



## ACTIVATION OF STUDENTS' KNOWLEDGE WHEN STUDYING THE SUBJECT OF MEDICAL GENETICS IN MEDICAL COLLEGES

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**Abstract:** The article deals with the system of lessons to enhance the cognitive activity of students and increase the effectiveness of education in teaching the subject "Medical Genetics" in medical colleges.

**Key words:** *Types of lessons, teaching methods, lesson plans, problem situations, lectures, didactic purpose, object of examination, theoretical lessons, practical lessons.*

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### INTRODUCTION

Socio-economic, spiritual and enlightenment changes taking place at the current stage of development of society require radical reform of education, improvement of the educational process by raising it to the level of developed democracies and training of highly qualified personnel meeting high spiritual and moral requirements. This requirement of the state as a social order to the system of continuing education is reflected in the Law of the Republic of Uzbekistan "On Education" and the "National Training Program".

The "National Program of Personnel Training" of the Republic of Uzbekistan includes a pedagogical idea aimed at educating well-rounded, highly cultured, professional, creative, socially active, socially and ideologically immune, spiritually alert, responsible for their social responsibilities and well-versed in scientific knowledge. reflects.

In order to implement this idea, the task of radically reforming all stages of education has been identified. One of the most important tasks of reform is to take a new approach to the process of teaching and educating.

In order to accomplish these tasks, every teacher in medical colleges must approach lessons with a sense of responsibility and understanding, organize lessons using different forms of organizing students' learning activities, and place great emphasis on activating students' learning and increasing the effectiveness of education.

### Literature review

An analysis of the literature shows that many studies have been conducted by scholars on the creation of a system of lessons to activate students' learning and increase the effectiveness of

education, and these scientific ideas are reflected in their work: [4] Myagkova A.N. and others, [5] Gafurov AT, Fayzullaev S.S., Matchonov B., [6] Taglina O.V., [7] Melnikov M.I., [8] Tertel A.L., [9] Olimkhojaeva P.R., Inogamova D.R., [10, 11] Tolipova J.O., [12] Fayzullaev S.S., [13] Inogamova D.R., Fayzullaev S.S., [14] Genike E.A., [15] Murtazin G.M., [16] Kamenskiy A.A. and others, [17] Yarygin V.N., [18] Ishmuhamedov R., [19] Yusupov N., [20] Inogamova D.R., [21] Dilfuza Inogamova, Sanobar Safarova and others.

### **Methodology**

We will focus on the system of lessons on the activation of students' cognitive activity and increase the effectiveness of education in the teaching of the subject "Medical Genetics": the effective organization of lectures, practical classes and seminars.

By lesson system, it is necessary to understand the sequence of lessons aimed at the formation and development of logically integrated concepts in the minds of students.

In creating a system of lessons, the teacher should follow the principle of consistent formation of medical genetic concepts that activate cognitive activity and increase the effectiveness of education. In order to increase the effectiveness of the educational process, lesson plans are developed and recommended for use by students, taking into account the educational and developmental goals of each topic included in the curriculum in the teaching of medical genetics.

### **A system of lessons to increase the effectiveness of education**

Other teaching methods can be used effectively if the lessons are organized in the form of reports.

Lecture is both a method and a form of the learning process, it serves to teach students the basics of science orally, organically and regularly. Thanks to the lecture, the student understands the essence of the subject and is forced to think freely and think about the subject. For this reason, the lecture becomes a unique school for the development of scientific thinking. It is necessary to read the report in such a way that under its influence students develop different views on the subject, its mission and future, the foundations of scientific beliefs, ideas and national ideology. To do this, the teacher must be able to enrich and select the content of each lecture with the latest science. A report can only be effective if it is based on positive collaboration.

Lectures used in teaching the subject "Medical Genetics" are divided into three groups according to the didactic purpose and content:

- introductory reports;
- thematic reports;
- generalizing reports.

Introductory lectures are used at the beginning of the course or in the first lessons devoted to the study of sections.

Topical reports are used when important aspects of a topic need to be highlighted. For example: "Principles of prevention and treatment of hereditary diseases."

Generalization reports can be used before midterm or final examinations or in the final lessons of a genetics course.

The lecture, organized using this method, has the following structure:

**The subject of the lesson.** Introduction. Genetics, its history and stages of development.

**The educational purpose of the lesson:** students are introduced to the object of examination of the subject of medical genetics, research methods, systematization of disciplines, theoretical and practical significance.

