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CONCERNING COMPUTER AIDED ILLUSTRATING PROCESS DURING PHYSICS AND PATHOLOGY EDUCATION OF FOREIGN STUDENTS IN BULGARIAN HIGH MEDICAL SCHOOLS

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Rezumat. *Nivelul cunoştinţelor de fizică ale studenţilor străini care studiază în facultăţile de medicină este, pe de o parte, foarte important pentru primul an de studii şi, pe de altă parte, este foarte diferit. În timpul procesului de învăţământ, ce include patologia generală şi cea clinică, trebuie să fie luat în considerare faptul că viitorii specialişti îşi vor desfăşura activitatea în clinici aflate peste tot în lume şi având diverse specificităţi. Acest fapt impune cerinţa alegerii materialelor didactice şi ilustraţiilor acceptabile pentru ţările cu o educaţie foarte avansată. În acord cu această cerinţă, materialele ilustrative corespunzătoare, legate de fizică şi de patologie, sunt discutate în ideea de a explica mai bine evenimentele şi faptele legate de fizică şi de patologie.*

Abstract. *The physics knowledge level of foreign students studying in High Medical Schools is from one side important for the first year of education and from the other very different. During the didactic process, including general and clinical pathology, it has to be in consideration that the future specialists will accomplish their work in clinics situated all over the world and of different specificity. That gives rise to a requirement to choose didactic materials and illustrations, acceptable for countries on top position of education. According to that, the corresponding interactive materials, connected to physics and pathology, are discussed with a tendency to better explain the events and facts of physics and pathology*.

Keywords: Education of foreign students, Multimedia illustration, Multidisciplinary approach

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1. Introduction

The illustration of the educational process has to be connected with the basic principles of development of knowledge with its continued changes concerning methods and techniques.

The purpose of the investigation is to analyse the results of some new educational forms, including computer aided illustrations, applied during the didactical work with foreign students from different countries.

During foreign students education it is obviously necessary for them to be acquainted of Bulgarian innovations, new technologies, new models etc., that demonstrate the achievements of Bulgarian scientists in the field of medicine, information technologies, energy effectiveness, and nanomaterials [1].

2. Methods

The applying of new forms of education is proposed, for the didactical work with students in the High Medical Schools:

- Interdisciplinary approach of basic questions for diagnostics and therapy [2];
- Heuristically methods of education in studying the transport processes of heat, substance etc. [3];
- Experimental work in small groups to work out appropriate skills of apparatus manipulation, as well as the correct choice of the used measuring techniques;
- Multimedia presentation of the material:

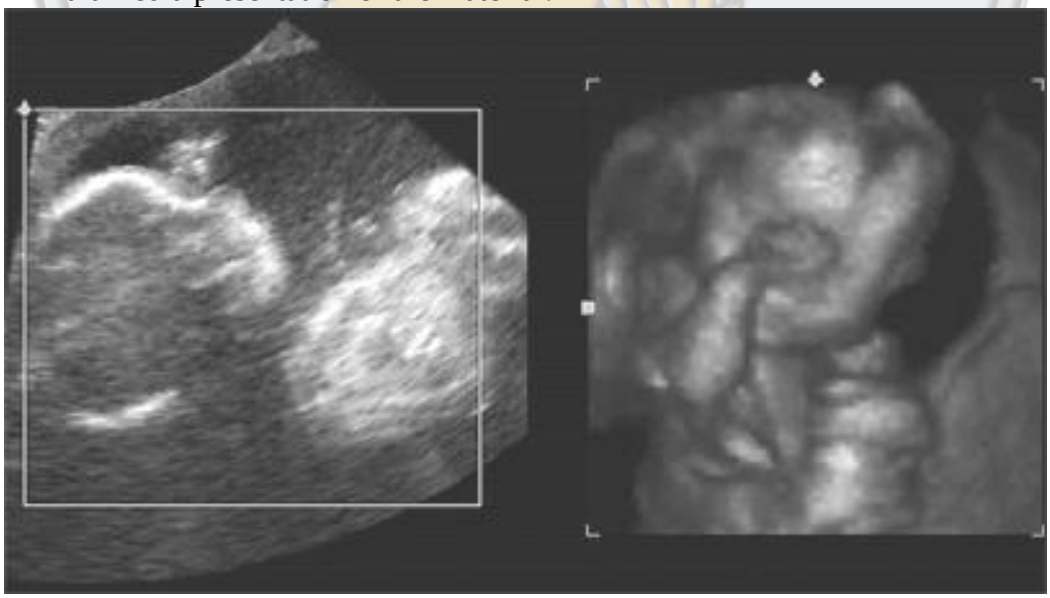
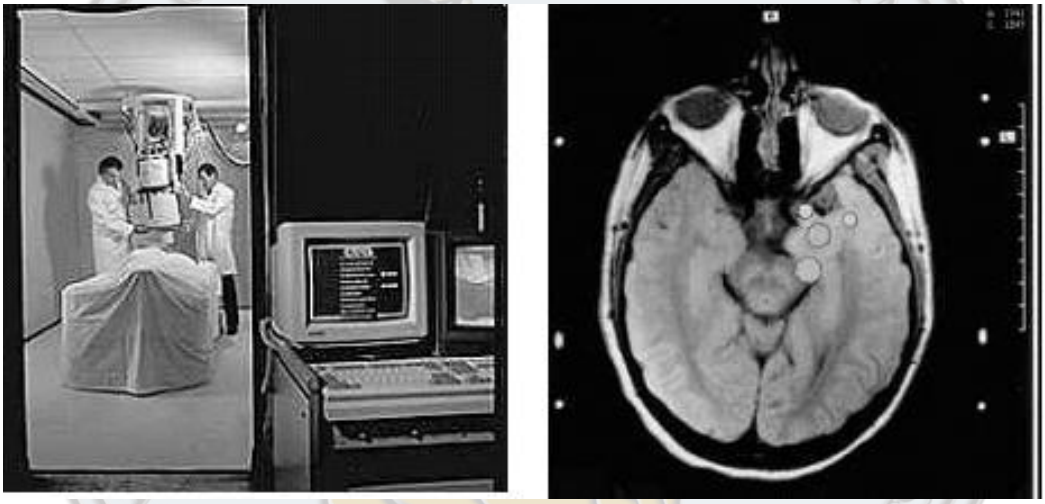


