МАТЕРІАЛИ

II науково-практичної інтернет-конференції

РОЗВИТОК ПРИРОДНИЧИХ НАУК ЯК ОСНОВА НОВІТНІХ ДОСЯГНЕНЬ У МЕДИЦИНІ

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Медицина є прикладом інтеграції багатьох наук. Наукові дослідження у сучасній медицині на основі досягнень фізики, хімії, біології, інформатики та інших наук відкривають нові можливості для вивчення процесів, які відбуваються в живих організмах, та вимагають якісних змін у підготовці медиків. Науково-практична інтернет-конференція «**Розвиток природничих наук як основа новітніх досягнень у медицині**» покликана змінювати свідомість людей, характер їхньої діяльності та стимулювати зміни у підготовці медичних кадрів. Вміле застосування сучасних природничо-наукових досягнень є запорукою подальшого розвитку медицини як галузі знань.

Конференція присвячена висвітленню нових теоретичних і прикладних результатів у галузі природничих наук та інформаційних технологій, що є важливими для розвитку медицини та стимулювання взаємодії між науковцями природничих та медичних наук.

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Розвиток природничих наук як основа новітніх досягнень у медицині: матеріали ІІ науково-практичної інтернет-конференції, м. Чернівці, 22 червня 2022 р. / за ред. В. І. Федіва – Чернівці: БДМУ, 2022. – 489 с.

У збірнику подані матеріали науково-практичної інтернет-конференції «Розвиток природничих наук як основа новітніх досягнень у медицині». У статтях та тезах представлені результати теоретичних і експериментальних досліджень.

Матеріали подаються в авторській редакції. Відповідальність за достовірність інформації, правильність фактів, цитат та посилань несуть автори.

Для наукових та науково-педагогічних співробітників, викладачів закладів вищої освіти, аспірантів та студентів.

each video the corresponding chemical reactions and explanation of the chemical properties of individual bioorganic compounds are given.

Thus, based on the above mentioned the implementation of distance learning needs application of modern educational methods which successfully optimizes teaching of bioorganic and biological chemistry in medical universities.

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The importance of mathematical education for future doctors

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Abstract. The importance of the role of mathematics in medical education is considered in the work. It is shown that knowledge in various branches of mathematics is necessary for future doctors and pharmacists for understanding of medical processes, making correct diagnosis, and undertaking of scientific medical researches.

Key words. medical education, mathematics, high school

Introduction. The question if mathematics is needed for the future specialist in the field of medical and pharmaceutical sciences always faces applicants for the education of these areas.

Unfortunately, at the stage of preparation, the vast majority of applicants do not have an awareness of how important the role of mathematics is in the development of medicine, since the educational process at school is aimed at presenting a certain amount of information, often without detailing the possible directions of use in the future for various fields of knowledge, without elements of interdimensional integration, and, as a result, there is no proper attention to the study of discipline by those who are planning their future with medicine. Moreover, even those who have already acquired a specialty of medical profile often do not realize the role of mathematics in the "technological process" of their direction and the development of technologies that they use every day. Mathematics for them is an abstract subject that is studied to become a teacher of the natural or engineering disciplines [4].

Material and methods. Possible directions of use of mathematical knowledge are presented as a result of the analysis of a number of disciplines studied by applicants for the education of medical areas and some areas of practical work of doctors of different profiles and scientists in the field of medicine. The following methods are used: theoretical (analysis of scientific sources, own pedagogical experience), partially empirical (pedagogical observation).

Results. Mathematics is an important part of medicine [1]. Consider some areas of mathematics usage in medicine. Each doctor deals with drugs and sometimes need to calculate their dosage (for example, a dose per kilogram of body weight, recalculation when changing the dosage of the active substance in the drug, preparation of mixtures with the appropriate concentration of components, etc.). It will be superfluous to emphasize the fact that non-compliance with doses will not contribute to the obtaining of anesthetic or therapeutic effects, and an overdose will show a large number of side effects; the dose of medicines for the child is almost always calculated depending on the age and weight of the child. Therefore, the procedure for performing mathematical operations, elements of working with fractions, calculations of proportions and percentages are extremely important and must be brought to automatism at the stage of secondary school, except that such knowledge is not superfluous for a patient who wants to be aware of the treatment process. In addition, some physiological (e.g., body mass index) and anatomical indicators (e.g., the size of thyroid structures), including those obtained using instrumental methods, are important for correct diagnosis change, which, in turn, leads to a change in what can be considered norms for a particular age category.

Almost every doctor to one degree or another deals with reading diagnostic information, which is reflected graphically and describes the dynamics of changes in arbitrary indicator (e.g., temperature dependence, ECG, ICG, etc.), so reading graphs is an extremely important task in the

study of mathematics. Understanding the concepts of an argument (independent variable), a function (a dependent variable), their behavior (growth, descending, monotony, periodicity (cyclicity), symmetry, the presence of extremes, a characteristic dependence that can be described by a set of elementary mathematical functions, etc.) of increments of argument and function, the speed of their change (derivative of the function) is an indisputable fact. Anomalies of the behavior of addictions are always evidence of a particular pathology.

