UCLouvain

wfarm2139

2021

Pharmacocinetic, genomics and toxicology

4.00 credits	37.5 h	Q1

Teacher(s)	Bindels Laure (coordinator) ;Elens Laure ;Haufroid Vincent ;
Language :	French
Place of the course	Bruxelles Woluwe
Main themes	A. This part of the class aims to introduce the basic concepts in toxicology that will allow the students to understand the rational of the current legal toxicological tests. Mechanisms of toxicity will be discussed and analyzed at various levels, from the generation of reactive species and their interactions with biological macromolecules, to the targeting of specific organs and the development of cancer and developmental malformations. Concepts related to risk evaluation are presented through the discussion and analysis of the results of in vivo and in vitro tests. B. In this part of the class, students are reminded of some basic notions of genetics, including the definition of various types of polymorphism (SNP, CNV, ..). The class focusses mainly on the influence of genetic polymorphisms on the clinical response to drug therapy (drug efficacy and side effects occurrence). Future prospects in personalized medicine are also presented.
Learning outcomes	**At the end of this learning unit, the student is able to :** 1 At the end of this teaching unit, the student will be able: - to explain the molecular mechanisms leading to a toxic response. - to summarize the procedures of risk evaluation. - to justify the toxicity of specific compounds for one organ in particular using evidence-based and scientific arguments. - to build a valid experimental plan to evaluate the toxicity of a compound and the underlying mechanisms. - to critically evaluate the relevance of an experimental plan aiming to test the toxicity of a given compound. - to formulate reasoned conclusions on the basis of a table presenting the results of a toxicological test. - to understand (1) the source of diversity due to the human genome and (2) the importance of taking into account this variability to explain the inter-individual difference in the clinical response to drug therapy. The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled 'Programmes/courses offering this Teaching Unit'.
Content	This class will introduce basic concepts in toxicology. The **pharmacokinetics** part aims to integrate the 4 processes governing the exposition to toxic compounds (Toxicokinetics). We will see how a toxic goes through the biological barriers to enter the organism (Absorption), whether and to what extent they diffuse in the tissues (Distribution), how they undergo chemical transformation (Metabolism) in order to be excreted in biological fluids. We will then consider various situations affecting the kinetics outcome of xenobiotiques (DDI, hepatic and kidney failure). The second part of the class aims to introduce the **basic concepts in toxicology** that will allow the students to understand the rational of the current legal toxicological tests. Mechanisms of toxicity will be discussed and analyzed at various levels, from the generation of reactive species and their interactions with biological macromolecules, to the targeting of specific organs and the development of cancer and developmental malformations. Concepts related to risk evaluation are presented through the discussion and analysis of the results of in vivo and in vitro tests. In the last part of the class (**pharmacogenomics**), students are reminded of some basic notions of genetics, including the definition of various types of polymorphism (SNP, CNV, ..). The class focusses mainly on the influence of genetic polymorphisms on the clinical response to drug therapy (drug efficacy and side effects occurrence). Future prospects in personalized medicine are also presented.
Bibliography	Les dias du cours et les articles scientifiques vus au cours sont disponibles sur Moodle. Le principal livre de reference est Burcham, Introduction to Toxicology, 2014, pdf disponible sur Moodle.
Faculty or entity in charge	FARM

Programmes containing this learning unit (UE)

Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Pharmacy	FARM2M	4		🔍
Master [120] in Biomedicine	SBIM2M	4		🔍