

Pathobiochemistry 2 “Molecular oncology”

1. Mechanism of the tumor disease origin – overview.
2. Physical factors concerned in tumor disease origin.
3. Chemical cancerogenesis.
4. Viral cancerogenesis.
5. The hallmarks of transformed cells.
6. Apoptose activation disorders in tumor cells.
7. The significance and mechanism of the p53 gene inactivation in the pathogenesis of human tumors.
8. DNA repair disorders in the cancerogenesis.
9. The Knudson’s double-hit hypothesis of tumor development.
10. Metabolic alterations in tumour cells, Warburg’s effect.
11. Tumor’s neovascularisation – molecular mechanisms.
12. Metastatic cascade – molecular mechanisms.
13. Tumor microenvironment – interrelationships between transformed cells and tumor stroma.
14. Intratumor heterogeneity
15. Hereditary tumor syndromes and sporadic tumor diseases.
16. The analysis of hereditary predisposition to tumor diseases – significance, examples, methods.
17. The analysis of somatic mutations and microsatellite markers in sporadic tumors – significance, examples, methods.
18. Options of minimal residual disease detection.
19. Oncogenes and tumor suppressor genes.
20. Tumor disease biomarkers – definition, classification according to structure, function and the site of origin.
21. Tumor disease biomarkers – methods of detection and identification in biological sample, examples.
22. Tumor specific and organ/tissue specific tumor biomarkers – examples.
23. Clinical application and interpretation of tumor biomarkers determination; sensitivity and specificity.

24. Modalities of the anticancer therapy, mechanism of action, side effects.
25. Basic classification of cytostatics, biochemical principles of chemotherapy.
26. Biochemical principles of radiotherapy.
27. Biochemical principles of hormonal therapy.
28. Principles of immunooncological therapy.
29. The basic of targeted therapy in oncology, usage and structure of monoclonal antibodies and lowmolecular drugs.
30. Examples of signal pathways related to oncogenesis (regulation of proliferation, differentiation, neovascularisation).
31. Examples of therapeutically targeted elements of signal pathways and ways of influencing them.
32. Pathology of signal cascades that regulate cell growth, concept and examples.