



МЕДИЦИНСКИ УНИВЕРСИТЕТ – СОФИЯ  
*Medical University - Sofia*  
МЕДИЦИНСКИ ФАКУЛТЕТ  
*Faculty of Medicine – Dean’s Office*

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## MOLECULAR BIOLOGY CURRICULUM

The curriculum has been adopted at the meeting of the Faculty Council № 41/08.07.2020

### Annotation of the academic discipline

Medical biology is a discipline that forms the biological views and thinking as well as the moral and ethical outlook of future medical specialists. The course in biology provides the necessary volume of theoretical knowledge and practical skills in organism, cellular and molecular biology, heredity and variability, reproduction, the organism, immunobiology, biological evolution, anthropogenesis, ecology and biology of parasites of medical importance and the elements of comparative anatomy of vertebrates.

Teaching biology gives to the pharmacists modern knowledge in genetics, molecular mechanisms of the basic genetic processes, interactions between paternal and maternal genome during fertilization, stages of *in vitro* fertilization in mammals and early embryonic development of different animals. Biology course provides to the pharmacists the base of their knowledge in immunology, molecular and cellular interactions in the immune response.

At the completion of Biology, pharmaceutical students must use freely the biological terminology, explain competent molecular-biological processes and associated structures in a living cell. Students must acquire skills to use light microscope, preparing of temporary microscope slides, basic immunological methods, human blood groups testing, dissection of experimental animals, solving of genetic problems. It is necessary for students to apply these knowledge and skills acquired in the course of Biology to create logical connections with cellular and molecular basis of specific pharmacogenetic problems. This knowledge can be integrated and can help them in their education during subsequent courses in the special disciplines and the practice of the profession.

### Lectures

1. Molecular basis of life
2. Organization and expression of the genome
3. From cells to organisms
4. Modern methodological approaches in diagnosis and research
5. Basic immunology

### Seminars

1. Techniques for light microscopy.
2. Chromatin and chromosomes. Giant chromosomes in larvae of dipteran insects. Barr body in oral mucosa cells.
3. Cell cycle. Mitosis.
4. Karyotype. Normal human karyotype.
5. Meiosis. Gametogenesis.
6. Fertilization. *In vitro* fertilization in a mouse model.
7. Embryonic development in echinoderms and vertebrates: cleavage, gastrulation, neurulation.

8. Cells and organs involved in immune response. Lymphocytes, phagocytes. Preparation and evaluation of lymphocyte suspensions.
9. Human alloantigens. ABO and Rhesus blood group systems. Blood group testing. Blood group inheritance.
10. Immunological methods. Agglutination: serum titration. Precipitation: ring test, Ouchterlony test. ELISA.
11. Mendelian inheritance. Morbid risk. Solving genetic problems.
12. Molecular biology methods – PCR, FISH. Pharmacogenetics.
13. Colloquium.
- 14 Gene, structural chromosomal and numerical chromosomal mutations. Evolutionary and medical importance of mutations.
15. Venomous animals, poisonous plants and fungi.

### **Ongoing assessment – forms, frequency**

During Biology practicals three written examinations and oral discussions about the material are made. The marks of these examinations are written in the student cards. The semester ends with a colloquium includes theoretical questions and oral examination on the material in the syllabus.

### **Academic literature:**

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