinary Medicine at University of Forestry – Sofia.

**Topic of the thesis:** "Examination of the regenerative potential of platelet-rich plasma and sodium hyaluronate with dexpanthenol in experimentally induced corneal ulcers in rabbits."

**By Prof. DSc IVAN BORISOV, member of the Scientific Jury approved by an order of the Rector of University of Forestry – Corresponding Member, Prof. DSc Ivan Alexandrov Iliev, № 369 from 05.07.2023.**

### **I. Relevance and significance**

The dissertation presented to me by assistant professor Seven Ruzhdi Mustafa "Examination of the regenerative potential of platelet-rich plasma and sodium hyaluronate with dexpanthenol in experimentally induced ulcers of the cornea in rabbits" with scientific consultant Assoc. Prof. Nadya Zlateva Panayotova, PhD, is dedicated to a current scientific problem.

From a scientific point, the topic of the dissertation work is *very clinically important and applied relevance* to both human and veterinary ophthalmology and regenerative surgery.

### **II. Structure of the PhD thesis**

The presented dissertation contains all the necessary sections, meets the requirements, and volume with sufficient.

The thesis is written on 164 pages and includes the following sections: Introduction - 2 pages, Literature review - 39 pages, Aim and Tasks - 1 page, Material and Methods - 12 pages, Results - 41 pages, Discussion - 30 pages, Findings - 1 page, Contributions - 2 pages, Recommendations for practice - 1 page, Publications connected to the thesis - 1 page, Citations of scientific publications connected to the thesis - 1 page and Literature index - 27 pages. The content of the dissertation is presented on 2 pages, and other 2 pages - a List of the abbreviations.

The paper is written in a very well-written scientific style, which shows the mastery of medical terminology and a very good knowledge of the problem in the chosen scientific field.

### **III. Introduction**

The introduction is concise, correct, precise, and concretely highlighting the relevance of the scientific problem posed in the thesis and motivating the purpose of the research.

#### **IV. Literature review**

The literature review reflects the anatomical features of the visual analyzer in mammals and the most recent scientific corneal structure information. It includes information on corneal damage and specifically on corneal ulcers, describing in great detail the features of corneal healing. A separate section reflects the known regenerative therapies for the treatment of corneal ulcers, indicating platelets as a reservoir of bioactive factors and the possibilities of their application in different medical forms, applied in different ways.

The material presented in the literature review, the anatomical features of the eye, the structure of the cornea, the pathogenetic mechanisms of the development of the corneal ulcer, as well as the cascades in the regenerative processes of the cornea are very well illustrated in 3 tables and 7 figures included in this section of the thesis.

A good impression is made by the high competence and vision of the author on problem studies based on the systematization and analysis of a significant number of literary sources of the leading scientists in this direction. This is confirmed by the 336 literary sources used in the Cyrillic and Latin alphabets.

At the end of the literature review, Assist. Prof. Mustafa makes a very successful summary of the literature review in which he logically motivates the purpose of the dissertation work and the resulting tasks.

#### **V. Goal and Tasks**

I believe that the purpose of the dissertation work is correctly formulated, specific, precise, clear, and in sync with the title of the thesis.

The tasks are specific, scientifically based, and correctly formulated.

#### **VI. Material and Methods**

The researched animals included in the dissertation work are sufficient in number. The experimental design is properly chosen. The follow-up period of the treated animals is sufficient. The research methods used (morphological, biochemical, ophthalmological, image-diagnostic, and histological) are modern, skillfully selected, and include a sufficient number of indicators.

The experimental studies were carried out following the permit for the use of experimental animals No. 337/2022, of the Ethics Committee of the BFSa.

The numerical results obtained were processed statistically by one-way analysis of variance ANOVA

#### **VII. Presentation of the obtained results**

The obtained results of the conducted research are reflected on 41 pages, 15 tables, and 45 figures. All of them provide new and useful information (paraclinical, ophthalmological, imaging-diagnostic, and pathohistological), both for the development of chemical and traumatic corneal ulcers, as well as in the four experimental groups of rabbits treated in different ways and with different preparations (I group - with an operative technique for temporary fixation of the third eyelid; II group - sodium hyaluronate and dexpanthenol, administered as eye drops; III group - autologous platelet-rich plasma administered as eye drops and IV group - autologous platelet-rich plasma administered by a single subconjunctival injection).

