

CHARLES UNIVERSITY, FACULTY OF MEDICINE in PLZEN

Subject: PATHOLOGY (3rd year)

Detailed syllabus:

Topic 1: Introduction. Death of the organism. Cell injury and cell death.

Content: pathology as a theoretical and clinical subject; biopsy; histology; cytology; immunohistochemistry; molecular genetics; fixation; form; autopsy; death; necrosis; apoptosis; pyroptosis; necroptosis; anoikis; ferroptosis

Duration: 1 week (2 lectures + 1 practical)

Topic 2: Adaptations. Tissue healing. Pigments, calcifications, crystals, stones.

Content: atrophy; hypertrophy; hyperplasia; metaplasia; proliferation; regeneration; reparation; granulation tissue; healing; organization; steatosis; lipidoses; mukopolysacharidoses; hyalin; proteinopathies; anthracosis; lipofuscin, ceroid, lipochrom, melanin, bilirubin, hemosiderin, lithiasis

Duration: 1 week (2 lectures + 1 practical)

Topic 3: Inflammation.

Content: alteration; exudation; proliferation; exudate; inflammatory mediators; cytokines; complement; chemotaxis; opsonization; phagocytosis; pus; abscess; phlegmone; pseudomembrane; granuloma; SIRS; sepsis

Duration: 1 week (2 lectures + 1 practical)

Topic 4: Hemodynamic disorders (hemostasis, thrombosis, embolia, hemorrhage, hyperemia, congestion, edema, infarction, shock).

Content: circulatory insufficiency; heart failure; concentric hypertrophy; excentric hypertrophy; congestion; cyanosis; induration; shock; anemia; ischemia; hyperemia; hemostasis; thrombosis; embolia; hemorrhage; hemorrhagic diathesis; coagulopathies; thrombocytopenia; thrombocytopathies; vasculopathies

Duration: 1 week (2 lectures + 1 practical)

Topic 5: Etiology of diseases.

Content: Genetic, environmental, nutritional and infectious etiology of diseases: cytogenetic disorders; chromosomal aberrations; mutation; amplification; translocation; epigenetic changes; heredity; imprinting; malnutrition; intoxication; radiation; injury; infection; viruses; bacteria; parasites; protozoa; helminths; prions; mycoses; pneumoconioses; silicosis; asbestosis.

Duration: 1 week (2 lectures + 1 practical)

Topic 6: Diseases of the immune system.

Content: immune response; hypersensitive reaction; allergy; IgE; immune complex; autoimmune disease; immune deficiency; transplantation; rejection; GvHD; amyloidosis.

Duration: 1 week (2 lectures + 1 practical)

Topic 7: Neoplasia (Molecular oncology, classification, grading, staging, paraneoplastic syndromes).

Content: tumor; pseudotumor; neoplasm; benign; malignant; carcinoma; sarcoma; differentiation; anaplasia; invasive; infiltrative; expansive; pushing; metastases; paraneoplastic syndrome; typing; grading; staging; TNM; tumor markers; oncogenes; tumor supressor genes; growth factors; receptors; signalling cascades; transcription factors; cyclins; angiogenesis; epithelial-mesenchymal transition; immune surveillance; genomic instability; precancerosis; dysplasia; pseudotumors; targeted therapy; precision medicine.

Duration: 2 weeks (2 lectures + 2 practicals)

Topic 8: Embryofetoperinatoneonatopathology.

Content: ectopic pregnancy; GEU; placenta; fetal membranes; umbilical cord; chorioamnionitis; vilitis; gestational trophoblastic disease; hydatidiform mole; choriocarcinoma; preeclampsia; amniotic fluid embolism; abortion; teratogen; fetal hydrops; newborn; prematurity; birth complications; asphyxia; hyaline membrane disease; bronchopulmonary dysplasia; retinopathy of prematurity; necrotizing enterocolitis; infection; hyperbilirubinemia; sudden infant death syndrome; SIDS.

Duration: 1 week (2 lectures + 1 practical)

Topic 9: Pathology of the cardiovascular system.

Content: Diseases of veins, arteries and lymphatic vessels. Diseases of the endocardium, myocardium and pericardium. Congenital developmental defects of the cardiovascular system. Hypertension; arteriosclerosis; atherosclerosis; arteriolosclerosis; aneurysm; dissection; vasculitis; varices; phlebothrombosis; thrombophlebitis; lymphangiopathy; lymphangiectasia; lymphedema; hemangioma; lymphangioma; angiosarcoma; congenital heart disease; endocarditis; valvular heart disease; ischemic heart disease; myocardial infarct; cardiomyopathy; myocarditis; pericarditis; rhabdomyoma; myxoma.

