

## OSP-PO1-T PATHOLOGY FOR DENTAL STUDENTS 1

Course director:

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**4 credit - semester exam - Obligatory subject for the Pre-clinical module - autumn semester - recommended semester: 5**

*Number of hours/semester:* **28 lectures + 0 practices + 28 seminars = total of 56 hours**

*Course headcount limitations (min.-max.):* **5 – 10** *Prerequisites:* **see your [Recommended Curriculum](#)**

### Topic

Basic pathological cellular responses underlying the various disease processes are taught during this course. These are discussed in the following seven main chapters: necrosis, degeneration, accumulation, growth disturbances, acute and chronic inflammation, circulation, immune pathology and general oncology. The most common and most important diseases are also discussed in details during the lectures and seminars.

The main educational task of this subject is to have the students understand the disease concepts as the unity of macroscopy, microscopy, clinical signs and symptoms, genetic and laboratory changes; factors that shape the clinicopathological thinking about diseases.

The general pathology course will form the very basis for the systemic / organ pathology as well as the subsequent clinical studies by teaching the etiology, pathogenesis and pathomechanism together with the gross morphological and microscopical changes of the various diseases. During this activity the principal and methodology of the diagnostic pathology will be covered. The theoretical part of the subject consists of 2 lectures a week (28 lectures altogether). The practical part includes 2x45 min. practice a week (altogether 14x90 min. in the course of the semester), which begins with 4x90 min. autopsy (4 practices), followed by 10 histopathology (10 practices).

### Conditions for acceptance of the semester

Maximum two absences, which means 2 practices, are allowed! Absences exceeding this rate (15% of the histopathology classes) in either semester will result in not signing the gradebook! Each missed seminar has to be made up for with another group in the same week.

### Mid-term exams

One macropreparation, one histological slide and a theoretical question will be given to the students at the examination by the end of the first semester.

### Making up for missed classes

Maximum two absences, which means 2 practices, are allowed! Absences exceeding this rate (15% of the histopathology classes) in either semester will result in not signing the gradebook! Each missed seminar has to be made up for with another group in the same week.

### Reading material

- *Obligatory literature*
  - V. Kumar: Robbins Basic Pathology, 2014
- *Literature developed by the Department*
  - Lecture slides are found on the homepage of Department of Pathology.
- *Notes*
- *Recommended literature*

### Lectures

#### I. INTRODUCTION, POSTMORTEM CHANGES, NECROSIS (4 LECTURES)

- 1 Postmortal changes. Cell injury and cell death. Causes of cell injury. Necrosis. Ultrastructural, light microscopical and gross changes  
Dr. Tornóczyki Tamás
- 2 Patterns of necrosis: coagulation and liquefactive necrosis. Organ examples.  
Dr. Tornóczyki Tamás
- 3 Clinicopathology of AMI  
Dr. Tornóczyki Tamás
- 4 Caseous necrosis and adiponecrosis. Apoptosis: morphology, pathomechanism  
Dr. Tornóczyki Tamás

## II. DEGENERATION, ACCUMULATION, PIGMENTS, CALCIFICATION (4 LECTURES)

- 5 Degenerations  
Dr. Vida Livia
- 6 Endogenous pigments  
Dr. Vida Livia
- 7 Exogenous pigments. Accumulation.  
Dr. Vida Livia
- 8 Calcification, lithiasis, amyloidosis.  
Dr. Vida Livia

## III. GROWTH DISTURBANCES (3 LECTURES)

- 9 Regressive changes: atrophy. Organ examples. Classification of cells according to the mitotic capacity  
Dr. Kereskai László
- 10 Progressive changes: hyperplasia and hypertrophy 1.  
Dr. Kereskai László
- 11 Progressive changes: hyperplasia and hypertrophy 2.  
Dr. Kereskai László

## IV. PATHOLOGY OF CIRCULATION (4 LECTURES)

- 12 Oedema, hyperemia and congestio  
Dr. Kajtár Béla
- 13 Haemorrhages  
Dr. Kajtár Béla
- 14 Thrombosis and embolisation  
Dr. Kajtár Béla
- 15 Hypertension, Shock  
Dr. Kajtár Béla

## V. INFLAMMATIONS (4 LECTURES)

- 16 Definition of acute inflammation, cellular and vascular reactions  
Dr. Kajtár Béla
- 17 Clinicopathological forms of acute inflammation  
Dr. Kajtár Béla
- 18 Chronic inflammation  
Dr. Kajtár Béla
- 19 Granuloma, granulomatous inflammation  
Dr. Kajtár Béla

## VI. IMMUNOPATHOLOGY (3 LECTURES)

- 20 Hypersensitivity reactions  
Dr. Kereskai László
- 21 Autoimmune diseases  
Dr. Kereskai László
- 22 Immunodeficiencies, transplantation immunology  
Dr. Kereskai László

