

CHEMISTRY AND BIOCHEMISTRY

1st year - DENTISTRY - *summer semester 2023/2024*

Lectures

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Friday 8⁰⁰ – 10³⁰ Azure Lecture Room

Week	Date	Topic
1	23.2.	Enzymes – structural, functional, thermodynamic aspects, kinetics, inhibition, regulation. Thermodynamics of biochemical reactions. High energy compounds. Citric acid cycle, respiratory chain.
2	1.3.	Degradation of major nutrients, digestion of saccharides, glycolysis. Oxidative decarboxylation of pyruvate.
3	8.3.	Lipid biosynthesis. Eicosanoids. Biomembranes. Integration of fatty acid and saccharide metabolism. Biosynthesis of cholesterol and bile acids. Steroids.
4	15.3.	Digestion of proteins, essential amino acids. Amino acid degradation, ammonia detoxification, the formation of urea. Metabolic reactions of aliphatic amino acids I. One-carbon units, the role of THFA.
5	22.3.	Metabolic reactions of amino acids II. The formation of catecholamines and thyroid hormones. Arginine, NO.
6	29.3.	<i>Public Holiday.</i>
7	5.4.	Formation and degradation of purine and pyrimidine nucleotides. Uric acid and gout. Conversion to deoxynucleotides. DNA structure. Replication and transcription of DNA. DNA repair.
8	12.4.	Structure of RNA (rRNA, tRNA). Processing of mRNA, genetic code, proteosynthesis. Posttranslational modifications and sorting of proteins. Proteolytic systems.
9	19.4.	DNA organization in chromatin, regulation of gene expression. Hormones and other regulatory molecules, signaling pathways. Programmed cell death (apoptosis).
10	26.4.	DNA and RNA viruses. Retroviruses, HIV. Analysis of DNA and mRNA in diagnostics, PCR, restriction enzymes. Recombinant technologies.
11	3.5.	Porphyrin biosynthesis, heme and its degradation, hemoglobin. RBCs and oxygen radicals. Blood plasma proteins. Genesis of immunoglobulins. Biochemistry of blood clotting and clot dissolution.
12	10.5.	Biochemistry of connective tissue, the formation of collagen, adhesive proteins. Metabolism of bone and tooth tissue.
13	17.5.	Biology of the oral cavity, dental caries, calculus and paradentosis.
14	24.5.	Biochemistry of nervous tissue. Biochemistry and energetics of the muscle activity. Liver functions. Nutrition, malnutrition, starvation.