Duration: 1 week (2 lectures + 1 practical)

Topic 10: Hematopathology (Pathology of lymph nodes and spleen. Bone marrow disorders).

Content: lymph node; B-lymphocytes; T-lymphocytes; NK-cells; plasma cells; lymph node; lymphadenopathy; lymphadenitis; granuloma; Hodgkin's lymphoma; non-Hodgkin lymphomas; NHL; histiocytosis; splenomegaly; myeloproliferation; myelodysplastic syndrome; acute leukemia; chronic leukemia; plasma cell myeloma

Duration: 2 weeks (4 lectures + 1 practical)

Topic 11: Basics of molecular genetics and pathology (Introduction to molecular biology. Application of molecular biology).

Content: human genome; DNA; RNA; polymerase chain reaction; PCR; in situ hybridization; mutation; next generation sequencing; NGS

Duration: 1 week (2 lectures)

Topic 12: Head and neck pathology (Pathology of teeth and oral cavity. Odontogenic cysts and tumors. Pathology of salivary glands. Pathology of the eye and ear. Pathology of the sinonasal region, nasopharynx, larynx and oropharynx).

Content: developmental disorders of the oral cavity; acute and chronic inflammation of the oral cavity; pseudotumors and hyperplasias of the oral cavity; epulis; leukoplakia, erythroplasia; tumors of the oral cavity; developmental defects of the teeth; dental caries; periodontitis; odontogenic cysts; odontogenic tumors; salivary gland; sialadenitis; Sjogren's syndrome; mucocele; salivary gland tumors; inflammations and non-neoplastic lesions of the ear; otitis media; otosclerosis; Meniere's disease; tumors of the ear; hordeolum; chalazion; glaucoma; tumors of the eye; upper respiratory tract infections; sinusitis; inflammatory nasal polyp; tumors of the nasal mucosa and nasopharynx; tonsillitis; oropharyngeal carcinoma; HPV; laryngitis; pseudotumors and tumors of the larynx; benign fibrous lesions; giant cell lesions of the craniofacial region; cartilaginous and bony tumors of the craniofacial region

Duration: 2 weeks (4 lectures + 1 practical)

Topic 13: Pathology of lung, pleura and mediastinum.

Content: Non-neoplastic diseases of the lung, pleural cavity and mediastinum. Tumours of the lung and pleura. Congenital malformations of the lung; pulmonary vascular diseases; chronic obstructive pulmonary disease; emphysema; chronic bronchitis; asthma bronchiale; bronchiectasia; interstitial lung disease; granulomatous inflammation; pneumoconiosis; infectious pneumonia; fluidothorax; pneumothorax; pleuritis; mediastinitis; bronchogenic carcinoma; SCLC; NSCLC; squamous cell carcinoma; adenocarcinoma; small cell carcinoma; large cell carcinoma; carcinoid; chondrohamartoma; carcinomatous lymphangiopathy; mesothelioma; solitary fibrous tumor.

Duration: 1 week (2 lectures + 1 practical)

Topic 14: Pathology of GIT (Pathology of digestive tube from esophagus to anus, and peritoneum).

Content: esophagus; diverticuli; achalasia; reflux; GERD; esophagitis; Barrett; adenocarcinoma; squamous cell carcinoma; stomach; gastritis; gastropathy; Helicobacter; autoimmune; NSAID; peptic ulcer disease; intestinal type adenocarcinoma; diffuse type adenocarcinoma; GIST; MALT lymphoma; neuroendocrine; NEN; NET; NEC; intestine; malabsorption syndrome; celiac disease; gluten; Tropheryma; Whipple; EATL; inflammatory bowel disease; IBD; ulcerative colitis; Crohn; mucosal prolapse; polyps; CRC; familial colorectal cancer; FAP; Lynch; peritoneum; peritonitis; mesothelioma; secondary müllerian system; carcinosis; pseudomyxoma peritonei.

Duration: 1 week (2 lectures + 1 practical)

Topic 15: Pathology of liver, biliary tree and pancreas (Non-neoplastic diseases and tumors of the liver, bile ducts, gallbladder and exocrine pancreas).

Content: liver; gallbladder; biliary, jaundice; hepatitis; cirrhosis; HAV; HBV; HCV; autoimmune hepatitis; alcohol; steatohepatitis; metabolic syndrome; NAFLD; NASH; Wilson disease; hemochromatosis; Reye syndrome; biliary atresia; choliopathies; polycystic disease; congenital hepatic fibrosis; Budd-Chiari syndrome; SOS; primary biliary cholangitis; primary sclerosing cholangitis; focal nodular hyperplasia; cavernous hemangioma; hepatocellular adenoma; hepatocellular carcinoma; HCC; intrahepatic cholangiocarcinoma; epithelioid hemangioendothelioma; angiosarcoma; cholelithiasis; cholecystitis; cholangitis; gallbladder carcinoma; Klatskin tumor; acute pancreatitis; chronic pancreatitis; pancreatic ductal adenocarcinoma; PDAC; IPMN; MCN; serous cystadenoma; SPN

Duration: 1 week (2 lectures + 1 practical)

Topic 16: Pathology of urinary system (Pathology of kidney, ureter, bladder and urethra. Glomerular diseases and tubulointerstitial nephritis. Inflammatory diseases of the outflow urinary tract. Tumors of the kidney and outflow urinary tract).