Fig. 1. 3D ultrasound imaging (A 4D imaging could be presented during the lecture, as well)

- Creation of little animations of physical and biological events, as well as models [5];
- Mathematical equations and their derivation [3];
- Experiments and events followed in their development with multiple repeated demonstrations [6];
- Presentation of experimental results, obtained by unique techniques (Fig. 1, Fig. 2, Fig. 3), that can't be put in use for students;
- Esthetic effect of the didactical material proposed;
- Presentation of liquid crystal structure, structure of membranes and respective discussion;
- To offer a plan for the didactical material.



a) b)

Fig. 2. a) Magnetic resonance imaging apparatus in combination with magnetic encephalography apparatus; b) Epileptic focuses imaging.

3. Results

As a result of the application of the didactic concepts mentioned above, and after using the methods for improving the educational process, a clear picture of the medical physics and pathology lectures is obtained, the degree of understanding of the material increases, especially when literature with mathematics interpretation is used, as well as when complicated experimental techniques with important application in medicine is applied.

These topics provoke the student's attention and interest concerning the studied disciplines and help students to find their field of interest in medicine.

They seem to be very important during the formation of future specialist, successfully realized in Bulgaria and abroad.

The experimental work in small groups prove to be especially useful when studying a clinical discipline – for example when macroscopic changes in some organs are discussed during the practical courses of clinical pathology – when an post-mortem examination is performed, or when some macroscopic preparations are studied.

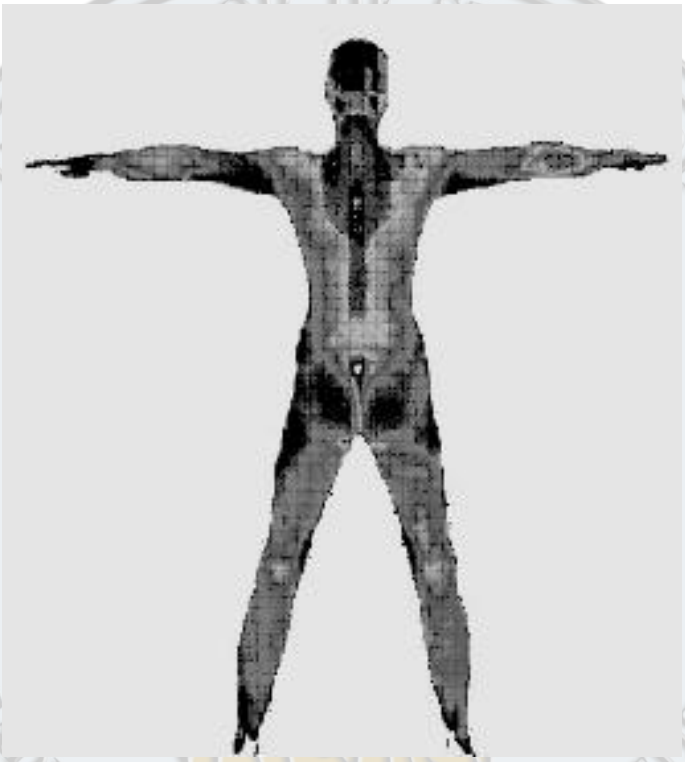


Fig. 3. Infrared thermography of a human body [7].