**Educational purpose of the lesson:** Explaining the theoretical and practical significance of the subject "Medical Genetics" broadens the scientific outlook of students, increases their interest in medicine.

**Course Objectives:** To develop students' basic medical genetics concepts, textbooks and independent work on the textbook.

**Lesson equipment:** portraits of G. Mendel and several geneticists, a table of stages of development of genetics, a diagram of the relationship of various disciplines. Slides with some genetic markers or diseases.

**Technology used in the lesson:** Lectures, demonstrations and conversations are used.

**Course Outline:**

I. Organizational part.

II. Pupils' knowledge of biology is activated in secondary schools and biology in the first stage of college.

III. Students will be introduced to the topic, purpose, and schedule of the lesson.

IV. New topic of expression.

The plan.

1. The science of genetics, the object and subject of study.

2. History and stages of development of medical genetics.

3. Research methods of medical genetics.

5. Problems of medical genetics.

6. Theoretical and practical significance of medical genetics.

Students became acquainted with many aspects of genetics when they were in the ninth grade of general secondary school. In addition, biology classes at the first stage of the college were stopped. What are those genes? DNA and RNA, their importance, the laws of G. Mendel and T. Morgan, genetic engineering, hybridomas.

All this should be taken into account in the planning of the lesson, so before giving a lecture on this topic, based on the existing knowledge of students, then organize a conversation and then introduce a new topic. That is, the basic knowledge of students is determined.

To do this, students are asked the following questions:

1. What is genetics and what does it study?

2. When do you think genetics appeared as a science?

3. Who first used the term genetics?

4. What branches of genetics do you know now?

5. What can you say about the listed items?

6. Why is the medical side of genetics being given more attention now?

7. How do you think medical genetics differs from general genetics?

8. What do you know about the history of genetics?

The leading function of this method is to motivate: to remind and express students' knowledge on a given topic with the help of purposeful and skillfully asked questions, and to discuss it with other students under the guidance of a teacher.

Students, together with the teacher, step by step acquire new knowledge through independent thinking, drawing conclusions, summarizing and generalizing. Another advantage of the conversation is that it maximizes the activity of thinking, allows the student to develop the power of learning.

After the question and answer session, the teacher introduces the new topic on the basis of visual aids with the help of visual aids and at the end of the lecture organizes independent work of students (Table).

**Table**  
**Organization of independent work of students**  
**homework assignments**

№	Assignments on the learning material that students need to master	Instructions for completing assignments
.	Read the textbook carefully, find the answers to the following questions: When did genetics appear as a science and how did it differ from other sciences?	Answer the questions independently.
.	What is the practical significance of medical genetics for humans?	
.	Which scientists' discoveries led to the emergence of genetics as a science?	
.	Why are there so many branches of genetics? (It is possible to play the question: Who knows the most common genetics?).	
.	Write down the main discoveries made in the field of genetics?	

Some authors instruct students to prepare reports (essays) on the life and work of scientists after the introduction. This will increase the interest of students in science.

Tolipova Zh.O. and Gafurov A.T. It is recommended to conduct introductory classes using didactic game technology. At the same time, students are given the status of scientists, with the help of which they present the subject.

Melnikov M.I. In his manual, he introduces a problem related to the content of the course in order to increase students' interest in science, for example: what varieties or crops are bred in this area (province, village) and why? such as asking questions. The teacher comes up with a daily problem, talks about new research in the field, and connects them to either the achievements of molecular biology and genetics, or to human physiology and others. On this basis, it reveals the content of the course, which is new to students, and the characteristics of its teaching methods.

Many are currently citing relevant literary sources, quoting from them. Such a system of lessons arouses interest in science, the desire to study it, to use special reference books.

Not all lessons begin with asking students questions related to practical activities. At this point, most teachers suggest solving problem situations.

**Practical lessons.**

The effectiveness of teaching the subject "Medical Genetics" depends on the level of practical training, as well as theoretical training.

The peculiarity of practical classes is that students test their theoretical knowledge in practice throughout the lesson.

Most medical genetics teachers do not link theoretical knowledge with practice. This is due to the fact that most of them do not know the genotype, genotype, homozygote, heterozygote, gamete, zygote, haploid, diploid set of chromosomes in which cells they are located, and do not know how to distinguish the types of gene interactions. Practical classes are held after each section of medical genetics. Students are required to complete the practical exercises specified in the program. In the curriculum: "Working with a microscope. "Introduction to cell structure in ready-made micropreparations", "Solving problems on studying the structure, number and protein biosynthesis of nucleic acids", "Laws of reproduction of traits", "Study of hereditary pathologies", "Study of hereditary pathologies". The didactic purpose of these practical exercises is to strengthen the theoretical knowledge of students on relevant topics, to achieve their effectiveness by teaching them to apply in practice.

