



## Course Regime

Course: **Biochemical markers**

Study Programme:

**Medicine**                  Dental Medicine

Year of the Course: 1   2   3   4   5   6

Semester:

Winter                      **Summer**

Course type:

Compulsory                **ELECTIVE**

Number of ECTS credits: **3**

Lecturer(s): **Prof. dr. Tea Lanišnik Rižner**

Participating Organisational Units (Departments and Institutes):  
Institute of Biochemistry

Date of Issue: 15. 9. 2019

## **A. General part** (*applies to compulsory and elective courses*)

### **1. Course objectives**

Students are introduced to different types of biomarkers, to cutting edge methodological approaches for identification of novel biomarkers, to different phases in the process of biomarker discovery, to basic diagnostic characteristics of biomarkers and to selected cases of biomarkers.

### **2. Comprehensive outline of the course organisation**

Organized study activities include lectures and seminars.

Attendance at the organized study activities is obligatory. In the case that the student cannot attend the organized study activities due to justified reason, she/he has to inform the lecturer in advance. In the case that the student cannot attend her/his presentation of seminar work, due to justified reasons, she/he has to arrange for replacement with her/his colleagues. The replacement has to be agreed by the lecturer in advance.

### **3. Description of on-going assessment of knowledge and skills**

### **4. Required conditions for the final examination (Course Exam)**

Attendance at organised study activities (lectures and seminars).

### **5. Final assessment and examination of knowledge and skills (Course Exam)**

The knowledge acquired at the elective course is assessed at the final seminar exam. Seminar exam includes preparation and presentation of seminar work. Students have to review published scientific and clinical studies about the selected topic and have to present their findings in written and oral form. Seminar work is prepared individually or in pairs.

Students submit the seminar in written form, present and defend it orally. Written form is prepared as Power Point presentation, which includes up to 15 pages. This document has to be sent to the lecturer via e-mail one week before oral presentation. Oral presentation is limited to 20 minutes, after that time the lecturer proceeds with questions and discussion.

The final grade is composed from grades of the written work and oral presentation. Written work is graded as first submitted to the lecturer. Grade of the written work includes evaluation of the structure of the seminar (aims of the seminar, introduction, key findings, literature) and appropriateness of the content. Oral presentation is graded according to clarity, considering time limitation and appropriateness of the content and responses to questions.

Seminar exam is graded according to the »Regulations for the Assessment of Knowledge and Skills for the Single-Cycle Master Study Programmes Medicine and Dental Medicine« of the Faculty of Medicine, University of Ljubljana. In the case of a negative grade, the student has to correct and modify the written seminar work and has to present and defend it once again orally.

### **6. Other provisions**

Application to the final exam proceeds according to the »Regulations for the Assessment of Knowledge and Skills for the Single-Cycle Master Study Programmes Medicine and Dental Medicine« of the Faculty of Medicine, University of Ljubljana.

### **7. Fundamental study material and Supplement reading**

Lectures and selected chapters from the textbook *Biomarkers In Medicine, Drug Discovery, and Environmental Health*; Vishal S. Valdyia, Joseph V. Bonventre (urednika), John Wiley & Sons, 2010; as well as recent review and research papers from the field of biomarkers.

## 8. Exam topics, clinical presentations and skills

### MOLECULAR BASIS OF BIOMARKERS:

-different biomolecules as potential diagnostic and prognostic markers (DNA, RNA molecules, individual proteins, metabolites, panels of these biomolecules).

### DEVELOPMENT OF BIOMARKERS:

-different biological samples as a source of biomarkers;  
-state of the art methodological approaches for search of novel biomarkers (omics approaches: genomics, transcriptomics, proteomics and metabolomics);  
-pre-analytical and analytical variables (standard operating procedure for collection, processing and storage of samples, appropriate analytical methods, appropriate statistical evaluation);  
-overview of different phases in biomarker discovery (discovery phase, validation phase, clinical validation phase).

### DIAGNOSTIC CHARACTERISTICS OF BIOMARKERS:

-evaluation of biomarkers based on ROC curves and AUC ;  
-basic diagnostic characteristics (specificity, sensitivity, positive and negative predictive values);  
-diagnostic and prognostic algorithms.

### SELECTED CASES OF BIOMARKERS:

-biomarkers in pre-clinical phases of development (panel of metabolites and proteins as potential diagnostic biomarkers of endometriosis);  
-biomarkers in routine clinical application (CA-125, HE-4, ROMA algorithm and ovarian cancer, PSA and prostate cancer, ...);  
-new approaches: MammaPrint®, Prosigna®, Oncotype®, Mammostrat®,...

## 9. Other information

### B. Elective Courses *(considered as Elective Course Announcement)*

#### 1. Participating main and guest lecturers

Prof. dr. Tea Lanišnik Rižner

#### 2. Estimated time period in the semester

Summer semester

#### 3. Maximum number of students for the elective course (if the number of students able to attend the course is limited)

30 students

4. Please specify if the elective course is available in English for incoming international students (Erasmus + and others). Please specify any additional conditions in the case that the elective course is available for visiting students.

**If needed, this elective class can be offered in English in the school year 2019/2020.**