## VII. ONCOPATHOLOGY (6 LECTURES)

- 23 Neoplasia, nomenclature, definitions. Benign and malignant behaviour of tumours. Terminology (nomenclature) of neoplasms. Definition of metaplasia, dysplasia and their relation to neoplasia. Organ examples. Anaplasia  
Dr. Tornóczki Tamás
- 24 Tumor growth, local spread and metastasis, types of metastases, grading and staging. Paraneoplastic syndromes. Tumor incidence and mortality.  
Dr. Tornóczki Tamás
- 25 Oncogenes, protooncogenes, oncoproteins, growth factor and growth factor receptor oncogenes (RET, KIT, PDGFR), growth factor receptor overexpression (ERBB1, ERBB2), organ examples.  
Dr. Tornóczki Tamás
- 26 Oncoproteins and ncogenes in signaltransduction: RAS and RAS signal proteins. Examples for oncogene with non-receptor tyrosine kinase function. The myc oncogene. Types and their changes and role in tumours (c-myc, n-myc).  
Dr. Tornóczki Tamás

- 27 Tumor suppressor genes: RB and p53. Their role in tumorigenesis.  
Dr. Tornóczy Tamás
- 28 Chemical and radiation carcinogenesis. Microbial carcinogenesis: RNA and DNA viruses. Helicobacter pylori.  
Dr. Tornóczy Tamás

#### Practices

#### Seminars

- 1 Autopsy practice
- 2 Autopsy practice
- 3 Autopsy practice
- 4 Autopsy practice
- 5 Autopsy practice
- 6 Autopsy practice
- 7 Autopsy practice
- 8 Autopsy practice
- 9 Necrosis 1.
- 10 Necrosis 1.
- 11 Necrosis 2. Degenerations.
- 12 Necrosis 2. Degenerations.
- 13 Accumulations
- 14 Accumulations
- 15 Growth disturbances
- 16 Growth disturbances
- 17 Pathology of circulation 1
- 18 Pathology of circulation 1
- 19 Pathology of circulation 2
- 20 Pathology of circulation 2
- 21 Acute inflammation
- 22 Acute inflammation
- 23 Chronic inflammation
- 24 Chronic inflammation
- 25 Oncopathology 1
- 26 Oncopathology 1
- 27 Oncopathology 2
- 28 Oncopathology 2

#### Exam topics/questions

#### PREPARATIONS

##### I. NECROSIS

- 1. Anaemic infarct of the heart
- 2. Haemorrhagic infarct of the small intestine
- 3. Gangraena sicca of the toes
- 4. Cerebral abscess
- 5. Acute pancreatitis with fat necrosis

##### II. DEGENERATIONS, ACCUMULATIONS, PIGMENTS

- 6. Steatosis hepatis
- 7. Aortic atherosclerosis with aneurysm
- 8. Haemochromatosis
- 9. Cholelithiasis, chronic cholecystitis and empyema
- 10. Nodular calcified aortic stenosis

### III. GROWTH DISTURBANCES

11. Atrophia cerebri
12. Hypertrophia dilatativa ventriculi sinistri cordis
13. Cor pulmonale chronicum
14. Hyperplasia prostatae

### IV. PATHOLOGY OF CIRCULATION

15. Cerebral apoplexy
16. Cerebral purpura
17. Abdominal aortic aneurysm - parietal thrombosis
18. Left atrial "ball" thrombus

### V. INFLAMMATIONS

19. Fibrinous pericarditis - cor villosum
20. Pseudomembranous colitis
21. Lobar pneumonia
22. Bronchopneumonia
23. Pulmonary abscess
24. Miliary tuberculosis
25. Phthisis cavernosa

### VI. ONCOPATHOLOGY

26. Fibroadenoma of the breast
27. Carcinoma of the breast
28. Leiomyoma of the uterus
29. Dermoid cyst
30. Rectal polyp
31. Rectal adenocarcinoma
32. Pulmonary metastases

### SLIDES

#### I. NECROSIS

1. Recent infarct of the heart
2. Haemorrhagic infarct of the lung

#### II. DEGENERATION, ACCUMULATION, PIGMENTS, CALCIFICATION

3. Steatosis hepatis
4. Haemosiderosis of the liver
5. Amyloidosis of the liver
6. Silicosis

#### III. GROWTH DISTURBANCES

7. Prostatic hyperplasia
8. Endometrial hyperplasia

#### IV. PATHOLOGY OF CIRCULATION

9. Pulmonary oedema
10. DIC - Fibrin thrombi in the kidney
11. Central hemorrhagic necrosis

#### V. INFLAMMATIONS

12. Fibrinous pericarditis
13. Pseudomembranous colitis
14. Purulent meningitis
15. Acute appendicitis

- 16. Sarcoidosis
- 17. Miliary tuberculosis

#### VI. ONCOPATHOLOGY

- 18. Cervical intraepithelial neoplasia CIN III
- 19. Squamous cell carcinoma of the lower lip
- 20. Adenocarcinoma metastasis in a lymph node

