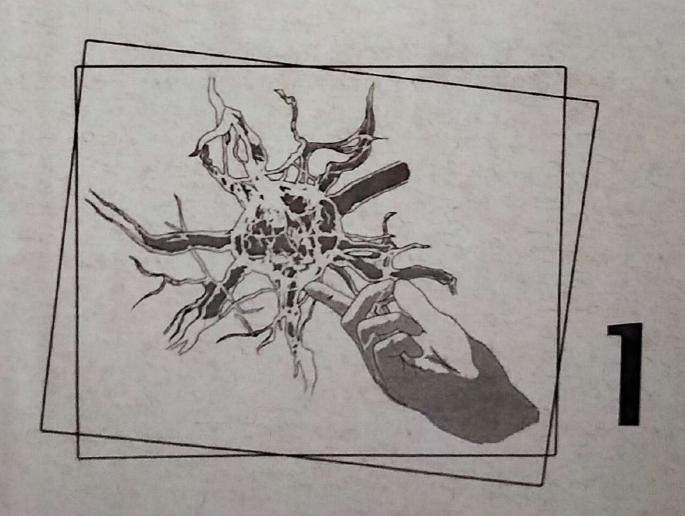
PHYSIOLOGY

workbook



TARAS SHEVCHENKO NATIONAL UNIVERSITY OF KYIV MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

V. O. Kurovska

O. M. Podpalova

PHYSIOLOGY

Workbook for students studying educational program "Medicine" Part 1



Reviewers:
Dr Hab., Prof. O.A. Shandra
(Odessa National Medical University),
Dr Hab., Prof. N. M. Voronuch-Semchenko
(Ivano-Frankivsk National Medical University)

Approved by the Academic Council of Educational and Scientific Center
"Institute of Biology and Medicine"
(the protocol № 11 from 25.06.2020)

Kurovska V. O.

K93 Physiology: workbook for students studying educational program "Medicine". Part 1.
 / V. O. Kurovska, O. M. Podpalova. – K.: Kyiv University Publishing and Printing Centre, 2020. – 203 p.

This workbook is intended to help students during independent extracurricular preparation for laboratory classes in physiology. It also aimed at the individual activity of each student during laboratory classes. Several types of activity are proposed: to systematize the material in the form of tables, to perform graphic schemes that combine knowledge of anatomy and physiology, as well as tasks that require to use knowledge not only of a current topic, but to approach the problem comprehensively, to analyse the material and come to the right conclusions. Protocols of laboratory work are aimed at the gaining of practical skills by students.

Content

Preface	7
Laboratory lessons 1. Subject and tasks of physiology. Methods of physiological researches. Functions of cell membrane. Types of transport across the cell membrane	8
Laboratory lessons 2. Registration of the resting potential and action potential of excitable tissues	17
Laboratory lessons 3. Studying the spread of excitation along the nervous fibers and mechanism of nerve impulse transmission through nervous-muscular junction	24
Laboratory lessons 4. Studying the mechanism of muscle contraction	31
Laboratory lessons 5. Studying of the single and tetanic curves of muscle contraction. Determination of the force of muscle contraction	37
Laboratory lessons 6. Module 1. Physiology of excitable tissues	44
Laboratory lessons 7. Biological regulation of body function. Analysis of reflex arch	46
Laboratory lessons 8. Studying of properties of central synapses	53
Laboratory lessons 9. Studying of the inhibition processes of the central nervous system	60
Laboratory lessons 10. Studying of spinal cord's role in motor functions regulation of an organism	67
Laboratory lessons 11. Studying of the role of brain stem in motor functions regulation	76
Laboratory lessons 12. Studying the functions of cerebellum	85
Laboratory lessons 13. Studying the role of prosencephalon in moving function regulation and homeostasis support of an organism	93
Laboratory lessons 14. Studying the functions of cerebral cortex	101
Laboratory lessons 15. Studying of electroencephalography. Physiology of sleep	109
Laboratory lessons 16. Module 2. Main principles of biological regulation, nervous regulation of motor functions of an organism, high cerebral functions and processes	117
Laboratory lessons 17. Studying the mechanisms of nervous regulation of visceral functions	119

Laboratory lessons 18. Studying the mechanisms of hormones' action	127
Laboratory lessons 19. Studying the role of hormones in regulation of body growth and development	133
Laboratory lessons 20. Studying the role of hormones in the regulation of glucose and calcium metabolism	139
Laboratory lessons 21. Studying the role of hormones in the homeostasis regulation, adaptation to stressful factors and sexual development and functioning	147
Laboratory lessons 22. Module 3. "Nervous and humoral regulation of the visceral functions of an organism	154
Laboratory lessons 23. Studying of somatosensory and gustatory systems	156
Laboratory lessons 24. Studying of auditory and olfactory sensory systems.	164
Laboratory lessons 25. Studying of visual sensory system	173
Laboratory lessons 26. Studying the physiological base of behavior, the role of necessities and motivations in behavioral reactions. Studying the mechanisms of memory and physiological bases of emotions	185
Laboratory lessons 27. Studying the physiological bases of acquired behavior: the research of conditional reflexes formation and inhibition. Studying the types of higher nervous activity	192
Laboratory lessons 28. Module 4. "Physiology of senses. High nervous activities of a human"	198
Recommended extra	200

PREFACE

This workbook is intended to help students during independent extracurricular preparation for laboratory classes in physiology. It also aimed at the individual activity of each student during laboratory classes.

The control questions of each topic serve as a guideline, the answer to which should be found in the recommended sources. In order to pay attention to certain terms and make the process of working with textbooks more conscious and creative, it is necessary to define the terms proposed for each topic. This will help students to memorize terminology. Some of terms require searching on the Internet that will encourage students to have wider knowledge on certain issues.

The proposed slides are intended to make the student's work more creative. Some of them must be filled in preparation for the lesson, others – in the classroom. The emphasis is on the individual work of the students. Several types of activity are proposed: to systematize the material in the form of tables, to perform graphic schemes that combine knowledge of anatomy and physiology, as well as tasks that require to use knowledge not only of a current topic, but to approach the problem comprehensively, to analyse the material and come to the right conclusions. Protocols of laboratory work are aimed at the gaining of practical skills by students. Such approach, with a combination of various types of activity during the laboratory lesson, will contribute to the acquisition of practical skills, the ability to analyze the results of studies of body functions and to come to the relevant conclusions.

The workbook also provides information that is not included in the curriculum of the discipline. This is the data of new studies, unknown issues of the implementation of certain functions, or information necessary for the understanding of the need of knowledge presented in the topic. For the same purpose, a list of scientific articles is proposed. The list is not obligatory, but will arise an interest of curious students and help them take steps in student science.

Authors