

Study program: Integrated academic studies of Pharmacy			
Type and level of the study program: integrated academic studies			
Course title: PHARMACOGENETICS (PhV-PHGEN)			
Teacher: Nataša,S,Vučinić			
Course status: elective			
ECTS Credits: 3			
Condition: Biology with human genetics; Pharmacokinetics			
Course aim The aim of the course is to teach students the latest knowledge related to biochemical and physiological effects of drugs on the molecular level and their mechanisms of action. To explain them clinical testing of target genes whose variation affects drug metabolism and can give a different response to the drug. Analysis of the effects of drugs may represent a good basis both for better and more rational therapeutic use and for designing new, potentially curative substances and therapeutic approaches. The knowledge of pharmacogenetics is essential for the formation of "personalized therapy".			
Expected outcome of the course: That students learn the specific technologies and methods for the identification of gene mutations and the functional consequences of mutations. To understand how genetic polymorphisms of enzymes and drug transporters may be associated with increased adverse drug reactions. To be able to relate important examples of pharmacogenetic biomarkers for the prediction of adverse reactions to the drug. To understand the use of pharmacogenetic regulatory guides for drug development. Students will realize the importance and ethical use of pharmacogenetics and personalized medicine			
Course description <i>Theoretical education</i> 1. Concept of pharmacogenetics and its historical development 2. Pharmacogenetics and pharmacoeconomics; differences and significance 3. Pharmacokinetics of drugs: mechanisms of drug action, drug- receptor interactions: basis of pharmacodynamics 4. Classification of receptors 5. Molecular basis for heritage (monogenic, multifactorial and polygenic) 6. Main types of genetic variation (6 main classes) and their consequences 7. Methods to identify mutation and to investigate their function 8. Pharmacogenetic polymorphisms 9. Clinically important genetic polymorphisms in enzymes 10. Clinically important genetic polymorphisms in drug transporters 11. The significance between pharmacogenetic therapy for different diseases 12. Connection between certain HLA alleles and adverse drug effects 13. Ethical issues in pharmacogenetics and the use of biobanks 14. Preventive and predictive significance of personalized medicine 15. Personalized medicine in future from pharmacogenetics to pharmacoeconomics <i>Practical education: exercises, other forms of education, research related activities</i> Exercises-tasks- examples and practice choosing and dosing drugs based on pharmacogenic analysis of targeted genes Laboratory work: DNA isolation, PCR, RFLP, electrophoretic methods Students research, essays			
Literature <i>Compulsory</i> 1. Thompson&Thompson. Genetics in Medicine, Nussbaum,Saunders Elsevier, 2007. 2. Turnpenny P, Ellard S. Emery's Elements of Medical Genetics, Churchill Livingstone, 2007. <i>Additional</i> 1. Strachan T, Read AP. Human Molecular Genetics 4th Edition, Garland Publishing, UK, 2011. 2. Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P. Molecular Biology of the Cell, 6th Ed, Garland Science, 2014.			
Number of active classes			Other:
Lectures: 30	Practice: 15	Other types of teaching:	Research related activities:
Teaching methods Lectures and practice			
Student activity assessment (maximally 100 points)			
Pre-exam activities	points	Final exam	points
Lectures		Written	60
Practices	10	Oral	
Colloquium		
Essay	30		