

### Biophysics is the Foundation for the Development of Scientific Thinking

**Shokirova Gavkharhan Nazirgulomovna**

Republic of Uzbekistan, Senior Lecturer, Fergana State University, PhD

**Kuramatova Shahlo Azizjon**

CAMU Medical University Assistent

#### Article Information

**Received:** February 15, 2023

**Accepted:** March 16, 2023

**Published:** April 17, 2023

**Keywords:** *virtual works, educational process, innovative method.*

#### ABSTRACT

*Biophysics occupies a certain place in medical education. He studies physical and physico-chemical processes in biological objects. In the educational process, it is advisable to use virtual work. Innovative methods contribute to the improvement of the educational process. Biophysics contributes to the development of scientific thinking.*

Currently, it is relevant to study a living organism at various levels of its organization, using the universality of physical laws and the rigor of mathematical solutions [1-3]. The study of complex macroscopic molecular systems (cells, organisms) is the task of biophysics. Management and regulation in the body are carried out by means of molecular signals, converters and information receptors. Biological regularities are studied using physical concepts and methods.

Biophysics is an obligatory part of the general professional training of students of medical universities and, as a fundamental the discipline is based on the latest scientific achievements (physics, chemistry, biology, etc.) and studies physical and physico-chemical processes in biological objects. When studying the course, knowledge of physics, mathematics, general biology is used and thus performs the function of an integrating science. Biophysics consists of sections: biophysics of cells (dedicated to the physical and physico-chemical properties of cellular and subcellular structures); quantum biophysics (explores the mechanisms of energy processes occurring in the body at the subcellular level); biophysics of ecology (considers the influence of external factors), etc.

In particular, radiation biophysics is interested in the biophysical action of ionizing radiation, the mechanisms of their absorption. In medicine, there is a need to determine the intensity of radioactive radiation to register various doses: absorbed (energy of ionizing radiation absorbed by a unit mass of the absorbing substance.); exposure (total amount of radioactive radiation reaching the substance) and biological (equivalent) doses. The biological dose, which depends

on the type of radiation, is used to assess the biological effect of radiation, while the absorbed and exposure doses characterize only the physical effect of radiation. The coefficient of relative biological effectiveness (RBE) characterizes the dependence of the biological effect of ionizing radiation on the type of radiation and which is determined experimentally by comparing the effects produced by them with the effects of action on biological objects, certain standard doses of x-ray radiation. The biological (equivalent) radiation dose is determined by multiplying the absorbed dose by the RBE coefficient.

In the process of teaching the discipline of medical biophysics, experiments are not carried out on biological objects, besides, radioactive radiation has a harmful effect, it becomes necessary to use other methods to clarify the fundamental principles of the effect of ionizing radiation on a living organism, in particular, an interactive form of education.

Studies have shown that dangerous doses taken gradually over a long period of time can lead to cancer. All this testifies to the inexpediency of using ionizing radiation for conducting experiments in the learning process (with the exception of experiments conducted in specialized laboratories). The importance of the created virtual works for the study of biophysical processes occurring in the body (the biophysical effect of high-intensity laser radiation on biological tissues, determining the energy of gamma radiation by absorption in matter, etc.) increases with the need to use the latest teaching technologies.

The growth of cognitive and creative activity requires the creation of an innovative space, an environment for the development of personality competence, which are achieved by introducing innovative methods into the educational process.

## References

1. Биофизика: учебник для вузов /Под ред. В.Г.Артюкова.- Екатеринбург: деловая книга, 2010.-293с.
2. «Актуальные вопросы современной техники и технологии» т.1, г. Липецк, РФ, 2010, С.71-74.
3. В.Г.Нечаева, Е.В.Шевченко, Л.К. Воронова, А.В. Коржуев. ПРЕПОДАВАНИЕ ФИЗИКИ В МЕДИЦИНСКОМ ВУЗЕ: ИСТОРИЯ И СОВРЕМЕННОСТЬ. Сибирский медицинский журнал, 2010, № 7. 36-39 л.
4. М. Дохов, “К вопросу об определении биофизики как науки” Международный журнал прикладных и фундаментальных исследований. pp. 34–40, 2016, [Online]. Available: <https://appliedresearch.ru/ru/article/viewid=8421>
5. М. Волькенштейн, Биофизика: Учебное пособие. СПб: Лань, 2012.
6. Суетенков Д.Е., Бирюкова Г.В., Зенина И.В. Преподавание вопросов биофизики в медицинских вузах ГБОУ ВПО Саратовский ГМУ им. В.И. Разумовского Минздрава России. Бюллетень медицинских Интернет-конференций (ISSN 2224-6150)2015. Том 5. № 11
7. Давыдов, В. В. Проблемы развивающего обучения / В. В. Давыдов. – М., 1986. – С. 89.
8. Ю.А.Згура. Инновационно-образовательные технологии и эффективная организация учебного процесса в медицинском вузе. Вузовская педагогика: материалы конференции / гл. ред. С.Ю. Никулина; Ю.А.Згура, Е. И. Харьков, М. Ю. Котловский, О. Г. Резниченко, Л. А. Филимонова. – Красноярск : Версо, 2011. – 477 с.
9. A.N.Remizov Tibbiy va biologic fizika T. O'zbekiston milliy ensklopediyasi 2005й.
10. Biofizika M. I. Bazarbaev, IMullajonov, A.Z.Sobirjonov, U.M.Abdujabborova, I, Sh Saidnazarova, X.Raximova. F.B.Nurmatova. T 2021
11. Самойлов Медицинская биофизика, Санкт-петербург, 2004