

Faculty of Medicine



FARM2272 Toxicology

[30h] 3 credits

This course is taught in the 1st semester

Teacher(s): Pedro Buc Calderon
Language: French
Level: Second cycle

Aims

To allow the students the understanding of the main mechanisms of toxicity as well as to give them a basic knowledge for the management of a toxicological dossier.

Main themes

To discuss the basic concepts of regulatory toxicology. The risk assessment procedure is discussed by using both in vitro and in vivo methods. The mechanisms of toxicity are discussed by starting from the formation of reactive intermediates, followed by their interaction with biomolecules, loss of cell homeostasis and finally cell death.

Content and teaching methods

The lecture is composed by 6 chapters.

- (1) Regulatory toxicology: basic concepts (dose; dose-effect; risk-hazard; NOEL, ADI, ..); critical analysis of a toxicological dossier.
- (2) Mechanisms of toxicity: metabolic activation; formation and properties of reactive intermediates (free radicals, electrophiles, ..); intracellular targets (lipid peroxidation, covalent binding to proteins, mutation and cancer).
- (3) Ionic and energetic deregulation: oxidative stress; activation of calcium-dependent hydrolases; hypoxia and ATP.
- (4) Cellular defence systems: antioxidant enzymes (superoxide dismutases, catalase, glutathione peroxidases, #); vitamins and oligo-elements (a-tocopherol, ascorbic acid, retinal, b-carotenoids, selenium, #).
- (5) Types of cell death: apoptosis (bcl-2, p53, caspases, #) and necrosis.
- (6) Organ-toxicity: Tobacco and lung toxicity; arteriosclerosis and LDL oxidation.

During the lectures the students play an active role by answering to the frequent questions raised by the teacher.

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Some pre-requisites are suggested. Organic chemistry, biochemistry, cell biology, xenobiotic metabolism, histology and cytology.

Evaluation: written test

Support: power point and iCampus

Other credits in programs

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| BIOL22/A | Deuxième licence en sciences biologiques (Biologie moléculaire, cellulaire et humaine) | (3 credits) | |
| BIOL22/B | Deuxième licence en sciences biologiques (Biologie des organismes et des populations) | (3 credits) | |
| ESP3DS/TI | Diplôme d'études spécialisées en santé publique (santé au travail - toxicologie industrielle) | | Mandatory |
| FARM22 | Deuxième année du grade de pharmacien | (3 credits) | Mandatory |
| TOX21 | Première licence en sciences biomédicales (toxicologie) | (3 credits) | Mandatory |