Content: kidney; ureter; urinary bladder; urethra; glomerulopathy; glomerulonephritis; nephrotic syndrome; nephritic syndrome; tubulointerstitial nephritis; pyelonephritis; urocystitis; polycystic disease; renal insufficiency; renal failure; renal cell carcinoma; angiomyolipoma; PEComa; Wunderlich syndrome; transitional cell carcinoma.

Duration: 1 week (2 lectures + 1 practical)

Topic 17: Pathology of male genital (Pathology of penis, prostate, testis, testicular adnexae, and scrotum. Developmental diseases, inflammations and tumors).

Content: testis; testicular adnexae; epididymis; tunica albuginea; prostate; penis; scrotum; cryptorchidism; Klinefelter; androgen insensitivity syndrome; orchitis; germ cell; sex cord - stromal tumors; seminoma; embryonal carcinoma; yolk sac tumor; choriocarcinoma; teratoma; Sertoli cell; Leydig cell tumor; hydrocele; varicocele; spermatocele; testicular torsion; adenomatoid tumor; mesothelioma; papillary cystadenoma; prostate hyperplasia; prostatitis; prostatic adenocarcinoma; Gleason score; balanoposthitis; Peyronie's disease; condyloma accuminatum; PeIN; penile squamous cell carcinoma; Fournier's gangrene.

Duration: 1 week (2 lectures + 1 practical)

Topic 18: Pathology of female genital (Pathology of the female reproductive system. Infections. Hormonal changes. Benign and malignant tumors).

Content: cervix; HPV; cervical intraepithelial neoplasia; CIN; HSIL; LSIL; bacterial vaginosis; Trichomonas vaginalis, Neisseria gonorrhoeae; Candida albicans; pelvic inflammatory disease; PID; vulva, condyloma accuminatum; lichen sclerosus et atrophicus; vulvar intraepithelial neoplasia; VIN; vaginal intraepithelial neoplasia; VaIN; squamous cell carcinoma; endocervical adenocarcinoma; uterus; uterus unicornis; uterus septus; menstrual cycle; endometriosis; adenomyosis; endometrial hyperplasia; endometrial polyp; adenomyoma; endometrial intraepithelial neoplasia; EIN, endometrioid carcinoma, serous carcinoma; stromal carcinoma; leiomyoma; leiomyosarcoma; STUMP; endometrial stromal sarcoma; ovarium; fallopian tube; polycystic ovary syndrome; cyst; salpingitis; oophoritis; cystadenoma; borderline tumor; carcinoma; serous; mucinous; endometrioid; fibroma; thecoma; granulosa cell tumor; teratoma; Krukenberg tumor; pseudomyxoma peritonei.

Duration: 1 week (2 lectures + 1 practical)

Topic 19: Pathology of breast (Developmental diseases of the breast. Regressive changes of the breast. Inflammatory breast lesions. Non-neoplastic and neoplastic lesions of mammary stroma. Benign epithelial lesions of the breast. Breast cancer).

Content: breast; mammary gland; polythelia; polymastia; amastia; hypoplasia of breast; macromastia; fat necrosis; breast infarct; puerperal mastitis; chronic mastitis; granulomatous mastitis; silicone mastitis; pseudoangiomatous stromal hyperplasia; myofibroblastoma; fibrocystic changes; FCD; adenosis; radial scar; ductal hyperplasia; fibroadenoma; phyllodes tumor; papilloma; adenomyoepithelioma; ductal carcinoma; carcinoma NST; lobular carcinoma; medullary carcinoma; mucinous carcinoma; tubular carcinoma; papillocarcinoma; Paget carcinoma; gynecomastia.

Duration: 1 week (2 lectures + 1 practical)

Topic 20: Pathology of skin (Tumors and non-neoplastic lesions of the skin).

Content: melanocytic nevi; melanoma; keratinocytic tumors; adnexal tumors; mesenchymal tumors; lymphoproliferative disorders; Brooke-Spiegler syndrome; Muir-Torre syndrome; cutaneous infections; non-infectious dermatoses; urticaria; eczema; erythema multiforme; psoriasis; lichen planus; blistering diseases; pemphigus; pemphigoid; Duhring; epidermolysis bullosa; porphyria.

