## UCLouvain

2019

wfarm1282t

In view of the health context linked to the spread of the coronavirus, the methods of organisation and evaluation of the learning units could be adapted in different situations; these possible new methods have been - or will be - communicated by the teachers to the students.

	2 cre	edits	20.0 h	Q1				
Teacher(s)		Michiels Thomas ;						
Language :		French						
Place of the course		Bruxelles Woluwe						
Prerequisites       - Principles of biology and basic biochemistry (nature and function of macromolecules : prometabolism ; biological membranes ; energy)         - Cellular biology : compartments of the cell, membranes, transport, function of organelles         - Molecular biology : principles of gene expression in bacteria and in eucaryotes         The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that are specified at the end of this sheet.					unction of organelles eucaryotes			
Main themes		The prerequisite(s) for this Teaching Unit (Unité d'enseignement – UE) for the programmes/courses that offer this Teaching Unit are specified at the end of this sheet. <b>Table of contents :</b> <b>A. General introduction</b> 1. Discovery and description of microorganisms 2. Definition of Microbiology (Eucaryotes versus procaryotes ; viruses versus bacteria) <b>B. Bacteriology</b> <b>1. Growth of bacteria</b> a. Growth conditions (temp., pH, salinity, pressure') b. Nutrients c. Growth curve d. Methods used to measure bacterial growth e. Evolution <b>2. Structure of bacteria</b> a. Size and shape b. The bacterial cell : - Cytoplasm components - Plasma membrane (phospholipid bilayer) and proteins (F0F1 ATP synthetase, respiratory chain components permeases, export and secretion factors) - Bacterial wall : Peptidoglycan, Gram staining - Morphology of Gram-positive bacteria (including periplasm, outer-membrane, LPS) - Surface structures (plii, flagellum, capsule) - Spores - At the community level : formation of biofilms <b>3. Membranes and transport of molecules</b> a. Import - Perineases (H- sympoters, ATPase-driven, phosphorylation-driven : PTS) b. Export and secretion <b>3. The E.</b> coli chromosome, its replication and error rate of polymerases b. Plasmids (replication, coding capacity, copy number, compatibility) - Experison of bacteria <b>4. Genetic information</b> <b>5.</b> The E. coli chromosome, its replication and error rate of polymerases b. Plasmids (replication, coding capacity, copy number, compatibility) c. Expression of bacteria (enscription and translation signals) <b>4. Transcription regulation :</b> <b>• operon (ex.</b> , NE Sexpone, signam <sup>******</sup> ) <b>• weo-component systems</b> (hohosphorelays)						
		""""ional regulation (small RNAs)						

Jniversité catholique de Louvain en-cours-2019-wfarm1282t
---

	Université catholique de Louvain en-cours-2019-wfarm1282t						
	"inter'bacterial regulation : quorum sensing						
	e. Mutations						
	- mutation types and frequency						
	- detection of mutants (screening versus selection)						
	f. Bacteriophages						
	- ', lytic cycle and lysogeny						
	g. Transfer of genetic information						
	- transformation, transduction, conjugation, transposition						
	<ul> <li>limitation of genetic transfer (restriction-modification, the CRISPR-Cas system)</li> <li>Anti-bacterial agents and antibiotics</li> </ul>						
	<ul> <li>5. Anti-bacterial agents and antibiotics</li> <li>a. Disinfectants and antiseptics (chemicals, heat, filtration, UV and gamma radiations)</li> <li>b. Antibiotics: antibiotic examples, targets and mode of action</li> </ul>						
	- metabolism						
	- replication and transcription						
	- Ribosomes						
	- cell wall synthesis						
	- membranes						
	c. Antibiotic resistance						
	- antibiotic inactivation						
	- target modification or overproduction						
	- target replacement						
	- efflux pumps						
	d. Abuse and misuse of antibiotics, and origin of resistances						
	C. Virology						
	1. General introduction						
	a. Historical discoveries in Virology						
	b. Virion morphology and structure (components : nucleic acids, capsid, envelope)						
	c. The viral cycle : Attachment, uncoating and entry, gene expression, réplication, assembly, egress (according to the nature of the virus)						
	d.Transmission and propagation						
	e. Classification						
	2. Selected examples illustrating the diversity of replication cycles according to the genome and virion properties.						
	a. SV40, a small non-enveloped DNA virus						
	b. poliovirus, a positive-stranded non-enveloped RNA virus						
	c. influenza, a segmented, negative-straded RNA virus						
	d. HIV. a lentivirus (example of retrovirus)						
	Practicals on bacteriology, gene transfer and antibiotic resistance are organized as part of this course						
Aims	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".						
Contont	Introduction to the world of viruses and bacteria. Topics include :						
Content							
	- structure and organization of typical bacteria (Gram+ or Gram-)						
	- bases of bacterial functioning (compartmentalization, transport, energy)						
	- nature, functioning, and evolution of bacterial (and bacteriophage) genomes						
	- DNA transfer within the bacterial cell and between bacteria						
	- priniciples of antibiotics activity, and development of antibiotic resistance						
	- structure, organization and mode of replication of viruses that infect eucaryotic cells						
	- functioning of viruses and consequences of the infection, based on selected examples						
	Syllabus (texte + illustrations présentées au cours), disponible sur Moodle						
Bibliography							
- • •	Site Web d'initiation à la virologie (+ tests et quiz)						
	http://www.virologie-UCLouvain.be						
	Prescott, L. M., Harley, J. P. & D. A. Klein (2003). Microbiologie. Bruxelles : De Boeck						
Faculty or entity in	FARM						
abouty of entity in							
charge							

Programmes containing this learning unit (UE)							
Program title	Acronym	Credits	Prerequisite	Aims			
Bachelor in Medecine	MD1BA	2	WMEDE1112 AND WMDS1109	٩			
Bachelor in Dentistry	DENT1BA	2	WMEDE1112 AND WMDS1109 AND WMDS1105	٩			