#### THEORETICAL QUESTIONS

##### I. POSTMORTAL CHANGES, NECROSIS

- 1. Cell injury and cell death. Causes of cell injury. Necrosis. Ultrastructural, light microscopical and gross changes. Apoptosis: morphology, pathomechanism.
- 2. Patterns of necrosis: coagulation type. Organ examples.
- 3. Patterns of necrosis: colliquation type. Organ examples.
- 4. Caseous necrosis and adiponecrosis

##### II. DEGENERATION, ACCUMULATION, PIGMENTS

- 5. The definition and types of degenerations. Parenchymal and fatty degeneration. Organ examples
- 6. Pathomorphology, pathogenesis and complications of atherosclerosis Aneurysm types
- 7. Exogenous and endogenous pigments. Anthracosis. Silicosis.
- 8. Hemoglobinogenic pigments I. Different forms of jaundice and cholestasis, morphology, differential diagnostics.
- 9. Hemoglobinogenic pigments II. Pathological forms of iron storage Endogenous nonhemoglobinogenous pigments: lipofuscin, melanin, homogentisinic acid.
- 10. Dystrophic and metastatic calcification. Organ manifestations. Pathomechanism and clinicopathological forms of stone formation
- 11. Amyloidosis.

##### III. GROWTH DISTURBANCES

- 12. Causes of atrophy; general gross morphology and microscopical characteristics. Pathomechanism of atrophy. Definition of atrophy, hypoplasia, aplasia, agenesis. Osteoporosis.
- 13. Definition, types and organ examples of hyperplasia. Definition of hypertrophy (causes, morphology, changes at cell cycle)
- 14. Left ventricular hypertrophy. Causes, sequential compensatory changes and functional consequences. Cor pulmonale chronicum.

##### IV. PATHOLOGY OF CIRCULATION

- 15. Definition of edema, pathomechanism (Starling law), clinical forms
- 16. Classification of haemorrhages based on pathomechanism, clinical forms. Congestion and hyperemia.
- 17. Thrombosis and embolus: definitions, causes, types and clinical consequences
- 18. Causes, types and pathomechanisms of shock. Disseminated intravascular coagulation (DIC).
- 19. Clinicopathological classification of hypertension and complications

##### V. INFLAMMATIONS

- 20. Vascular and cellular mechanisms of acute inflammations
- 21. Clinicopathological classification of acute inflammation based upon exudate types. Organ examples.
- 22. Definition, causes, cellular and humoral mechanisms of chronic inflammation.
- 23. Pathogenesis and clinicopathology of tuberculosis
- 24. Granuloma, granulomatous inflammation

##### VI. IMMUNPATHOLOGY

- 25. Mechanisms of hypersensitivity reactions, examples of related disorders
- 26. Pathogenesis of autoimmune disorders. Systemic lupus (SLE)
- 27. Transplantation immunity. Acquired immunodeficiency syndrome (AIDS)

##### VII. ONCOPATHOLOGY

- 28. Neoplasia, nomenclature, definitions. Definition of metaplasia and dysplasia, organ examples and their connections with neoplasia

29. General characteristics of benign and malignant tumors, anaplasia, tumor growth, local spread and metastasis, types of metastases
30. Incidence and mortality of cancers. Grading és staging. Paraneoplastic syndromes.
31. Oncogenes, protooncogenes, oncoproteins, growth factor and growth factor receptor oncogenes (RET, KIT, PDGFR), overexpression of normal growth factor receptors (ERBB1, ERBB2). Organ examples.
32. Oncogenes and oncoproteins in signal transduction: RAS and RAS signal proteins. Examples of oncogenes with non receptor tyrosine kinase activity, examples. The myc oncogene: types, their changes and roles in tumors (c-myc, n-myc)
33. Tumor suppressor genes: RB and p53 genes and their roles in tumorigenesis. Neurofibromatosis, NF1.
34. Chemical and radiation carcinogenesis. Mikrobial carcinogenesis: RNA és DNA viruses, Helicobacter pylori

The Department of Pathology reserves the right to propose minor modifications in the curriculum

#### Participants

Dr. Bogner Barna István (FWINMS), Dr. Czina Márton (DQBJDS), Dr. Gyömörei Csaba (HW4NIX), Dr. Kajtár Béla (SOUO7C), Dr. Kaszás Bálint (C6EZUZ), Dr. Kereskai László (C0HF7F), Dr. Pap Anita (DO1ZZP), Dr. Semjén Dávid (D3T05F), Dr. Smuk Gábor (YWNUZF), Dr. Tornóczki Tamás (FND8FK), Dr. Vida Livia (XJJ5MJ)