PROBLEMS OF FORMATION AND DEVELOPMENT OF PERSONALITY

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РЕАЛИЗАЦИЯ ПРИНЦИПОВ ПРЕЕМСТВЕННОСТИ И ПОСЛЕДОВАТЕЛЬНОСТИ ПРИ ПРЕПОДАВАНИИ ОБЩЕЙ ХИМИИ И НОРМАЛЬНОЙ ФИЗИОЛОГИИ В МЕДИЦИНСКОМ ВУЗЕ

IMPLEMENTATION OF THE PRINCIPLES OF CONTINUITY AND CONSISTENCY
IN TEACHING GENERAL CHEMISTRY AND NORMAL PHYSIOLOGY
AT A MEDICAL UNIVERSITY

**Лапкин М.М., Трутнева Е.А.,
Лаксаева Е.А.**

Рязанский государственный медицинский
университет имени академика И.П. Павлова

**Lapkin M.M., Trutneva E.A.,
Laksaeva E.A.**

Ryazan State Medical University

Аннотация:

В статье рассматривается реализация принципов последовательности и преемственности при преподавании в медицинском вузе дисциплин «Общая химия» и «Нормальная физиология». Приводится ряд преподаваемых тем и вопросов, которые позволяют реализовывать указанные педагогические принципы: растворы, роль различных ионов в обеспечении физиологических функций, буферные системы и их роль в регуляции кислотно-щелочного баланса организма и ряд других. Рассматриваются возможные формы междисциплинарного взаимодействия: согласование рабочих программ и учебных планов в рамках совместных заседаний кафедр и методических советов; написание междисциплинарных учебных пособий; чтение междисциплинарных проблемных лекций; проведение совместных заседаний студенческих

Abstract:

In the article, we discuss the principles of consistency and continuity implemented in the education of general medicine and normal physiology at the medical university. We give several taught topics and questions to allow the application of these pedagogical principles: solutions, the role of various ions in physiological functions, buffer systems, and their role in regulating the acid-base balance of the body and many others. We reviewed possible forms of interdisciplinary interaction: coordination of work programs and curricula within the framework of joint departments and methodological councils, writing of interdisciplinary textbooks, reading of interdisciplinary problem lectures, holding joint meetings of student scientific societies devoted to current scientific problems. We believe that multidisciplinary interaction will allow us to

научных кружков кафедр, посвященных актуальным научным проблемам. Авторы приходят к заключению, что междисциплинарное взаимодействие позволит избежать необоснованного дублирования в преподавании, высвободит дополнительные временные ресурсы и в целом повысит эффективность образовательного процесса.

Ключевые слова:

общая химия, нормальная физиология, преемственность и последовательность преподавания.

eliminate to eliminate unreasonable duplication in teaching, free up additional temporary resources, and increase the effectiveness of the educational process in general.

Key words:

general chemistry, normal physiology, consistency and continuity of teaching.

Introduction

The principles of continuity and consistency are one of the basic in education at any level. They suggest the presence of interdisciplinary connections, especially between natural sciences, taught in a specific sequence per the curriculum [1-4]. In the framework of higher medical education, they are general and organic chemistry, biological chemistry, anatomy, histology, normal physiology, and several others. It was shown that the further success of medical students in clinical disciplines depends on the preparation during fundamental science courses. For today's student, a future doctor, science literacy is essential, allowing the application of basic scientific concepts to solve diagnostic and medical issues in real clinical situations. The particular relevance of the principles under consideration is currently associated with the restructuring of the educational process. It is an outcome of the approval of a new educational standard in medical higher education. This state educational standard implies the focus of training on improving its quality, increasing the time for acquiring practical professional skills, expanding the timeshare allocated for independent work. For obvious reasons, it is crucial to eliminate duplication from the curriculum between different natural science disciplines with the further formation of an appropriate content of related topics assigned for teaching at each stage of training.

That is why we aimed to show possible topics to implement the principles of sequential interaction in the teaching of general chemistry and normal physiology and to introduce possible forms of interdisciplinary interaction.

Aim

Was to identify the topics of the disciplines "General Chemistry" and "Normal Physiology" that allow implementing the principles of consistent interaction in teaching these disciplines and suggest possible approaches for implementing these principles.

