

Study Programme: Master Academic Studies in Biochemistry
Course Unit Title: Experimental methods for determination of bioactivity
Course Unit Code: IB-510
Name of Lecturer(s): Associate Professor Ivana Beara
Type and Level of Studies: Master of Science Degree
Course Status (compulsory/elective): elective
Semester (winter/summer): winter
Language of instruction: English
Mode of course unit delivery (face-to-face/distance learning): Face-to-face
Number of ECTS Allocated: 6
Prerequisites: None
<p>Course Aims:</p> <p>The goal of the course is to provide students with theoretical knowledge and practical skills for the purpose of estimating biological activities of pharmacologically active compounds and natural products. Furthermore, the goal of the course is to develop students' ability to independently choose appropriate methodology for testing selected biological activity.</p>
<p>Learning Outcomes:</p> <p>By the end of this course, students will be able to (1) understand basic principles of methods for evaluation of biological activities and difference between <i>in vitro</i>, <i>in vivo</i> and <i>ex vivo</i> tests, (2) demonstrate creativity in the selection of methods, depending on the objective and stage of experiment, (3) understand basic principles and ethics in working with laboratory animals, (4) independently apply the appropriate experimental procedures in the study of biological activities, (5) processes data independently, critically present the results and conclude.</p>
<p>Syllabus:</p> <p><i>Theory</i></p> <p>Types of biological activities. Basic principles of biochemical assays. <i>In vitro</i>, <i>in vivo</i> and <i>ex vivo</i> assays. Use of laboratory animals in the study of biological activities. Application of tissue culture in bioassays. The selection of appropriate experimental method, substrate, target molecules, activators/inhibitors of biological response, method for detecting bioactivity and way of presenting results. Detailed review of selected biological activities: anti-oxidant, anti-inflammatory, anti-cancer, antiviral, antimicrobial, antimutagenic, antifungal, antibiotic, anticoagulant, etc. Selected examples of <i>in vitro</i>, <i>in vivo</i> and <i>ex vivo</i> methods for study of various biological activities.</p> <p><i>Practice</i></p> <p>Introduction to design of experiments. Evaluation of anti-inflammatory, anti-oxidant and antimicrobial potential of selected plant extracts, essential oils and natural products.</p>
<p>Required Reading</p> <ol style="list-style-type: none"> 1. P. Shiqi, Z. Ming: <i>Pharmaceutical Bioassays: Methods and Applications</i>, John Willey & Sons, USA, 2009. 2. M. I. Choudhary, W. J. Thomsen, <i>Bioassay Techniques For Drug Development</i>, Informa Healthcare, 2001. 3. L. Bohlin, J. G. Bruhn: <i>Bioassay Methods In Natural Product Research And Drug Development</i>, Kluwer Academic Publishers, 1999. 4. Journals: Journal of Pharmaceutical and Biomedical Analysis, Journal of Biochemical and Biophysical Methods, Methods in Enzymology, Journal of Microbiological Methods, Laboratory Animals, etc.

Weekly Contact Hours: 5 (75)	Lectures: 2 (30)	Practical work: 3 (45)	
Teaching Methods: Lectures, laboratory work, seminar(s)			
Knowledge Assessment (maximum of 100 points): 100			
Pre-exam obligations	points	Final exam	points
Active class participation	10	written exam	60
Practical work	20	oral exam	
Preliminary exam(s)		
Seminar(s)	10		
The methods of knowledge assessment may differ; the table presents only some of the options: written exam, oral exam, project presentation, seminars, etc.			