

Faculty of Medicine, Masaryk University, Brno

Syllabus of the subject-matter required for the Admission Examination

BIOLOGY

General characteristics of living systems

A brief survey of the classification system. Acellular, unicellular and multicellular organisms. Bacteria. Cyanobacteria. Viruses. Medically important yeasts and molds. Medically important plants and protozoa. Medically important worms and insects. Basic characteristics of vertebrata and mammals. Milestones in biology and medicine.

Cell biology

Cell theory. Chemical composition of the cell. Structure and function of proteins. Structure and function of nucleic acids. Saccharides and lipids. Prokaryotic and eukaryotic cell – basic differences. Biomembranes and membrane organelles, structure, function. Cytoskeletal system. Cell movement. Membrane transport. Endocytosis and exocytosis. Energy transformation in mitochondria and chloroplasts. Transcription and translation. DNA replication. Structure of cell nucleus. Cell cycle. Mitosis. Meiosis. Stem cells. Cell differentiation. Cancer cell.

Genetics

Genetic information. DNA. RNA. Protein. Expression of genetic information. Heredity and variability. Basic genetic terms. Gene and genotype. Allele. Homozygote and heterozygote. Character and phenotype, Dominance and recessivity. Gene and its expression. Prokaryotic and eukaryotic chromosomes. Meiosis. Segregation and recombination of chromosomes in diploid organisms. Mendel's laws. Autosomal and gonosomal inheritance. Genetic tasks. Mutations. Karyotype. Chromosomal aberrations. DNA technology.

Human biology

Homeostasis. Tissues of the human body. Skeleton and muscles. Respiratory system and its function. Body fluids. Blood. Blood groups and transfusion. Immune system and defense mechanisms. Circulatory system and its function. Lymph and its circulation. Digestive system and nutrition. Body temperature and its maintenance. Urinary system. Excretory system. Skin and its functions. Endocrine glands. Hormones and hormonal regulation. Nervous system. Senses. Human reproduction and reproductive organs. Gametogenesis. Sexual reproduction. Human development. Human genetics.

Evolution

Origins of the live. Origin of the cells. Basics of evolution. Chemical evolution. Paleontological evidence of the earliest forms of life. Darwinian evolution. Classification of living systems. Acellular organisms.

Ecology

Abiotic and biotic factors. Biosphere. Ecosystems. Population explosion. Building of sustainable society.

Recommended literature:

Matthew Stubbs MBBS BSc, Narin Suleyman BSc, Crash Course Cell Biology and Genetics Updated Print + eBook edition 4th Edition. 2015. ISBN-13: 978-0723438762 ISBN-10: 0723438765

Neil A. Campbell, Jane B. Reece, Lisa Urry, Michael L. Cain et.al, Biology: A Global Approach (10th International Edition) - 2014. Pearson Education Limited (Verlag) 978-1-292-00865-3 (ISBN)

[Sylvia S. Mader Dr.](#), [Michael Windelspecht](#). Human Biology. McGraw-Hill Education; 15 edition (January 27, 2017). ISBN-13: 978-1259689796. ISBN-10: 1259689794