One of the common applications of mathematics in medicine is the usage of elements of probability theory and mathematical statistics. Statistical methods are used to check the effectiveness of new drugs or medical procedures compared to existing ones, assess the risks for patients undergoing certain treatment, identify consistency in changes in indicators (correlation and regression analyses), influence various factors on the study trait (elements of ANOVA) depending on the distribution of random variable (e.g., normal distribution), which is investigated. The basis of this knowledge is the elements of statistics in the course of school mathematics.

The results of generalization of statistical observations of certain indicators (e.g., the level and prevalence of morbidity caused by a certain causative agent of infection), the rate of their growth and growth (e.g., the number of hypothetical contacts), analysis of the nature of the behavior of the indicator (e.g., exponential), in turn, allow predicting phenomena. Such a tool is extremely important for epidemiologists to prevent the spread of diseases and their prevention. Also, epidemiologists often use elements of mathematical modeling of processes for forecasting.

No less important elements of mathematical modeling are for pharmacology. For example, a number of pharmacokinetic parameters (e.g., elimation constant, half-life, seeming initial concentration, distribution volume, specific distribution volume, clearance, maximum stationary concentration, etc.) are conditional indicators that are calculated according to certain ratios. Differential equations are used as pharmacokinetic models, depending on the method of administration of drugs. Solutions of these equations (systems of equations) are pharmacokinetic curves that describe the behavior of the concentration of drugs in biological fluids, and the area under the pharmacokinetic curve is the dose of the drug circulating in the system at the time t.

Mathematics is also important for the diagnostic, since it is a guarantor of the correctness of identification of the patient's condition [3]. Testing samples can give the following results: true positive result: positive test, disease is; false positive result: positive test, no disease; true negative test: negative test, no disease; false negative result: the test is negative, the disease is.

The ability of the test to distinguish between healthy and sick patients is a measure of how high-quality the diagnostic test is to establish this difference. The accuracy of the diagnosis does not

show the full picture, so sensitivity and specificity are also necessary. In medical studies, sensitivity is the fate of patients who were recognized as patients as a result of the use of a diagnostic method from the total number of patients, that is, the ability of the diagnostic system to detect the disease.

Consider the direction of instrumental research and the determination of the true values of measurable values during medical research. In this case the question of systematic and random errors during measurements will certainly arise, and as a result of measurement errors in general. And if we take into account that measurements can be made both directly and indirectly (the described characteristic is calculated according to a certain ratio), then knowledge will be needed not only of elements of probability theory and mathematical statistics, but also elements of differential calculus, more precisely finding partial derivative functions that describe a value that is measured indirectly. This is possible provided that there is knowledge about the rules of differentiation and derivatives of elementary functions.

Most of the technological advances that doctors enjoy every day are joint efforts and achievements of scientists in the field of natural sciences, engineers, programmers and mathematicians. Thanks to these achievements, the doctor "sees", "hears", "perceives to the touch", etc. Visualization of medical images, regardless of what physical factor is used to analyze the biological structure, depends entirely on the "mathematical processing" of the result of such interaction, and the mathematical apparatus used for the needs of medicine (gray-skaled or color images, graphics, 2D-5D images, etc.). Thus, the doctor's obligatory understanding of the importance of mathematics for interpreting the results obtained is an indisputable fact.

Conclusions. For everyone who is planning the future with medicine, the fact of the need to study different branches of mathematics is undeniable. Knowledge of algebra, statistics and general computation is important for most future doctors [2]. It is impossible to specify more or less important branches, they are interrelated and predict the continuity of knowledge. Will it be necessary to study deeper certain branches of mathematics independently and in detail when mastering a specialty in the field of medical sciences? The answer is unequivocal – yes. Therefore, applicants who are planning their future with medicine should have sufficient knowledge of the mathematics course of at least the level of "Standard".

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Motivative aspects of teaching pharmacotherapy in the training of specialists in the laboratory diagnostics educational program

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Abstract. Laboratory diagnosis detects the early stages of pathological processes, monitors the dynamics of markers of the disease, which provides quality treatment and reduces the level of severe complications. At the same time, despite the tight integration into all areas of practical medical care and the crucial role in choosing tactics for the treatment of most diseases, the involvement of students in the field of "Technology of Medical Diagnosis and Treatment" and replenishment of laboratories by graduates remains an actual problem. Among the causes of the personnel crisis in the field of laboratory medicine is the lack of motivation of students in education. The article highlights the features of methodological approaches in the teaching of pharmacotherapy, which provide a motivational component in mastering the stages of the educational program at the Department of Pharmacology. The conclusion is made about the need for a harmonious combination of methodological approaches for the formation of educational and professional motivation of all at the stages of undergraduate education of medical laboratory assistants.

Key words: motivation of students, laboratory diagnostics.

The laboratory service in Ukraine is intensively developing and has achieved significant success due to the re-equipment of material and technical base and mastering high-tech methods and techniques to provide the most complete information about the health of patients. At the same time, even if students study their chosen field, not all graduates join clinical laboratories or diagnostic service centers. Providing laboratories with highly qualified specialists is a modern problem, and given the growing need for laboratory research in complex epidemiological situations, it is an extraordinary problem. According to modern pedagogical ideas, the formation of professional