UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
IMPH-451	Pharmaceutical Biotechnology and Pharmacogenomics/ Φαρμακευτική Βιοτεχνολογία και Φαρμακογωνιδιωματική	5
Prerequisites	**Department**	**Semester**
IMPH-123	Health Sciences	Fall/Spring
Type of Course	**Field**	**Language of Instruction**
Compulsory	Pharmacy	Greek/ English
Level of Course	**Lecturer(s)**	**Year of Study**
1st Cycle	Dr Androulla Miliotou	4th
Mode of Delivery	**Work Placement**	**Corequisites**
Face-to-Face	N/A	N/A

Course Objectives:

The main objectives of the course are to:

1. Give students an understanding of the principles of human genetics and genomics as they apply to improving the problems in drug therapy optimization and patient care, thus providing basic understanding of discipline of pharmacogenomics.
2. To teach the basic principles of Pharmaceutical Biotechnology and to emphasize on biotechnological products as therapeutic approaches
3. Give students an understanding of the genetic basis of variability in drug response can contribute to drug efficacy and toxicity, adverse drug reactions and drug-drug interaction
4. Emphasize the understanding of the genetic component of patient variability to deliver effective individualized pharmaceutical care.
5. Enable pharmacy students to better understand and manage the new genomics based diagnostic tools as they become available as well as make best treatment choices.

Learning Outcomes:

After completion of the course students are expected to be able to:

1. Display knowledge and understanding of the basic principles of Pharmaceutical Biotechnology

2. Understand the basic principles of human genetics and heredity as they apply to inter-individual variation in treatment response
3. Demonstrate an ability to apply the principles of molecular and cellular biology to explain the genetic basis of variability in drug response
4. Display knowledge and describe how genetic variability in genes encoding drug metabolizing enzymes, drug transporting proteins, and drug receptors (targets) can contribute to variability in drug disposition and action, leading to changes in pharmacokinetics, pharmacodynamics, and clinical outcome
5. Understand the impact of Pharmacogenomics in different therapeutic areas. Discuss case studies reporting the clinical consequences of pharmacogenomics on therapeutic efficacy or toxicity
6. Apply pharmacogenomic concepts to a particular drug therapy to solve relevant problems in pharmaceutical care
7. Recognize the societal and ethical implications of genetic testing and the resultant individualization of drug therapy

Course Content:

1. Introduction to pharmaceutical biotechnology and pharmacogenomics
2. Gene technologies in drug development (recombinant DNA technology, cloning vectors, genomic hybridization with microarrays, PCR)
3. Biochemical analysis of recombinant proteins
4. Production and processing of Pharmaceutical Biotechnology products
5. Pharmacological and pharmacogenomics approaches to improve drug delivery clinical outcomes, Personalized medicine
6. Genetic polymorphism of CYP isoenzymes and drug transporters
7. New pharmacological classes of drugs (antibodies, antisense RNAs, siRNAs, aptamers)
8. Clinical pharmacogenomics and drug interactions; Practical utility of various pharmacogenomics resources in the clinical setting
9. Pharmaceutical biotechnology of monoclonal antibodies (mAbs); Pharmacodynamics and pharmacokinetics of mAbs; Pharmacogenomics of mAbs, Development of new innovative molecularly targeted cancer therapeutics; Cancer pharmacogenomics and biotherapeutics
10. *Examples of drugs related to the pharmacogenomics application in clinical practice:* a) Pharmacodynamics- and pharmacogenomics-guided warfarin dosing in individual patients; b) Pharmacological assessment of tamoxifen-paroxetine interaction and pharmacogenomics of tamoxifen in oncology; c) Thiopurine drugs and pharmacogenomics of TPMT enzyme in guiding dosage schemes; d) Pharmacogenomics of antidepressant and psychotropic drugs; e) pharmacogenomics of cardiovascular system
11. Pharmacogenomics of monoclonal antibodies in cancer treatment, organ transplants and inflammatory diseases
12. Vaccines

13. Gene Therapy, Stem Cell Technology

Learning Activities and Teaching Methods:

Lectures, Discussions

Assessment Methods:

Midterm exam, final exam

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Pharmaceutical Biotechnology: Concepts and Applications.	Gary Walsh	John Wiley & Sons: West Sussex.	2007	978-0470012451
Pharmaceutical Biotechnology: Fundamentals and Applications.	Daan J. A. Crommelin, Robert D. Sindelar, Bernd Meibohm	Informa Healthcare: New York.	2008	9781420044386
Φαρμακογονιδιωματική και Πρωτεϊνωματική, Τα Εργαλεία Της Εξατομικευμένης Ιατρικής (1η Έκδοση)	Steven H.Y Wong, Mark W. Linder, Roland Valdes, Jr	Παρισιάνου Α.Ε.	2011	9789603947219

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Pharmacogenomics: The Search for Individualized Therapies.	J. Licinio and M.-L. Wong	Wiley-Blackwell	2009	9783527616305