


	<p>e. Mutations</p> <ul style="list-style-type: none"> - mutation types and frequency - detection of mutants (screening versus selection) <p>f. Bacteriophages</p> <ul style="list-style-type: none"> - , lytic cycle and lysogeny <p>g. Transfer of genetic information</p> <ul style="list-style-type: none"> - transformation, transduction, conjugation, transposition - limitation of genetic transfer (restriction-modification, the CRISPR-Cas system) <p>5. Anti-bacterial agents and antibiotics</p> <p>a. Disinfectants and antiseptics (chemicals, heat, filtration, UV and gamma radiations)</p> <p>b. