

| NAME OF THE COURSE | | Genotoxicity and how to investigate it | | | | |
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| Code | PMB531 | Year of study | 1. | | | |
| Course teacher | Assist. Prof. Željana Fredotović, PhD | Credits (ECTS) | 2,0 | | | |
| Associate teachers | | Type of instruction (number of hours) | L | S | E | F |
| | | | 15 | | 15 | |
| Status of the course | elective | Percentage of application of e-learning | 10% | | | |
| COURSE DESCRIPTION | | | | | | |
| Course objectives | To provide students basic knowledge about genotoxicity and genotoxic agents, consequences at the molecular and cellular levels, and experimental methods of genotoxicity analysis. Introduce students to the examples from everyday life and ways of assessing the impact of genotoxic compounds on human health. | | | | | |
| Course enrolment requirements and entry competences required for the course | None. | | | | | |
| Learning outcomes expected at the level of the course (4 to 10 learning outcomes) | <p>After passing the exam, the student will:</p> <ol style="list-style-type: none"> 1. Know the main sources of genotoxic compounds around us 2. Gain knowledge about the action of genotoxic compounds on DNA 3. Know the basic experimental methods for genotoxicity detection 4. Be able to independently perform a simple test for genotoxicity analysis 5. Be able to use an epifluorescence microscope in the analysis of genotoxicity | | | | | |
| Course content broken down in detail by weekly class schedule (syllabus) | <p>Lectures</p> <ol style="list-style-type: none"> 1. Introduction to genotoxicity, historical overview, division of genotoxic compounds, effect of genotoxic compounds on DNA (3 hours) 2. Experimental tests for genotoxicity testing_1. part (3 hours): bacterial reverse mutation test in <i>Salmonella Tympthymurium</i> (Ames test), bacterial reverse mutation test in <i>E. coli</i>, gene mutation test in mammalian cell culture, gene mutation test in <i>Saccharomyces cerevisiae</i>, spot test in mice 3. Experimental tests for genotoxicity testing_2. Part (3 hours): In vitro chromosomal aberration test, micronucleus test, comet test, sister chromatid exchange test, <i>Allium</i> test 4. Genotoxic compounds around us. Types of genotoxins in food of plant and animal origin. Genotoxins produced by food processing. Genotoxins from the environment. Genotoxic compounds in cosmetics and medicines (3 hours) 5. Assessment of the impact of genotoxic compounds on human health (3 hours) <p>Exercises: Microelectrophoresis of single cells in agarose gel (comet test)</p> <ol style="list-style-type: none"> 1. Preparation of solutions: LMP agarose, NMP agarose, lysis solution, denaturation and electrophoresis solution, Tris-Cl solution (3 hours) 2. Preparation of microscopic slides in agarose solution (2 hours) 3. Preparation and application of cells on microscopic slides precoated with agarose gel and cell lysis (2 hours) 4. Cell denaturation and electrophoresis (3 hours) 5. Rinsing, dehydration, drying and staining of slides (2 hours) 6. Microscopy and calculation of DI (genotoxicity index) (3 hours) | | | | | |
| Format of instruction | <input type="checkbox"/> lectures <input type="checkbox"/> seminars and workshops <input checked="" type="checkbox"/> exercises <input type="checkbox"/> <i>on line</i> in entirety | | <input type="checkbox"/> independent assignments <input checked="" type="checkbox"/> multimedia <input checked="" type="checkbox"/> laboratory <input type="checkbox"/> work with mentor | | | |

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| | <input type="checkbox"/> partial e-learning <input type="checkbox"/> field work | | <input type="checkbox"/> (other) | | | |
| Student responsibilities | The obligations of students are regular attendance at classes (lectures) and independent preparation of materials for essey. | | | | | |
| Screening student work (name the proportion of ECTS credits for each activity so that the total number of ECTS credits is equal to the ECTS value of the course) | Class attendance | 0,1 | Research | | Practical training | |
| | Experimental work | 0,4 | Report | | (Other) | |
| | Essay | | Seminar essay | | (Other) | |
| | Tests | | Oral exam | 1,5 | (Other) | |
| | Written exam | | Project | | (Other) | |
| Grading and evaluating student work in class and at the final exam | Oral exam (75%), experimental work (20%) and class attendance (5%) are graded. | | | | | |
| Required literature (available in the library and via other media) | Title | | | | Number of copies in the library | Availability via other media |
| | Dhawan A. and Bajpayee M. ed. 2013. Genotoxicity assessment, Methods and Protocols, 1st edition, Humana Press, Springer Science+Business Media, New York. | | | | | |
| | Fredotović Ž. 2018. Genotoxicity and how to investigate it, internal script | | | | | Web material |
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| Optional literature (at the time of submission of study programme proposal) | Pharmaceu Sci G., Saks M., Upreti S. and Dang R. 2017. Genotoxicity: Mechanisms, Testing Guidelines and Methods, Glob J Pharmaceu Sci. Haverić S., Haverić A., Hadžić M. 2014. Uvod u genotoksikologiju. Pojskić L., editor. Uvod u genetičko inženjerstvo i biotehnologiju, 2. izdanje. Institut za genetičko inženjerstvo i biotehnologiju (INGEB), Sarajevo. Dani F., Veiga-Menoncello Anna C.P., Marin-Morales M.A. 2014. DNA damage induced by diet. In book: Toxic Effects of Chemicals in Food, Chemical and Consumer Product Safety Edition: 1 Chapter: DNA damage induced by diet. Publisher: Research Signpost, Editors: Grasiela Dias de Campos Severi-Aguiar, Armindo Antonio Alves | | | | | |
| Quality assurance methods that ensure the acquisition of exit competences | Student questionnaire | | | | | |
| Other (as the proposer wishes to add) | | | | | | |