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THE FEATURES OF TEACHING DISCIPLINE «BIOLOGICAL AND BIOORGANIC CHEMISTRY» TO THE FOREIGN STUDENTS OF ENGLISH-LANGUAGE FORM OF EDUCATION

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Introduction. Nowadays, Ukraine has become more integrated into the global educational space. However, the martial law introduced in Ukraine on February 24, 2022 has sharply changed the educational process in the institutions of higher education. It led to the transfer of the educational process in Bogomolets National Medical University to the distant form. This made the problem of organizing the English-language form of education for the foreign students relevant. Currently, there are no studies that would allow an objective estimation of the existing methods of distance learning for the foreign students.

At the same time it is significant to realize - the use of English language for learning, the fluency in English medical terminology, the skills to use the English-language Internet search engines and e-libraries enhance the “convertibility of education” of not only foreign but also Ukrainian students, opening the possibility of internship or specialization in the countries of Western Europe, Canada, and USA. Moreover, according to the current trends towards the integration into the world scientific community, the use of English-language form of teaching opens up the new economic reserves for Ukrainian institutions of higher education and increases their competitiveness in the international educational markets [2]. It is obvious, the increase of the percentage of employees involved in English-language form of education is a prior task in terms of improving the quality of educational activities of the institution and enlarging its rating.

Aim. To analyze the problems and perspectives of teaching the discipline “Biological and Bioorganic Chemistry” to the foreign students of English-language form of education in conditions of distance learning during the martial law in Ukraine.

Results and discussion. In medical universities the discipline «Biologic and Bioorganic Chemistry» is a fundamental theoretical discipline which mastering makes the basis for the further clinical training of medical students. The discipline is studied

on the first and second course and by the students' opinion comprises one of the complex theoretical disciplines, which mastering requires not only to memorize the large amount of information, but also to be able to analyze, to interpret and to compare data concerning the features of biochemical processes in the human body [1]. When studying the discipline, the student gets the skills and abilities that allow:

- to understand the features of biochemical processes in the organs and tissues in the body and the ways of their regulation;
- to know the medical and biochemical characteristics of metabolism in organs and tissues at disorders of their functions;
- to master the principles of making biochemical analysis of biological fluids;
- to estimate and to interpret the clinical diagnostic value of the results of laboratory analysis.

The successful mastering of discipline "Biological and Bioorganic Chemistry" provides the further interdisciplinary integration between different academic subjects. In higher education medical institutions, the traditional way of interdisciplinary integration is the sequential study of medical and biological, fundamental, and then clinical (profile) subjects. The mastering of every subsequent discipline based on the knowledge obtained from the previous ones is a way of activating the knowledge, skills and abilities of the subject-oriented learning within its vertical integration [3].

During the martial law in Ukraine, our goal was to make learning comfortable for the foreign students of English-language form of education. We aimed to prepare and substantiate the methods and approaches which facilitate the study of the discipline, to enhance the level of perception of the information, to promote the clinical thinking, to apply the basic concepts of Biological chemistry with the mastering of practical skills for the understanding of the clinical assessment of typical conditions of the patients at diagnosis of the diseases.

It should be noted that the main problem of study of chemical disciplines by the foreign future doctors is the difference of the students' entry-level of knowledge in chemical disciplines caused by the diversity in educational programs of the high schools and colleges in different countries. It greatly complicates the process of adaptation of the student to studying the subject "Biological and Bioorganic Chemistry" to a proper extent. The presence of students with significantly different entry-level requires the teacher to give more attention to the weaker students who need the individual approach allowing faster adaptation and learning the discipline.

Since the successful studying of discipline "Biological and Bioorganic Chemistry" requires a certain level of knowledge in the basic chemical and biological disciplines of the school level, such as "Biology", "Organic chemistry" and "General chemistry" in a certain extent, it is important to check the entry-level of knowledge of students on the first lesson. It allows to reveal the students who require the additional individual work during the consultation time and need to get the adapted tasks for self-training at extracurricular time to reach the proper level of mastering the discipline. A necessary condition for teaching the future doctors of the English-language form of education is to prepare the materials and methodical guides that would allow to master the major skills of the entry-level:

- to know the structure of the cell, its components and their biological significance for functioning of the organ and organism generally;
- to understand the main principles of classification and nomenclature of organic compounds;
- to analyze the relationship of the chemical structure of organic compound to its biochemical properties;
- to determine the main ways of transformation of organic compounds which define the course of biochemical processes;
- to understand the physical and chemical basis of biochemical processes, such as the influence of external factors on the rate, energetics and direction of chemical reactions.

The main principles for effective formation of English-language competence by studying the "Biological and Bioorganic Chemistry" are the mastering of clinical disciplines and making the scientific basis for solving professional tasks by the future doctors in the English-speaking environment. The professional mobility of the university graduates is an important factor for internships and employment abroad [4].