Challenges

1. Conduct a comparative analysis of the educational programs of the disciplines "General Chemistry" and "Normal Physiology" to identify those educational processes in the process of teaching which you can implement the principle of continuity and consistency.
2. Consider the amount of training material established by the topic that should be considered by each discipline to eliminate possible duplication and form a unified approach in the interpretation of its content.
3. To consider possible forms of interdisciplinary interaction for the implementation of the principles of continuity and sequence of taught disciplines.

Materials and Methods

We analyzed work programs of the disciplines "General Chemistry" and "Normal Physiology" related to the "General Medicine" specialty. In the course of the study, a comparison was made of the structure of the compared educational programs, an assessment was made of the sequence of presentation of educational material and its content. The analysis of literature data on the possible forms of interdisciplinary interaction in the preparation of educational programs.

Results and Discussions

A detailed analysis of the topics in the work programs in the specialty "General Medicine" of the disciplines "General Chemistry" and "Normal Physiology", similar in basic content, made it possible to identify areas of duplication of material, as well as areas that require agreement on its content. As a result of the work carried out, proposals were formulated to coordinate the content and sequence of the presentation of educational material in educational programs, as well as a model of an interdisciplinary training manual was proposed. In this tutorial, it is proposed to develop a network chart of topics of the studied disciplines, with vectors reflecting the sequence of presentation of topics of educational material. At the final stage, on the basis of literature data, as well as our own experience of interdisciplinary interaction, possible organizational forms of coordinating the volume, content and sequence of presentation of educational material in educational programs are proposed. Topics of curricula agreed upon in the teaching of general chemistry and normal physiology at Ryazan State Medical University (Table 1).

During the analysis of work programs, it is proposed to divide the volume and content of the subjects studied in the disciplines "General chemistry" and "Normal physiology" in order to avoid duplication in teaching. In addition, it is proposed to form a unified approach in the interpretation of the taught material in order to unify the educational process.

Table 1

An example of topics and questions in a course of general chemistry and normal physiology taught in accordance with the principles of consistency and continuity

The name of the topic and its content in the discipline "General Chemistry"	The name of the topic and its content in the discipline "Normal Physiology"
Classification of solutions. Diluted, saturated, and supersaturated solutions. Solubility, laws of its change. The concept of colligative properties of solutions. Vant Hoff Law on Osmotic Pressure. The role of osmosis in biosystems. Plasmolysis, hemolysis, turgor. Hypo-, iso- and hypertonic solutions. Theory of solutions of strong electrolytes. The ionic strength of solutions, activity coefficient, and ion activity.	General physiology, the role of various soluble salts in the formation of osmotic pressure in tissues. Bioelectric phenomena in excitable tissues, the role of various ions in bioelectrogenesis. Physiology of muscle tissue, the role of Ca^{++} ions in the mechanisms of muscle contraction. Physiology of synaptic transmission, the role of Ca^{++} ions in the mechanisms of exocytosis of mediators in the synaptic cleft. Blood physiology, the role of Ca^{++} ions in hemostatic mechanisms. Humoral relationships in the body, the role of Ca^{++} ions as a secondary mediator of intracellular signal transmission.
Buffer systems. The composition of the buffer systems; classification of buffer systems; buffering mechanism; factors affecting the buffer capacity and pH of buffer systems.	Physiology of blood. The role of protein-hemoglobin, carbonate, and phosphate buffer systems in optimizing the pH of the body's internal environment. Physiology of respiration. The role of CO_2 and erythrocyte-plasma processes in the formation of a carbonate buffer system.
Solutions of gases in liquids. Laws of Henry, Henry - Dalton, I.M. Sechenov.	Physiology of respiration. The role of the partial pressure of gases in the alveolar air and the partial tension of gases in the blood in diffusion processes in the lungs and tissues.
Kinetics. The speed of a chemical reaction. Kinetic equations, reaction order. The rate constant of a chemical reaction, its physical meaning. Activation energy. Arrhenius equation. Homogeneous and heterogeneous catalysis. Reversible and irreversible chemical reactions. Chemical equilibrium. The law of mass action for equilibrium. The equilibrium constant, its connection with Gibbs energy.	Humoral relationships in the body. The role of self-regulatory chemical processes in the synthesis of physiologically active substances in animals and humans.

