

**«СОГЛАСОВАНО»**

Председатель методической комиссии медицинского  
факультета

\_\_\_\_\_ Н.В. Смирнова  
Протокол № 8

от «26» марта 2025 г.

**«УТВЕРЖДАЮ»**

Декан медицинского факультета

\_\_\_\_\_ В.Н. Диомидова  
от «3» апреля 2025 г.

**Перечень экзаменационных вопросов (задач, тестов и др.)  
по дисциплине: «Молекулярная биология» для студентов второго курса по  
специальности «Лечебное дело» 2024 / 2025 учебного года**

1. Apoptosis and processes of oncogenesis (OPK-7, OPK-9). 2 Biological functions of DNA (OPK-7, OPK-9).
2. Biological functions of DNA (OPK - 7, OPK - 9).
3. Viral DNA. Heterocomplexes with DNA (OPK - 7, OPK - 9).
4. RNA isolation, mutation detection, genome correction, DNA sequencing (OPK - 7, OPK - 9).
5. Genetic structures: chromosomes, plasmids, nucleoids, genomes of mitochondria and chloroplasts (OPK - 7, OPK - 9).
6. Detection of mutations with obligatory sequencing, segments occupied by them, image analysis of fluorescently labelled nucleotides (PC - 21).
7. Domains and chaperones. Protein heterocomplexes in biological membranes. Functions and structure of membrane proteins (OPK - 7, OPK - 9).
8. Initiation, elongation and termination of translation in prokaryotes and eukaryotes (OPK - 7, OPK - 9).
9. Cell is the basic unit of structure and development of all living organisms (OPK - 7, OPK - 9).
10. Cell as an integral, dynamic system (OPK - 7, OPK - 9).
11. Cellular topology of ribosomal RNA and protein formation and assembly of ribosome subunits (OPK - 7, OPK - 9).
12. Cell cycle (OPK - 7, OPK - 9).
13. Construction of microbial cells. Production of transgenic organisms (PC - 21).
14. RNA expression matrices, nucleic acid hybridisation, gene and DNA cloning (OPK - 7, OPK - 9).
15. Methods of molecular genetics (for independent study) (PC - 21).
16. Molecular mechanisms of genetic processes: replication, repair, genetic recombination (OPK - 7, OPK - 9).
17. Molecular mechanisms of translation. Components of the biosynthesis system (OPK - 7, OPK - 9).
18. Nucleic acids: structural organisation of DNA (OPK - 7, OPK - 9).
19. Metabolism, the role of the cell envelope in this process (OPK - 7, OPK - 9).
20. Main directions of applied molecular biology: genetic engineering. Methods of genetic engineering (PC - 21).
21. Basic provisions of the theory of functional units (OPK - 7, OPK - 9).
22. Features of ontogenesis of prokaryotes and eukaryotes (OPK - 7, OPK - 9).
23. DNA polymorphism. Nuclear, extranuclear, transposable DNA (OPK - 7, OPK - 9).
24. Protein production using recombinant DNA molecules, primers corresponding to known genes, recombinant DNA molecules (OPK - 7, OPK - 9).
25. The concept of supramolecular systems. Intermolecular interactions (OPK - 7, OPK - 9).
26. Posttranslational modification of proteins, processes of protein storage and removal (OPK - 7, OPK - 9).
27. Prions. Amyloids (OPK - 7, OPK - 9).

28. Diversity of RNA (OPK - 7, OPK - 9).
29. DNA repair. Mechanisms of mutations (OPK-7, OPK-9). 30.
30. DNA replication, inaccurate copying of DNA as a cause of evolution (OPK - 7, OPK - 9).
31. DNA restriction, nucleic acid hybridisation, cloning. Chemical synthesis of a gene. Genetic transformation (OPK - 7, OPK - 9).
32. Ribosome as a translation machine (OPK - 7).
33. Ribosomal proteins, proteins of ribosome companions (OPK - 7). 34.
34. Ribosomal RNA, the active centre of the ribosome (OPK - 7).
35. Role of environment in intermolecular interactions (OPK - 7, OPK - 9).
36. Assembly of ribosome into translation machinery (OPK - 7).
37. Systems analysis of the organisation of living matter (OPK - 7, OPK - 9).
38. Composition and primary structure of proteins. Spatial organisation of polypeptide chains, their stabilisation (OPK - 7).
39. Protein splicing, its types (OPK - 7).
40. RNA splicing, its types, its role in immune response (OPK - 7, OPK - 9).
41. Structure and types of DNA (OPK - 7).
42. Structure and differences of the genome of cell nucleus and mitochondria (OPK - 7).
43. Structure and functioning of the cell nucleus (OPK - 7).
44. Structure and functioning of mitochondria (OPK - 7).
45. Structure and functioning of ribosomes (OPK - 7).
46. Structure and functioning of cell membrane system (OPK - 7).
47. Structure and functioning of cytoskeleton (OPK - 7).
48. Structure of water. Effects of excluded volume (OPK - 7). 49.
49. Gene structure. Gene expression (OPK - 7).
50. Structural organisation of macromolecules: proteins and their heterocomplexes (OPK - 7).
51. Structural organisation of RNA. Functions and diversity of RNA. RNA structures and their stabilisation (OPK - 7).
52. Transcription and mRNA processing. Genetic code. Transcription and processing of tRNA. Structure and functions of rRNA (OPK - 7).
53. Translation. Differences of translational mechanisms in pro- and eukaryotes (OPK - 7).
54. Three-dimensional organisation of ribosomes. Stages of ribosome formation in a cell (OPK - 7).
55. Three-dimensional structure of a cell (OPK - 7).
56. Sites of bacterial ribosomes that are targeted by bacteriostatic antibiotics (OPK - 7).
57. Phylogeny of eukaryotic cell (OPK - 7, OPK - 9).
58. Functions and structures of different types of rRNA (OPK - 7, OPK - 9).
59. Chemical structure and spatial organisation of DNA, stabilising interactions in structures (OPK - 7).
60. Cytosolic and mitochondrial ribosomes, differences of ribosomes of pro- and eukaryotes, differences of amino acid code of mitochondria and cell nucleus (OPK - 7).

Translated with DeepL.com (free version)

**Вопросы обсуждены на заседании кафедры медицинской биологии с курсом микробиологии и вирусологии. Протокол № 8 от «26» марта 2025 года**