One of the key problems at ensuring the extracurricular work of the foreign students is related to the complication of choosing the information references that would cover the largest part of questions for self-training to the proper extent. Usually the junior students do not possess enough skills to work with the literature and to consciously use the internet search engines. That is why providing them with methodical materials to get the proper level of knowledge with the further consolidation of already studied material by solving situational problems and by making the laboratory experiments during the practical class is the prior task of the teacher.

Making typical generalized tasks for the students involves the use of the overall design in representation of biochemical schemes, metabolic maps, and illustrative material during all the course. This approach in preparation of the lecture slide-courses and methodical guides for the practical classes and extracurricular work contributes to the better recognition of already known biochemical elements in the general structure of the currently studied issues. It is also important to apply visualization techniques using both interactive technologies and more traditional approaches of representing the structural formulas, notes, key words and schemes, which allow the student to understand, to memorize and to logically connect the individual concepts and ideas [5].

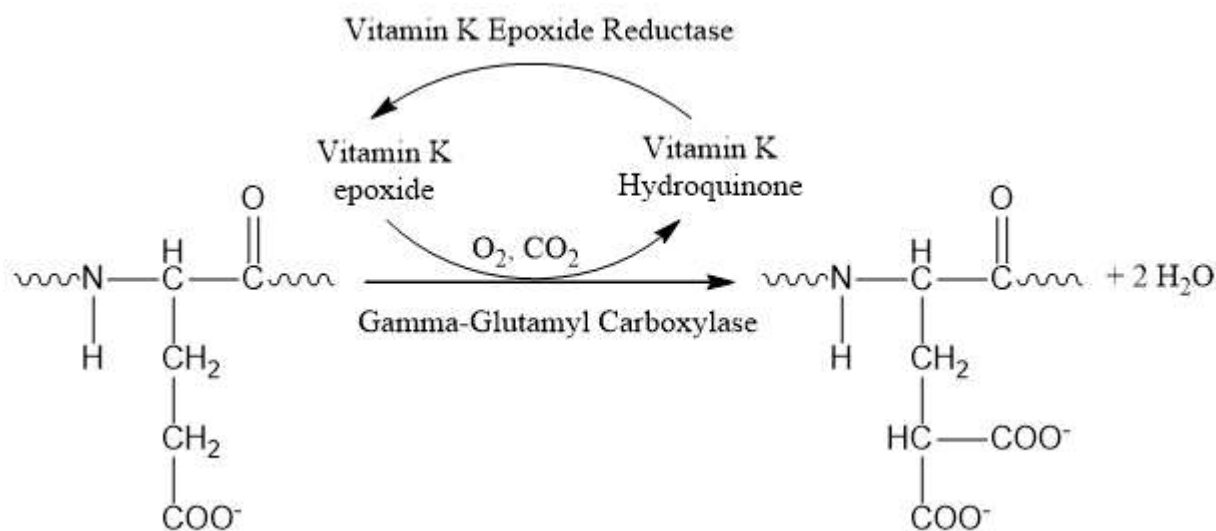
It is principal to pay attention to the aspects of organizing the practical classes; it is very important to ensure the effective work of the foreign students of English-language form of education during the distant or combined (distant and classroom) forms of education. It is necessary to provide explanations regarding how to use the educational resources (Zoom and Google Meet) and the specially created platform Likar.NMU, which is not always clear to the student. It is also important to acquaint the students with regulations of procedure of the practical classes, with the structure of discipline, with estimation criteria for the practical classes, intermediate control works, and final control.

An effective solution of the problem of the conscious and successful study of the discipline "Biological and Bioorganic Chemistry" by the foreign students of English-language form of education appeared in the lecture slide courses developed by the

lecturers of the department, the methodical guides for the individual extracurricular work of the student, the manuals and situational tasks, which generally contributed to the study and consolidation of material. When solving the situation tasks, the student was allowed to realize the importance of studying the biochemical processes in the human body for diagnosis of diseases. Down the passage there is an example of the situation task with the standard answer:

The situation task: The patient has hemorrhages, the concentration of prothrombin in blood is reduced. What vitamin deficiency caused the violation of the biosynthesis of this clotting factor?

The standard answer: The violation of prothrombin biosynthesis is caused by the deficiency of vitamin K. Vitamin K is essential for post-translational modification of many protein factors of blood coagulation (prothrombin, factors VII, IX, X, XI and XII). This post-translational modification is gamma-carboxylation of glutamic acid residues in polypeptide chain. Appearing of the second carboxylic group in gamma position of glutamic residue enhances its affinity of to Ca^{2+} :



For many coagulation factors binding of calcium ions is essential for their activation. Deficiency of vitamin K required for activation of the blood clotting factors results in appearance of hemorrhages.

Conclusions. The features of the teaching discipline "Biological and Bioorganic Chemistry" to the foreign students of English-language form of education require the special organization and methodical approaches aiming to ensure the adaptation to the requirements of the discipline which take into account the possible differences in the entry-level of knowledge, the need to involve both individual and group methods for organization the classroom and extracurricular work.

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