

SUBJECT PRESENTATION

1. Program data

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| 1.1 University | „VICTOR BABEȘ” UNIVERSITY OF MEDICINE AND PHARMACY TIMIȘOARA |
| 1.2 Faculty | DENTAL MEDICINE FACULTY |
| 1.3 Departament | III Functional Sciences |
| 1.4 Field of study ¹⁾ | Bachelor/Health |
| 1.5 The cycle of studies ²⁾ | Bachelor |
| 1.6 Study Program/Qualification | Dental Medicine - English Section |

2. Data about the discipline

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| 2.1. Name of the discipline | PATHOPHYSIOLOGY | | | | | | | |
| 2.2 Course instructor | Ioana MOZOȘ, MD, PhD, Associate Professor, course instructor | | | | | | | |
| 2.3 Laboratory instructor | Ioana MOZOȘ, MD, PhD, Associate Professor, laboratory instructor | | | | | | | |
| 2.4 Year of study | II | 2.5 Semester | I | 2.6 Type of evaluation | Exam | 2.7 The discipline regimen | Content ³⁾ | DF |
| | | | | | | | Compulsoriness ³⁾ | DI |

3. Total estimated time (hours per semester of teaching activities)

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|---|------------|--------------|-----------|----------------|-----------|
| 3.1 Number of hours/week | 4 | 3.2 lectures | 2 | 3.3 laboratory | 2 |
| 3.4 Total hours from the teaching plan | 56 | 3.5 lectures | 28 | 3.6 laboratory | 28 |
| Distribution of time | | | | | ore |
| Study after manual, course support, bibliography and notes | | | | | 33 |
| Additional documentation in the library, on the specialized electronic platforms and on the field | | | | | 34 |
| Training seminars / laboratories / projects, themes, papers, portfolios and essays tutorial | | | | | 22 |
| Tutorial | | | | | |
| Examinations (1 seminar, 1 practical assessment, 1 practical exam, 1 final exam) | | | | | 5 |
| Other activities | | | | | |
| 3.7 Total hours of individual studies | 89 | | | | |
| 3.8 Total hours/semester | 150 | | | | |
| 3.9 Number of credits⁵⁾ | 5 | | | | |

4. Preconditions (where applicable)

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| 4.1 curriculum | Anatomy, Cellular and Molecular Biology, Biochemistry, Physiology |
| 4.2 competences | It is not necessary |

5. Conditions (where applicable)

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| 5.1 for the lecture | <ul style="list-style-type: none"> • Mobile phones will be closed during classes, telephone conversations are not tolerated during lectures, the students may not leave the classroom for personal calls • The students are not allowed to be late, considering that it disrupts the educational process • Attendance at the lecture is mandatory with a maximum of 30% absences allowed |
| 5.2 for the practical lab | <ul style="list-style-type: none"> • Mobile phones will be closed during classes, telephone conversations are not tolerated during lectures, the students may not leave the classroom for personal calls • The students are not allowed to be late at the lab, considering that it disrupts the educational process • Attendance at the lecture is mandatory with a maximum of 30% absences allowed. • Recovering of up to 2 absences /semester are allowed. The absences may be recovered in the last week of each semester in agreement with the group assistant after paying the appropriate fee (excepting medical cases) • The dates of the seminars and final exam are determined by the course instructor in agreement with the students. Applications for postponement will be accepted only for objective, legitimate reasons. • The practical exam will be in the last week of the 2nd semester from the topics of the practical laboratory; • Promotion of the practical exam is mandatory in order to promote the final exam. |