This work train students to proceed in team for multidisciplinary collaboration, including international investigations, that provokes sometimes the greatest scientific discoveries in the field of medicine. During education of pathology with foreign students, the fundamental character of the material and the basic morphological notions sense has to be combined with its clinical character, i.e. studying the morphological bases of different diseases, all in Latin, English, Bulgarian and their own language with view of realizing correct professional contacts.

Better communicativity in foreign student's clinical and scientific activities is connected to the choice of books, used during their educational process.

Students ought to be directed for use of sources of established informational prestige in the medical collegiums, where the material is discussed according the last scientific achievements but good illustrated and easy understandable.

As example the scientific presentation of carcinogenesis is shown (Fig. 4), important from diagnostic, therapeutic and social point of view. It is necessary to point out to the students that the basic of nature have character of probability, and because of that despite the knowledge progress, every time there is something that can't be described precisely and provoke fear [9].

It is necessary to show to students that the nuclear energetic is one of the greatest achievements of science and some defects, connected to the work of nuclear plants could be removed. Similar manner could be used to interpret the results of some other physics achievement, already applied in human life that could be a subject of perfection [10].

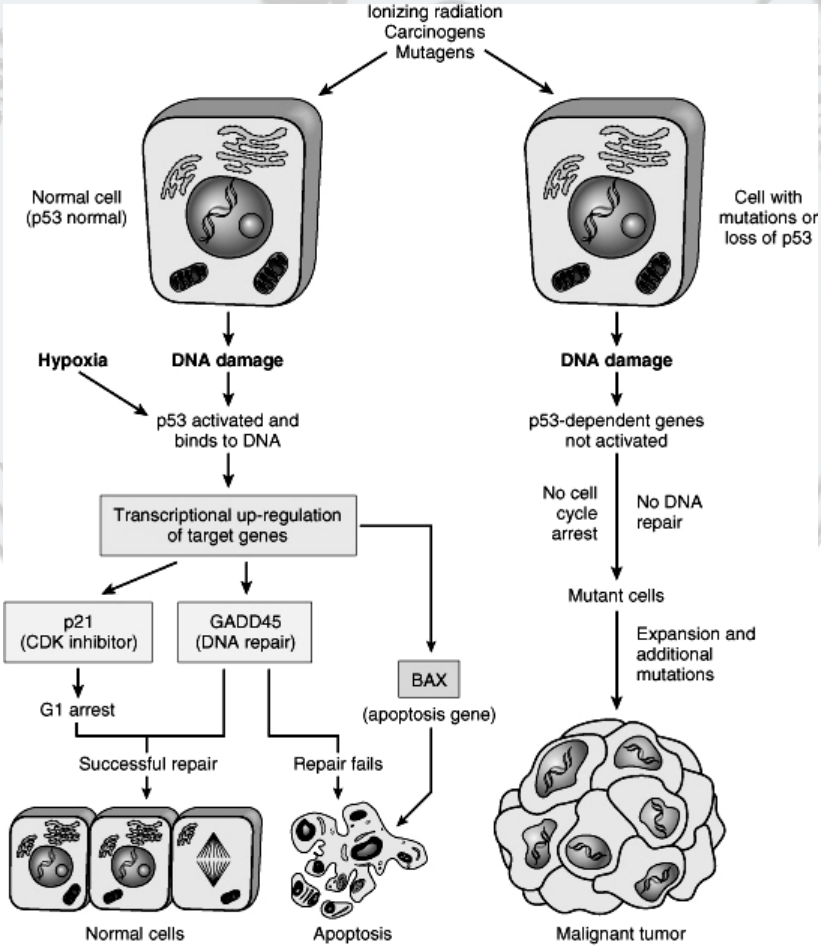


Fig. 4. Carcinogenesis [8].

Conclusions

The physics and pathology didactic process with foreign student is much more complicate and responsible task, because of the language barrier and the different knowledge level of students from different countries.

The new forms of education, accompanied by a computer aided illustrating process seem to increase the degree of understanding, especially when complicated experimental techniques with important application in medicine is applied.

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