Duration: 1 week (2 lectures + 1 practical)

Topic 21: Pathology of bones and joints.

Content: giant cell lesions of bones; vascular lesions of bones; Ewing sarcoma; Bobby; Pamela; JR; PNET; small round sarcoma; fibrous dysplasia; osteosarcoma; Erdheim-Chester disease; chondroma; chondroid lesions; Maffucci syndrome; phosphaturic mesenchymal tumor

Duration: 1 week (2 lectures + 1 practical)

Topic 22: Pathology of soft tissues (Adipocytic tumors. Smooth muscle tumors and skeletal muscle tumors. Tumors with fibroblastic and myofibroblastic differentiation. Vascular and perivascular tumors. Tumors of uncertain histogenesis and undifferentiated sarcomas. Neuroectodermal tumors).

Content: mesoderm; mesenchyme; lipoma; hibernoma; liposarcoma; leiomyoma; STUMP; leiomyosarcoma; rhabdomyoma; rhabdomyosarcoma; nodular fasciitis; benign fibrous histiocytoma; fibromatosis; dermatofibrosarcoma protuberans; solitary fibrous tumor; fibrosarcoma; hemangioma; lymphangioma; glomus tumor; Kaposi's sarcoma; epithelioid hemangioendothelioma; angiosarcoma; PEComa; synovial sarcoma; Ewing's sarcoma; schwannoma; neurofibroma; perineurioma; malignant peripheral nerve sheath tumor; MPNST

Duration: 1 week (2 lectures + 1 practical)

Topic 23: Pathology of endocrine system (Non-neoplastic diseases and tumors of the pituitary, thyroid gland, parathyroid glands, adrenals, endocrine pancreas, and epiphysis).

Content: pituitary; thyroid gland; parathyroid glands; adrenals; pancreas; islets of Langerhans; epiphysis; hyperpituitarism; hypopituitarism; neurohypophyseal syndromes; pituitary adenoma; craniopharyngioma; goiter; thyrotoxicosis; hypothyroidism; cretinism; myxedema; Graves-Basedow; thyroiditis; follicular adenoma; follicular carcinoma; papillary carcinoma; medullary carcinoma; orphan Annie's eyes; hyperparathyroidism; hypoparathyroidism; pseudohypoparathyroidism; Recklinghausen; hypercortisolism; Cushing syndrome; hyperaldosteronism; adrenogenital syndrome; Waterhouse-Friderichsen syndrome; Addison disease; pheochromocytoma; paraganglioma; neuroblastoma; diabetes mellitus; metabolic syndrome; NET; NEC; pinealocytoma; pinealoblastoma; DNES; carcinoid syndrome; Zollinger-Ellison syndrome; MEN syndromes.

Duration: 1 week (2 lectures + 1 practical)

Topic 24: Pathology of nervous system.

Content: Congenital malformations of central nervous system. Cerebral edema, herniation, hydrocephalus. Mechanical injury of the central nervous system. Intracranial hemorrhage. Cerebrovascular diseases. Encephalomalacia, myelomalacia, global cerebral ischemia. Meningitis. Encephalitis. Slow viral infections and prion diseases of central nervous system. Degenerative diseases of CNS. Metabolic and nutritional diseases of nervous system. Tumors of central nervous system – general review, symptoms, prognosis. Glial tumors of CNS. Other (than glial) tumors of CNS. Tumors of meninges and peripheral nerves. (neural system; CNS; brain; spinal

cord; peripheral nerves; global cerebral ischemia; respirator brain; stroke; ictus; intracerebral hemorrhage; aneurysm; arteriovenous malformation; anencephaly; kraniorhachischisis; meningoencephalocele; spina bifida; Arnold-Chiari; Dandy-Walker; syringomyelia; syringobulbia; hydrocephalus; hydromyelia; cerebral edema; intracranial hypertension; cerebral herniation; epidural hemorrhage; subdural hemorrhage; subarachnoidal hemorrhage; contusion; diffuse axonal injury; meningitis; encephalitis; SSPE; PML; prions; Creutzfeldt-Jakob; kuru; BSE; dementia; Alzheimer; synucleinopathy; Parkinson; FTLN; tauopathy; Pick; ALS; Reye syndrome; Wernicke-Korsakoff; demyelination; multiple sclerosis; axonal degeneration; diabetic polyneuropathy; syndrom Guillain-Barré; ependymoma; astrocytoma; glioblastoma; oligodendroglioma; medulloblastoma; PNET; AT/RT; glioma; SEGA; von Hippel-Lindau; meningioma; SFT; neuroma; schwannoma; neurofibroma; neurofibromatosis).

Duration: 1 week (2 lectures + 1 practical)