6. Specific accumulated skills

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| Professional Skills | <ol style="list-style-type: none"> 1. Developing a medical vocabulary useful in clinical practice 2. Understanding the concept of illness, etiology and mechanisms responsible for the onset and evolution of pathological disorders: understanding and knowledge of functional disorders, compensatory mechanisms at different stages of disease; pathogenesis of organ dysfunctions and therapeutic principles 3. Development of the ability to formulate a positive and differential diagnosis for the studied disorders according to the interpretation of laboratory and paraclinic investigations compared to normal parameters 4. Knowledge and understanding of the implications of various cardiovascular, respiratory, hematological, digestive, renal, metabolic and endocrine disorders for dental practice. |
| Cross-cutting Skills | <ol style="list-style-type: none"> 1. Identifying roles and responsibilities in a multidisciplinary team and applying effective relationship and work techniques within the team to facilitate future interdisciplinary collaborations 2. Effective use of information sources and communication resources and assisted training (Internet, specialized software applications, databases, on-line lectures, etc) both in Romanian and in an international language 3. Identification of objectives to be achieved, of available resources, the conditions for their completion, the work stages, working time, the related implementation deadlines and the related risks 4. Initiation of scientific research activities about the pathogenesis of several disorders and their relationship with dental medicine |

7. Objectives of the discipline (resulting from the specific accumulated skills)

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| 7.1 The general objective of the discipline | Acquiring basic pathophysiology knowledge. |
| 7.2 Specific objectives | <ol style="list-style-type: none"> 1. Knowledge and understanding of pathophysiological mechanisms involved in occurrence and evolution of pathological processes and their relationship with dental medicine 2. Explaining clinical signs, functional disorders, compensatory mechanisms, therapy principles and laboratory changes according to pathophysiological mechanisms. Differentiating the functional disorders that contribute to the disease, those that arise as a result of the disease and those produced by the compensatory mechanisms of the disease. 3. Identifying the main disorders and establishing their correct diagnosis (formulation of diagnostic assumptions according to paraclinical investigations) 4. Explaining the implications of the cardiovascular, respiratory, hematological, digestive, renal, metabolic and endocrine disorders for dental medicine. |

8. Contents

| 8.1 Lecture | Teaching methods | Number of hours | Observations |
|---|--|-----------------|---|
| 1. Definition and objective of pathophysiology. Pathophysiology of the respiratory system: bronchial asthma, COPD, pneumonia, pulmonary embolism, cystic fibrosis, respiratory failure, implications of respiratory diseases for dental medicine | <ul style="list-style-type: none"> • Oral lecture delivered through structured, interactive Powerpoints along with a rich and suggestive iconography that will be available on the Moodle e-learning platform of the university • PPT presentations contain suggestive images and tables of mechanisms and signs of pathological conditions as well as questions from the presented materials • The informative material is continuously adapted to the latest information in the field of pathophysiology of studied diseases, describing the implications of different diseases for dental medicine • Each lecture starts with the educational objectives and ends with the summary of the presented material. | 2 | The optional bibliography for dental medicine is available at the Department of Pathophysiology, at the library of the „Victor Babes” University and on google.books. |
| 2. Pathophysiology of atherosclerosis and coronary heart disease: mechanisms of atherogenesis, atherosclerosis risk factors, consequences of the imbalance between myocardial oxygen demand and supply, angina pectoris, myocardial infarction, unstable angina, implications for dentistry in patients with coronary heart disease | | 2 | |
| 3. Pathophysiology of blood pressure disorders: blood pressure regulation, definition and classification of HT, essential and secondary HT, malignant HT, complications of HT, orthostatic hypotension: definition, causes, mechanisms, clinical signs, implications of HT and orthostatic HT for dental medicine | | 2 | |
| 4. Pathophysiology of heart failure (HF), valvulopathies and circulatory shock: | | 2 | |