Genetic problems occupy a large part of the practical training in the field of "Medical Genetics". The educational value of solving problems in genetics is great, as can be seen in the following:

1) the level of theoretical genetic knowledge is assessed by solving problems and the possibility of their application in practice is determined;

2) In solving problems, students use thinking operations such as analysis and synthesis, comparison, abstraction, identification, classification and systematization. As a result, students' thinking expands, logical thinking develops. The problem is usually related to the problem. The student thinks about the solution to the problem and seeks ways to solve the problem, and then moves on to practical action to prove the correctness of the chosen idea, that is, to solve the problem. Then proceed to substantiate the result obtained.

3) Solving genetic problems helps to consciously assimilate many genetic terms. In particular, in the treatment of hereditary diseases and genetic markers used in medical genetics, students learn more about these diseases.

To solve problems in medical genetics, students use the knowledge resources in the sections "Fundamentals of Cytology", "Biochemical Fundamentals of Genetics", "Reproduction of Organisms", and in genetics, phenotype, genotype, genotype, genotype, genotype, dominant, dominant they must have a partial knowledge of the clinic of hereditary diseases and be able to use genetic symbols.

Practical training is organized on the basis of the following stages:

I. Students are introduced to the purpose, course, and tasks of the workshop.

II. Students are divided into small groups and given homework assignments.

III. Independent work of students in small groups is organized.

IV. Subgroups are asked to complete their homework assignments.

V. Practical classes are completed.

Recommended feedback suggests that practical exercises in the field of medical genetics play an important role in strengthening students' knowledge. The practical presentation of genetic issues in a variety of ways helps to expand students' cognitive activity. During the organization and conduct of the educational process, teachers of medical genetics can be recommended to use in practice the following types of issues:

***I. Problems that can be solved by applying students' knowledge.***

Problem – 1. Which organelles have been identified by electron microscopy?

Problem – 2. What is the role of DNA in the process of protein biosynthesis?

***II. Issues aimed at developing students' thinking.***

Problem – 1. As a result of meiosis, one of the human sex cells received 24 chromosomes and the other 22 chromosomes. If such chromosomal cells are involved in fertilization, the organism with which chromosome set is formed and what disease occurs as a result.

Problem – 2. If the child's father is homozygous for Rhesus positive (R +) and the mother is Rhesus negative (R-), then:

- What is the phenotype and genotype of the child?

- What happens to the mother if the developing embryo's blood passes through the placenta to the mother's blood, or if the mother's blood passes into the embryo's blood?

- Why can a second child born to such parents be stillborn?

***III. Issues aimed at distinguishing the given objects.***

Problem – 1. Observe the given plant cell under a microscope. What is the division stage? By what signs did you determine the type of division? Find the number of chromosomes.

Problem – 2. Use a magnifying glass to observe two different *Drosophila* flies and find out how they differ from each other. Explain why T. Morgan conducted his experiments on *Drosophila* flies.

***IV. Issues aimed at forming, advancing and substantiating hypotheses.***

Problem – 1. It is known that monozygotic twins develop from a single fertilized egg and have the same genotype. Parents with identical twin daughters have split up as a result of the divorce. A few years later, when the girls met, it became clear that they were different from each other. Explain this phenomenon.

Problem – 2. Rheumatic anemia is inherited in the dominant type. 25% of children born to heterozygous parents die. What does this have to do with anything?

***V. Issues that create a connection between theoretical and practical knowledge.***

Problem – 1. Patients with diabetes mellitus and phenylketanuria donate urine for biochemical testing. Explain why.

Problem – 2. To diagnose Shershersky-Turner and Klinefelter syndromes, the drug is prepared from the lunar mucosa or blood leukocytes and stained with special dyes. This inspection will help determine what.

***VI. Issues related to the development of student observation.***

Problem – 1. In the middle of the year, a person's body weight and skin color change. What is the reason for this?

Problem – 2. Observe your eyes and the color of your eyes and hair. What dominant signs did you see in them? The appearance of dominant characters depends on what.

