

Faculty of Medicine



BCHM1230 Cell and molecular biology

[22.5h+22.5h exercises] 4 credits

Teacher(s): Pierre Courtoy
Language: French
Level: First cycle

Aims

To discover the power of integrating morphological, biochemical and physiological aspects of cell processes, both qualitatively and quantitatively. To reach an in-depth knowledge, both ultrastructural and biochemical, of the various subcellular and extracellular compartments, in relation with their functions. To understand the basic regulation of cellular differentiation and population control. And to understand how exemplary diseases can be explained at the cell and molecular level.

Main themes

Lectures will (i) emphasize the functional advantages of various forms of subcellular and tissular compartmentation in a dynamic perspective (structural biology) ; (ii) integrate molecules in this compartmentation context (cellular biochemistry) ; (iii) translate elementary cellular reactions into visible body responses (cellular physiology) ; (iv) reveal the long-term temporal dimension of life, by presenting cell biology as a series of appropriate responses to external challenges (cellular evolution) ; and (v) present exemplary pathologies which are best explained from a cell biological perspective (cellular pathology). Practical courses lead the student to (i) recognize and identify the various forms of life organization at the ultrastructural level, with emphasis on methods, scale and topological relations ; and (ii) understand and evaluate analytical approaches to study cell biology.

Content and teaching methods

Lectures cover the following topics : (1) general organisation of biological membranes ; (2) material fluxes across membranes ; (3) information exchange across membranes ; (4) the secretory apparatus ; (5) the endocytic apparatus ; (6) mitochondria and peroxysomes ; (7) the intracellular matrix ; (8) the extracellular matrix ; (9) control of gene expression ; (10) control of cell populations. Practicals are organized as five afternoons per student group devoted to self-learning under supervision followed by exercises.

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

Prerequisite : general biology, histology and biochemistry.

Examination : the written exam is based on a series of open questions, several of which are testing the capacity to integrate various informations learned throughout the course, and on the analysis of one or two ultrastructural document(s) within a molecular and functional context.

Individual support : printed notes, CD-ROM of practicals, for sale and accessible via the Intranet, recommended textbooks available at the Faculty library

General Faculty support : one academic member, one assistant, audiovisual facilities for self-learning

Other credits in programs

DENT12BA	Deuxième année de bachelier en sciences dentaires	(4 credits)	Mandatory
MED12BA	Deuxième année de bachelier en médecine	(4 credits)	Mandatory
SBIM12BA	Deuxième année de bachelier en sciences médicales	(4 credits)	Mandatory
SBIM1PM	Année d'études préparatoires au master en sciences biomédicales	(4 credits)	Mandatory