**BLOOD FUNCTIONS AND PHYSICO-CHEMICAL PROPERTIES.**

Blood cells: peculiarities of the composition, metabolism of erythrocytes, leucocytes, lymphocytes and thrombocytes. Function – metabolism relationships.

Plasma organic compounds: proteins and enzymes, non-proteic nitrogen substances, residual nitrogen, carbohydrates, lipids and organic acids. The major proteins of blood plasma: brief characteristics, methods of separation and assay. Hypo-, hyper-, disand para-proteinemias: notion, causes and examples. Oncotic pressure and its disorders, reasons and correction.

Blood enzymes: classifacation, practical utility. Indicator (organ specific) blood enzymes in liver and heart diseases. Mechanism of enzymes’ level increasing in the blood serum.

Plasma non-proteic nitrogen compounds. Hyperammonemia and hyperuremia, causes, consequences. Bilirubin: types, formation, excretion in the healthy human organism. Disorders of hemoglobin’s catabolism: icteric syndrome (types, causes, disorders of bilirubin conjugation, its excretion and clinical laboratory diagnostics).

Inorganic compounds: the major anions, cations and microelements, their role. Mechanisms of oxygen and CO2 transport, biochemical mechanisms of respiration function of blood. Functional requirements to hemoglobin and cooperative binding of oxygen, role of 2,3-diphosphoglycerate in this process. Role of carboanhydrase in gases transport in the blood. Disorders of gas transport (mechanisms, diseases). Hypobaric and hyperbaric oxygenation, its usage in medicine. Acid-base equilibrium: buffer systems and physiological mechanisms of buffering. Disorders of acid-base equilibrium of the blood: alkaloses and acidoses, types, diagnostics and mechanisms of buffering correction.

Fluid-coagulation equilibrium. Biochemical mechanisms of blood clotting: plasmic and platelets coagulation factors (brief characteristic). Extrinsic and intrinsic mechanisms of blood clotting: causes, timing and cascade mechanism. Fibrinolitic and anticoagulant mechanisms. Natural and synthetic anticoagulants, their mechanism of action and usage in medicine. Role of vitamins K and D in the blood coagulation. Native and synthetic anticoagulants (antivitamins K: pelentan, dicumarol, etc.), utility in medicine.

Chemical components of the blood as drugs (albumin, gamma-globulin, interferon, etc.).