The use of modern methods and equipment for the evaluation of the development of chemical and traumatic corneal ulcers, as well as the monitoring of the ophthalmologic condition in the four

groups of rabbits, provide objective digital results that are statistically processed, well-visualized, and showing the development of the regenerative potential when applied surgically and medical treatment of corneal ulcers.

My assessment of the results of the special ophthalmological examination conducted is positive, which is very well illustrated, and the obtained digital results are processed statistically, presented in tabular form, and have an evidentiary nature for the results of the conducted treatment in the different experimental groups of rabbits.

The results of tracking the speed and nature of corneal healing in the control and experimental groups, obtained through diagnostic imaging studies, deserve high praise.

For the first time in veterinary ophthalmology in our country, optical coherence tomography of the anterior segment of the eye of rabbits is performed and the obtained results are illustrated in 16 figures.

The presented results of the histological examinations of the cornea are proof of the achieved healing effect in the rabbits from the different experimental groups. The histological preparations are very well made, correctly selected, and interpreted and demonstrate the comparative regenerative results of the cornea in the rabbits of the four experimental groups.

## **VIII. Discussion of results**

In the "Discussion" section, Assist. Prof. Mustafa analyzes the obtained results with the expertise of a competent clinician-ophthalmologist. The discussion of the obtained results is thorough and competently interpreted. The discussion logically follows the structure of the literature review and its results.

The discussion ends with a very good conclusion, reflecting the fulfillment of the main aim and tasks, as well as the prospects for the application of platelet-rich plasma for the treatment of slow-healing and deep corneal ulcers in veterinary practice. It is pointed out that the instillation of platelet plasma shows faster and better results compared to its subconjunctival injection as it quickly calms the corneal surface and reduces tear secretion, which is a proven fact from the perspective of their application in veterinary ophthalmology.

## **IX. Findings**

Based on the obtained results and their discussion, the dissertation student formulated 7 conclusions, which reflect the essence of the studies conducted on the regenerative potential of platelet-rich plasma and sodium hyaluronate with dexpanthenol in experimentally induced ulcers of the cornea in rabbits.

## **X. Contributions**

At the end of the thesis, Assis. Professor Mustafa points out 10 contributions, of which 6 are original and 4 confirmatory, which are of important clinical significance and enrich the existing information in this very interesting and understudied field of veterinary ophthalmology.

I accept that all contributions - original and confirmatory, are the personal work of the dissertation student.

## **XI. Recommendations for practice**

The practical value of the dissertation is expressed in the 4 recommendations for practice given by the author of the thesis, which could also be used by veterinary ophthalmologists and clinical veterinary surgeons treating pets.

## **XII. Publications connected to the thesis**

In connection with the topic of the thesis, three collective scientific articles in English are pointed out, and the lead author of all of them is Assist. Prof. Mustafa.

## **XIII. Citations of scientific publications connected to the thesis**

One of the scientific publications related to the current dissertation was cited in a scientific journal with an impact factor.

## **XIV. Literature Index**

The 336 literary sources included in the dissertation thesis are sufficient in number. More than 50% of the cited authors included in the literature review and discussion are from the last 10 years.

## **XV. CONCLUSION**

The dissertation student gathered the majority of the notes and recommendations made at the meeting of the expanded departmental council of the Department of "Surgery, Radiology, obstetrics and gynecology", held on 23.06.2023, which contributed to a significant improvement in the quality of the presented dissertation work.

The problem considered in the dissertation work presented by **Assist. Prof. SEVEN RUZHDI MUSTAFA** on the topic " Examination of the regenerative potential of platelet-rich plasma and sodium hyaluronate with dexpanthenol in experimentally induced corneal ulcers in rabbits" is of high scientific and applied importance.

Based on the research methods mastered and applied by the PhD student, the correctly conducted experiments, the summaries, conclusions, and contributions made, I believe that the presented dissertation thesis meets all 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 law on the development of the academic staff in the Republic of Bulgaria (PPZRASRB) and the Regulations for the development of the academic staff at the Forestry University (PRASLTU), which is why I allow myself to evaluate it **POSITIVELY** and recommend to the Honorable members of the Scientific Jury to vote with a full conviction for the awarding of the educational and scientific degree "**DOCTOR**" in the scientific specialty "**Surgery, Radiology and Physiotherapy of Animals**", professional field - 6.4. "**Veterinary medicine**" and field of higher education 6. "**Agricultural sciences and veterinary medicine**".

24.07.2023  
Stara Zagora

Statement prepared by: \_\_\_\_\_  
/ Prof. DSc Ivan Borisov /