

THE NAME OF THE TOPICS OF LABORATORY CLASSES AND THEIR CONTENT

FOR 1ST YEAR STUDENTS OF GROUPS 101A-110A

SUBJECT "MEDICAL BIOLOGY AND GENERAL GENETICS"

THE SECOND SEMESTER OF THE 2022-2023 ACADEMIC YEAR

Topic 1.

The sex biology and genetics

1. Sex as a biology trait. Primary and secondary sex traits. Sex-limited and sex-controlled traits. M. Lyon hypothesis about female's mosaicism for the expression of X-linked genes.
2. The biological sex determination in a human. Significance of genes Tfm and SRY in the formation of sex. Morris syndrome.
3. The hermaphroditism (true and false). The pathological forms of sexual self-consciousness: transsexualism, fetishism, and transvestism.

Topic 2.

The reproduction of organisms. Feature of human reproduction

1. Reproduction – one of the main features of life systems. Types of sexual and asexual reproduction.
2. Ovo- and spermatogenesis in mammals. Features of gemetogenesis in human.
3. Morphological and functional features of human gametes.
4. Insemination (external and internal). Enzymatic processes at insemination. Fertilization, its phases and biological essence. Features of human fertilization.
5. The contemporary reproductive strategy of humankind (artificial insemination, *in vitro* fertilization, intracytoplasmic sperm injection).

Topic 3.

The individual development

1. Ontogenesis, its types and periods.
2. The development periods in the embryo and its characteristics: prozygote, zygote, cleavage, gastrulation, and histo-, organogenesis. The gene control of prenatal ontogenesis.
3. The intra-uterine development of human. Provisional organs. Their role in mother-fetus relationships. The critical periods in embryo development. Teratogenic factors of environment.
4. Postembryonic development and its periods. The gene control of postnatal ontogenesis. Growth and development, their neurohormonal regulation. Medical aspects of human constitution types and their classifications.
5. Ageing of organism and its biological aspects. Hypothesis of ageing. Gerontology and geriatry. Role genetic and social factors and medicine in human longevity. Clinical and biological death of organism. Eutanasia.

Topic 4.

Ontogenetic homeostasis and their regulation

1. The main components and general laws of regulation of homeostasis.
2. Mechanisms of homeostasis at gene level. Classification of transplantation types: autotransplantation, syngenic transplantation, allotransplantation, and xenotransplantation. Transplantation immunity. The gene control of histocompatibility at transplantation of tissues and organs: HLA system and blood groups (AB0, MN, Rh, and other).

3. Mechanisms of homeostasis at cell level. Regeneration of tissues and organs as a result of organism's homeostasis at cell level. Physiologic regeneration and its significance for organism. Classification of tissues and organs at their regeneration abilities.

4. Reparative regeneration and its types (typical and atypical). Types of reparative regeneration in vertebrates: intracellular compensative hyperplasia of organelles, regenerative hypertrophy, and complete regeneration. Significance of regeneration for biology and medicine.

5. Mechanisms of homeostasis at system level. Role of nervous and endocrine systems in regulation of homeostasis.

Topic 5. Population genetics.

1. Population structure of humankind. Big populations, deme, isolate. Influence of isolation on gene pool of population.

2. Action of migration, mutation, and gene drift on gene pool of human populations. Natural selection as a unique evolutionary force. The general models of natural selection: directional selection, overdominance and underdominance. Founder effect and genetic bottleneck.

3. Genetic polymorphism of human populations, its biological, medical, and social aspects.

4. Genetic load and its medical significance.

Topic 6. The basis of parasitology. Medical protistology. Phylum Sarcomastigophora, class Sarcodina.

1. Forms of ecology relationships in nature. The aim and subject of medical parasitology.

2. Classification of parasites: true and false, superparasite, monoxenic and heteroxenic parasites, ectoparasites (permanent and temporal) and endoparasites: intracellular, tissue, organ, and cavity parasites. Classification of parasite hosts: definite, intermediate, additional, reservoir, obligate, and facultative.

3. The ways of parasite invasion. The relationships in the system «parasite-host». Parasitocenosis.

4. Diseases caused by parasites, their classification. The concept about natural regions of parasite diseases.

5. Dysentery amoeba: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

Topic 7. Medical protistology. Phylum Sarcomastigophora, class Zoomastigota.

1. African and American trypanosomes: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

2. Leishmania sp.: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

3. Trichomonas sp.: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

4. Lamblia: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

Topic 8. Medical protistology. Phylum Apicomplexa, class Sporozoa. Phylum Infusoria, class Ciliata. Phylum Microspora, class Microsporea.

1. Plasmodium sp.: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

2. Toxoplasma: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

3. Cryptosporidium: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

4. Balantidium: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

5. Pneumocystis: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

Topic 9. Medical helminthology. Phylum Plathelminthes, class Trematoda.

1. Large liver fluke: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

2. Cat liver fluke: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

3. Lung fluke: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

4. Blood flukes: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

Topic 10. Medical helminthology. Phylum Plathelminthes, class Cestoda.

1. Beef tapeworm: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

2. Pork tapeworm: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

3. Dwarf tapeworm: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

4. Fish tapeworm: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

5. Dog tapeworm: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

Topic 11. Medical helminthology. Phylum Nemathelminthes, class Nematoda. Geohelminthes.

1. Human roundworm: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

2. Whipworm: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

3. Dwarf threadworm: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

4. Dog roundworm: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

Topic 12. Medical helminthology. Phylum Nemathelminthes, class Nematoda. Biohelminthes and contact helminthes.

1. Trichina worm: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

2. Heart and skin worms (Dirofilaria sp.): classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

3. Pinworm: classification, geographical distribution, features of morphology, ways of invasion, life cycle, pathogenic action, methods of diagnostics and prophylaxis.

Topic 13. Medical arachnoentomology. Phylum Arthropoda, class Arachnoidea.

1. Features of morphology and biology, medical significance of ticks from Ixodidae family.

2. Features of morphology and biology, medical significance of mites from Sarcoptidae and Demodicidae families.

3. Features of morphology and biology, medical significance of mites from Tyroglyphidae and Pyroglyphidae families.

Topic 14. Medical arachnoentomology. Phylum Arthropoda, class Insecta I.

1. Features of morphology and biology, medical significance of insects from Blattoidea order.
2. Features of morphology and biology, medical significance of insects from Hemiptera order.
3. Features of morphology and biology, medical significance of insects from Anoplura order.
4. Features of morphology and biology, medical significance of insects from Aphaniptera order.

Topic 15. Medical arachnoentomology. Phylum Arthropoda, class Insecta II.

1. Order Diptera. Features of morphology and biology, medical significance of Aedes, Anopheles, and Culex mosquitoes.
2. Features of morphology and biology, medical significance of sandflies, blackflies, and horseflies.
3. Features of morphology and biology, medical significance of flies (house fly, market fly, biting house fly, grey flesh fly, Wolfart's fly, and tsetse fly).

Topic 66. The basis of parasitology. FINAL CLASS.

Topic 17. Poisonous living organisms. Computer test

1. Poisonous fungi and characteristics of their poisons.
2. Poisonous plants and characteristics of their poisons.
3. Poisonous animals and characteristics of their poisons.