***VII. Issues that provide new information for students.***

Problem – 1. In cats, the gene that carries the black color is inherited in a sex-linked manner. The allele of this gene is yellow. However, the dominant phenomenon is not observed in both alleles. If these two genes come together in a heterozygous organism, then the cat will be cypress. Why cypress-colored cats are so rare in nature. What color cats are born when black cats are mixed with black cats? What about mixing with a yellow cat?

Problem – 2. In humans, four different blood groups occur in the presence of three alleles of a single gene - A, B, O. The allele O (blood group I) is recessive, and the alleles A (blood group II) and B (blood group III) are dominant. Alleles A and B together give blood group IV, that is, the effect of these genes occurs with codominance. If a heterozygous woman of the second blood group marries a man of the third blood group, what blood group are they most likely to give birth to?

### ***VIII. Issues that develop scientific skills.***

Problem – 1. Enamel hypoplasia is a dominant trait that is inherited when attached to the X chromosome. A healthy baby boy was born to parents with this anomaly in the family. What is the probability that their second son and daughter will develop the disease?

Problem – 2. In humans, hemophilia is a recessive symptom.

It is located on the X chromosome. Albinism is a recessive disorder in the autosome. A son with albino and hemophilia was born to parents who were healthy by these symptoms. What is the probability that their second son will be born with the same pathological symptoms. Can they give birth to healthy girls?

Because these issues are presented as a genetic game, they are of great interest to students, broaden their horizons, develop logical thinking, that is, teach them to analyze, compare, summarize and summarize the material.

### **Workshop.**

In teaching the subject of "Medical Genetics" it is advisable to use, in addition to lectures, seminars. In this case, students learn independently on the basis of the schedule given by the teacher, using the study material from sources.

Such classes have a great opportunity to activate the cognitive activity of students, to independently acquire, expand and deepen knowledge. In this process, the role of teachers is to prepare students for seminars, to organize and manage independent learning activities. There are two approaches to organizing and conducting workshops.

The first approach: the report is a system of seminars, in which the teacher presents the teaching material in the form of a report, using visual aids. Then, based on the assignments, students re-develop the learning materials independently, concretize it and discuss it in class. It is advisable to use this approach when the subject is rich in concepts and terms.

The second approach: is that the seminar lessons are used in the form of independent work, that is, the students prepare independently on the basis of the study material, which is still unknown to them. From this approach, the learning material is much simpler and is used when students have the opportunity to master it independently. The didactic purpose of such a seminar is to help students apply what they have already learned in new situations.

The teacher can use several methods of new pedagogical technologies in seminar lessons. For example, working in small groups on collaborative learning technologies, such as "Zig-Zag", "Saw", "Reading Together", and organizing research in small groups.

In our opinion, the use of collaborative learning technologies in the seminar classes should teach each student to work hard on a daily basis, to think creatively and independently, to work independently, to instill in each student a sense of self-worth, self-esteem and self-worth. allows for the formation of

Collaborative learning technology involves teaching students in teams, in small groups. For this reason, students need to be able to work consistently and diligently, to complete assignments fully and efficiently, to master the material well, to be proficient in the subject, and to be able to master the basics.

When using collaborative learning technology in a team teaching method, the teacher divides the students into equal teams. Every team performs the same task. Team members work together to complete the recommended learning tasks on the topic and acquire the knowledge, skills, and competencies required for the topic.

Collaborative learning technology is used in the study of team teaching methods in the study of "Genetics and the Environment", "Pathology of Hereditary Diseases", "Methods of testing genetics in medicine" and other topics. The seminar, organized using this method, will have the following structure.

**Course Outline:**

I. Organizational part.

II. Students' knowledge of the topic is monitored and evaluated.

III. Students are introduced to the topic, purpose, and course of the lesson.

IV. Learning a new topic:

a) to form several small groups of students in teams and to achieve quality performance of the assigned tasks independently by each team member;

b) implementation of complete processing of training materials.

V. Question-answer, team discussion on a new topic.

VI. Monitoring and evaluation of students' knowledge with the help of test questions.

VII. Processing and finalizing a new topic.

VIII. Homework assignment.

**CONCLUSION**

Using modern methods and tools to organize the educational process, taking into account the psychological and individual characteristics of students, each lesson is organized in a way that meets the needs of today's evolving society.

Academician according to Pasechnik V.V., "Changes that are actively implemented in the field of education also begin with the teacher. The future of the homeland and the spheres of life begins with the teacher ... . For example, the requirements for a teacher are much higher than for other specialists".

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