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| definition of HF, determinants and precipitating causes, compensatory mechanisms, classification of HF, pathophysiology of acute pulmonary edema and peripheral edema, pathophysiology of mitral stenosis, aortic stenosis, aortic insufficiency, endocarditis, implications of HF for dental medicine, antibiotic prophylaxis of endocarditis, definition, classification and stages of circulatory shock, anaphylactic shock, allergic reactions to dental materials | | | |
| 5. Disorders of red and white blood cells: definition and classification of anemia, pathophysiology of disorders of iron metabolism, anemia due to B12 vitamin deficiency and folic acid deficiency, hemolytic anemia, anemia due to bone marrow deficiency, anemia in dental medicine, definition and classification of polycythemia, pathophysiology of acute and chronic leukemia, lymphomas, multiple myeloma, implications of malignant hematological disorders for dental medicine | | 2 | |
| 6. Pathophysiology of bleeding disorders: vascular purpura, thrombocytopenia, thrombocytopathies, coagulopathies, implications of hemorrhages for dental medicine, hypercoagulability states | | 2 | |
| 7. Pathophysiology of electrolyte imbalances: volume depletion and hypervolemia. Hypo- and hypernatremia, hypo- and hyperkalemia. Pathophysiology of acid-base balance: classification of acid-base disorders, disorders due to acidosis and alkalosis, metabolic acidosis and alkalosis, respiratory acidosis and alkalosis, implications of acid-base disorders for dental medicine | | 2 | |
| 8. Seminar from lectures 1-6 | | 2 | |
| 9. Pathophysiology of carbohydrate metabolism: general concepts, diabetes mellitus: definition, classification, complications, implications of diabetes for dentistry. Pathophysiology of calcium and phosphate metabolism: rickets, osteomalacia, osteoporosis, Paget's disease | | 2 | |
| 10. Pathophysiology of the renal system: glomerulopathies, urinary tract obstruction, urinary tract infections, acute kidney injury, chronic kidney disease, oral manifestations of uremia | | 2 | |
| 11. Pathophysiology of inflammation: definition, etiology, clinical signs, inflammatory mediators, the vascular phase, the cellular phase, repair processes, pulpitis and dental granuloma. Pathophysiology of pain: pain theories, classification of pain, orofacial pain. Pathophysiology of thermoregulation: fever, hyperthermia, hypothermia | | 2 | |

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| 12. Digestive pathophysiology: gastroesophageal reflux disease, peptic ulcer, diarrhea, chronic bowel disease, appendicitis, jaundice, acute and chronic hepatitis, liver cirrhosis, implications for dental medicine in hepatitis and liver cirrhosis | | 2 | |
| 13. Pathophysiology of the oral cavity I: dental plaque, dental calculus, dental caries, dental erosion, the dental effect of fluoride | | 2 | |
| 14. Pathophysiology of the oral cavity II: gingivitis, periodontitis, pathophysiology of salivary glands. | | 2 | |
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Mandatory references:

1. I. Mozoș. Curs de Fiziopatologie pentru medicină dentară. Mirton Publishing House, 2015
2. I. Mozos. Pathophysiology lecture notes for dental medicine. Lambert Academic Publishing 2015
3. PPT presentations available for students. These presentations will be available on the e-learning Moodle platform of the university.

Optional references:

1. L Story. Pathophysiology. A practical approach. 3rd Edition. Jones & Bartlett Learning, 2018
2. T Capriotti, J Parker Frizzell. Pathophysiology. Introductory Concepts and Clinical Perspectives. FA Davis Company, 2016
3. MA Papadakis, SJ McPhee. Current Medical Diagnosis and Treatment 2014. Lange Medical Publications, 2014
4. KC VanMeter, RJ Hubert. Gould's Pathophysiology for the Health Professions. Elsevier, 2014
5. SE Huether, KL McCance. Understanding Pathophysiology. Elsevier, 2012
6. S Silbernagl, F Lang. Color Atlas of Pathophysiology, Thieme, 2010
7. MA Weinberg, SL Segelnick, JS Insler, et al. The dentist's quick guide to medical conditions. Wiley Blackwell, 2015
8. SF Malamed. Medical emergencies in the dental office. 7th Edition. Elsevier Mosby, 2015
9. L Mitchell, DA Mitchell. Oxford Handbook of Clinical Dentistry. 6th Edition, Oxford University Press, 2014
10. SS Hiremath. Textbook of preventive and community dentistry. 2nd Edition. Elsevier, 2011
11. P Gängler, T Hoffmann, B Willershausen. Konservierende Zahnheilkunde und Parodontologie. Georg Thieme Verlag, 2011
12. C Scully. Medical Problems in Dentistry. 6th Edition, Churchill, Livingstone, Elsevier, 2010