The released time resources are recommended to be used for the presentation of educational material, the volume of which was limited by the time limits of the state educational standard, which will increase the information content and consistency of the presentation of the topics proposed for study. However, to implement the results of the work requires their consolidation in educational programs for teaching faculty meetings and statement of Educational-methodical Council of the University.

Here is an example of continuity and consistency of teaching General chemistry and normal physiology. One of the most important topics of General physiology is "Bioelectricity". To understand the origin of bioelectric phenomena in excitable cells and tissues, students need to know the theory of Arrhenius electrolytic dissociation, the state of ions of soluble salts in solutions, the laws of ion movement in accordance with concentration and electrochemical gradients. Without knowledge of these issues, it is impossible to understand the theory of bioelectrogenesis. And if students in the second year come with the necessary knowledge for mastering this topic, it greatly simplifies the assimilation of educational material and vice versa.

In General, the coordination of work programs and curricula of disciplines taught in higher education institutions can be carried out in various organizational forms:

1. Joint meetings of departments and methodological councils as main coordinators of interdisciplinary teaching;
2. Mutual work of the departments in the development and tutoring of elective courses and the introduction of relevant issues in the subject olympiads;
3. Joint "interdisciplinary" work of student scientific societies, holding inter-department interdisciplinary problematic meetings;
4. Preparation and reading of complex interdisciplinary lectures by professors of departments to improve the consistency and continuity of teaching;
5. Writing joint textbooks and monographs by the staff of the departments.

Professors and instructors of the Ryazan State Medical University have already attempted to form the continuity and sequence of taught disciplines. We demonstrate experience in publishing the collective interdisciplinary textbooks and monographs. We, physiologists, have close collaborations with a teaching staff of other disciplines: food hygiene [5], dentistry [6,7], neurology [8,9], clinical psychology [10], physical education [11]. We also interact with our colleagues from the General chemistry department on the implementation of the principles of continuity and consistency [12, 13]. However, done in this direction is not sufficient. Several reasons that impede the optimization of these and other possible forms of interdisciplinary interaction today are the oppressive workload of teachers in compulsory curricula, and, possibly, the specific language of the taught disciplines, which makes interdisciplinary communication challenging.

Conclusion

There is no doubt that the pedagogical principles of continuity and consistency are an integral part of the educational process at a medical university. They should be practically implemented in various organizational forms, including teaching such disciplines as general chemistry and normal physiology.

There is no conflict of interest.

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СВЕДЕНИЯ ОБ АВТОРАХ:

Лапкин Михаил Михайлович – доктор медицинских наук, профессор, заведующий кафедрой нормальной физиологии с курсом психофизиологии, Рязанский государственный медицинский университет имени академика И.П. Павлова; 390026, Рязань, ул. Высоковольная, д. 9. E-mail: lapkin_rm@mail.ru

Трутнева Елена Анатольевна – кандидат медицинских наук, доцент, доцент кафедры нормальной физиологии с курсом психофизиологии, Рязанский государственный медицинский университет имени академика И.П. Павлова; 390026, Рязань, ул. Высоковольная, д. 9. E-mail: e_lena68@mail.ru

Лаксаева Елена Анатольевна – кандидат биологических наук, доцент, доцент кафедры общей химии, Рязанский государственный медицинский университет имени академика И.П. Павлова; 390026, Рязань, ул. Высоковольная, д. 9. E-mail: elenalaksaeva@mail.ru

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INFORMATION ABOUT AUTHORS:

Michael M. Lapkin – MD, PhD, Professor, Head of the Department of Physiology with the Psychophysiology Course, Ryazan State Medical University; 9, Vysokovolttnaya Street, 3900026, Ryazan. E-mail: lapkin_rm@mail.ru

Elena A. Trutneva – candidate of medical sciences, associate professor at the Department of Physiology with the Psychophysiology Course, Ryazan State Medical University; 9, Vysokovolttnaya Street, 3900026, Ryazan. E-mail: e_lena68@mail.ru

Elena A. Laksaeva – candidate of biological sciences, associate professor at the Department of General Chemistry, Ryazan State Medical University; 9, Vysokovolttnaya Street, 3900026, Ryazan. E-mail: elenalaksaeva@mail.ru

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