

1. The reliability (accuracy and precision) of the laboratory results – the possibility of influencing.
2. The origin of errors in collection and storage of blood and urine specimens.
3. Biological and analytical sources of variation of laboratory results.  
The critical difference between two serial results on the same patient.
4. Normal result of a laboratory test – problems, limits of the reference range.
5. Acute phase reactants.
6. Basal metabolic rate; assessment of the required energy supply for patients on parenteral nutrition.
7. Anthropometric, biochemical, and immunological assessment of nutritional disorder.
8. Sugars and polyols as sources of energy in parenteral nutrition.
9. Fat emulsions and amino acids in parenteral nutrition.
10. Biochemical tests assessing the gastric acid secretion.
11. Acute pancreatitis – biochemical confirmation of the clinical diagnosis.
12. Tests of pancreatic exocrine function.
13. Tests of intestinal absorption and of other intestinal functions.
14. The distribution of total body water. Ionic composition of ECF and of ICF, relations between them.
15. Daily water intake and output, regulation of water homeostasis.  
Isotonicity, hyperosmolality and hypoosmolality of blood serum.
16. The relations between the ionic ECF composition and disturbances of acid-base status.
17. Hypernatraemia and hyponatraemia (the most frequent causes, clinical symptoms).
18. Hyperkalaemia and hypokalaemia (the most frequent causes, clinical symptoms).
19. The main tumour markers (classification and application).
20. Tumour markers in prostatic cancer and carcinoma of the lung.
21. The normal intake of iron, iron transport, storage and utilization. Biochemical investigation of iron deficiency and overload.
22. Biochemical tests in myocardial infarction (interpretation of the results, reinfarction). Factors associated with a risk of ischaemic heart disease.
23. Biological factors influencing the laboratory test results.
24. Interference of drugs with laboratory tests.
25. Differential diagnosis in the oliguric phase of acute prerenal and renal failure.
26. Investigation of glomerular and tubular functions of the kidney.
27. Differential diagnosis of proteinuria.
28. Assessment of nitrogenous compounds in blood serum and in urine.
29. Differential diagnosis of various types of hyperbilirubinaemia (jaundice).
30. Altered blood serum enzyme activities in the diagnostics of liver disease.
31. Blood serum enzyme tests in the diagnostics of biliary obstruction.
32. Clinical applications of lactate dehydrogenase and alkaline phosphatase isoenzymes measurements..
33. Nitrogen balance – importance and calculation.
34. The principle of determination of energetic expenditure by the method of indirect calorimetry.

35.  $pO_2$  gradient (atmospheric or inspired  $pO_2$ , arterial and mixed venous blood  $pO_2$ ).  
Consequences of hypoxia, estimate of its origin.
36. Serum cholesterol and triacylglycerols – normal values.  
Lipoproteins – function, associations between hyperlipidaemia and arterial disease.
37. Classification of dyslipidaemias (therapeutic classification).
38. The genetic dyslipidaemias, relation to atherosclerosis.
39. Secondary dyslipidaemia.
40. The buffer systems in various body fluids: kinds and importance.
41. Metabolic acidosis and alkalosis: examples of causes, laboratory and clinical findings, the principles of treatment.
42. Respiratory acidosis and alkalosis: examples of causes, laboratory and clinical features, the principles of treatment.
43. Compensatory responses in acid-base disorders, therapeutic calculations.
44. Mixed acid-base disturbances: their causes, biochemical findings, calculations of the plasma buffer base and of the anion gap.
45. Disorders of glucose metabolism: hyper- and hypoglycaemia (the causes of them, clinical features), the causes of glycosuria.
46. Disorders of fructose and galactose metabolism. Intestinal disaccharidases deficiency (laboratory and clinical features).
47. The main metabolic disorders in diabetes (carbohydrates, lipids, proteins, minerals, water, acid-base balance).
48. Biochemical tests in diabetology – the principle and importance, oGTT.
49. The causes of hypercalcaemia, investigation of abnormal calcium metabolism.
50. The causes of hypocalcaemia, investigation of calcium metabolism.
51. Osteoporosis and other metabolic bone diseases. Biochemical markers of bone turnover.
52. Urolithiasis, the predisposition factors, basic chemical investigation on patients with renal stones.
53. Basic laboratory tests for abnormalities in thyroid function.
54. Disorders of purine metabolism and excretion, biochemical investigations..
55. Biochemical investigations of the adrenal cortex disorders.
56. Adrenocortical insufficiency and hyperfunction, tests determining the causes.

Examples of textbooks:

**Beckett G. (et al.): Clinical Biochemistry** (Lecture Notes Series) 7<sup>th</sup> Ed.  
Blackwell Publ., 2005 (328 pp.) ISBN 978-1405129596

**Gaw A. (et al.): Clinical Biochemistry: An Illustrated Colour Text** (2<sup>nd</sup> Ed.)  
Edinburgh: Churchill Livingstone, 1999 (165 pp.) ISBN 0-443-06183-1

**Laker M.F.: Clinical biochemistry for medical students.**  
London: Saunders Co., 1996 (357 pp.) ISBN 0-7020-1690-X