| 8.2 Seminar/ Laboratory | Teaching-learning methods | Number of hours | Observations |
|---|--|--------------------|--------------|
| 1. Investigations in pulmonary diseases: static and dynamic lung volumes, obstructive and restrictive ventilatory dysfunctions, the main conditions causing ventilatory dysfunction, PEFR, the importance of recognizing ventilatory dysfunctions for dental medicine | <p>PRESENTATION+DEBATE+CASE PRESENTATIONS</p> <ul style="list-style-type: none"> • Oral PPT presentation delivered through structured, interactive Powerpoints along with a rich and suggestive iconography that will be available on the Moodle e-learning platform of the university • Presentation of the paraclinical investigation methods (laboratory tests and functional explorations) in the form of tables, diagrams, diagnostic algorithms, case presentations, in order to familiarize and retain the main laboratory and paraclinical investigations for a certain pathology. • Indications, contraindications, methodology and interpretation of the results of various current functional exploration techniques (ECG, spirometry, etc.) • Typical examples of laboratory bulletins and interactive discussions on clinical cases are included in presentations and protocols. | 2 | |
| 2. Normal electrocardiogram and ECG in rhythm and conduction disorders: normal ECG elements, assessing heart rate, the normal sinus rhythm, atrial and ventricular arrhythmias, conduction disorders | | 2 | |
| 3. ECG in myocardial ischemia and infarction, biomarkers in myocardial necrosis | | 2 | |
| 4. Investigations in red and white blood cell | | 2 | |

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| disorders: identifying iron deficiency and hemolytic anemia, anemia due to vitamin B12 or folic acid deficiency, causes of neutrophilia, eosinophilia, basophilia, lymphocytosis, lymphopenia and neutropenia, elements of laboratory diagnosis in leukemia | | | |
| 5. Investigations in hemostasis disorders: methods exploring primary hemostasis, intrinsic and extrinsic coagulation and fibrinolysis, methods of anticoagulant therapy monitoring | | 2 | |
| 6. Investigation of electrolyte imbalances: lab tests assessing hydro-electrolyte imbalances, hypo- and hypernatremia, hypo- and hyperkalemia | | 2 | |
| 7. Practical evaluation of laboratories 1-5. | | 2 | |
| 8. Investigation of acid-base disorders: Recognize the type of acidosis or alkalosis: metabolic, respiratory, mixed, uncompensated or compensated, list the main causes of respiratory and metabolic acidosis and alkalosis. Investigation of calcium and phosphate imbalances: hyper- and hypocalcemia, hypo- and hyperphosphatemia, hypo- and hyperparathyroidism, vitamin D deficiency | | 2 | |
| 9. Investigation of diabetes mellitus: static, dynamic and special tests, glycemic control, recognize the existence of complications of diabetes mellitus | | 2 | |
| 10. Investigation of lipid metabolism disorders, metabolic syndrome, hyperuricemia and gout | | 2 | |
| 11. Investigations of saliva and salivary glands. Exploring pain | | 2 | |
| 12. Investigating patients with halitosis. Exploration of the dental | | 2 | |

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| plaque. Investigating patients with bruxism | | | |
| 13. Evaluation of patients with gingivitis and periodontitis | | 2 | |
| 14. Rehearsal tests. Make-up of absences | | 2 | |
| Mandatory references: 1. PPT presentations available for students. These presentations will be available on the e-learning Moodle platform of the university. | | | |
| Optional references: 1. Stefan Silbernagl, Florian Lang. Fiziopatologie. Atlas color, Thieme 2011 2. MA Papadakis, SJ McPhee. Current Medical Diagnosis and Treatment 2014. Lange Medical Publications 2014 3. KC VanMeter, RJ Hubert. Gould's Pathophysiology for the Health Professions. Elsevier 2014 4. SE Huether, KL McCance. Understanding Pathophysiology. Elsevier, 2012 5. P Gängler, T Hoffmann, B Willershausen. Konservierende Zahnheilkunde und Parodontologie. Georg Thieme Verlag, 2010 6. MA Weinberg, SL Segelnick, JS Insler, et al. The dentist's quick guide to medical conditions. Wiley Blackwell, 2015 7. C Scully. Medical Problems in Dentistry. 6th Edition, Churchill, Livingstone, Elsevier, 2010 8. SF Malamed. Medical emergencies in the dental office. Seventh Edition. Elsevier Mosby, 2015 | | | |

9. Corroborating the contents of the discipline with the expectations of the representatives of the epistemic communities, professional associations and representative employers in the field related to the program

The student will be familiar with the pathophysiological mechanisms of the most important syndromes and disorders, that he will face later in the clinic and practice, as well as laboratory investigations enabling diagnosis of those syndromes, the main therapeutic measures and implications for dental medicine.

Thus he acquires the necessary information and skills, enabling acquiring of more complex knowledge according to the current requirements of the labor market in the field of health, meeting the European, educational and professional standards. It should be noted that the profession of dental practitioner is regulated at EU level, including minimal training standards, which are considered in the curriculum content.

In order to draw up and standardize the content, as well as to choose the methods of teaching / learning, the discipline stakeholders organized and participated in the didactic workshops within the national conferences of the Romanian Society of Pathophysiology (every 2 years). The meetings aimed to discuss with the stakeholders of Pathophysiology for Dental Medicine from other university centers, identify the needs and expectations of the employers in the field, and coordinate with other similar programs within the other higher education institutions. The course instructor also participated in the 8th International Pathophysiology Congress in Bratislava on September 5-8, 2018, which allowed an exchange of experience with colleagues from universities abroad, involved in teaching pathophysiology.

Students interested in the research activity have the opportunity to be recruited in the Student Scientific Circle "Signaling, kinetics and bioenergetics of pathological and adaptive cell processes" conducted in collaboration with the Department of Biophysics of the 3rd Department of Functional Sciences, and to work under direct guidance of the teaching staff of the discipline and to participate actively in the national student scientific sessions.

10. Evaluation

| Type of activity | 10.1 Evaluation criteria | 10.2 Evaluation methods | 10.3 Percent from the final mark |
|------------------|---|--|----------------------------------|
| 10.4 Lecture | <p><i>Knowledge for 5:</i> Definitions, classifications, causes responsible for the occurrence of a disorder /dysfunction and of the main implications of several disorders for dental medicine</p> <p><i>Knowledge for 10:</i> Definitions, classifications, causes responsible for the occurrence of a disorder /dysfunction and of the main implications of several disorders for dental medicine; the main pathophysiological</p> | <p><i>Continuous evaluation:</i> 1 seminar consisting of 20 MCQs from the first six lectures</p> <p><i>Final evaluation:</i> 50 MCQs</p> | <p>10%</p> <p>50%</p> |

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| | mechanisms involved in occurrence of disorders, correlations of the mechanisms with the clinical symptoms and knowledge of the implications for dental medicine of the studied disorders | | |
| 10.5 Laborator/Stagiu | <p><i>Knowledge for 5:</i> The existence of a suitable medical vocabulary, the identification of the pathological results of the studied investigations</p> <p><i>Knowledge for 10:</i> Identification of all pathological changes, possible causes underlying the changes, interpreting the significance of the results of investigations and assessing their importance for dental medicine.</p> | <p><i>Continuous rating:</i> - 1 practical evaluation, consisting of a 20 MCQs, including interpretation of the investigations / analysis bulletins from the material handed over to the practical lab until the date of the verification; - activity at practical work</p> <p><i>Final evaluation:</i> practical exam - <i>oral</i> exam preceding the theoretical examination; includes the interpretation of 2 functional and laboratory exploration bulletins (ECG, analysis bulletins, etc.) and 20 MCQs.</p> | <p>7.5%</p> <p>7.5%</p> <p>25% (15+10%)</p> |
| 10.6 Minimum performance standard | | | |
| <p>Knowledge of terminology and understanding of the pathophysiological mechanisms underlying the main cardiovascular, respiratory, hematological, renal, digestive, endocrine and metabolic disorders and understanding of their implications for DM.</p> <p>Knowledge of terminology, recognition of pathophysiological changes of parameters used in routine paraclinical diagnosis.</p> | | | |

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| Date of completion 2.11.2018 | Signature of the course instructor Ioana Mozoș, MD, PhD, Associate Professor | Signature of the practical laboratory instructor Ioana Mozoș, MD, PhD, Associate Professor |
| Signature of the Head of the Pathophysiology Discipline: Professor Danina Muntean, MD, PhD | | |
| Date of approval in the department 2.11.2018 | Signature of the Head of the Department: Professor Virgil Păunescu, MD, PhD | |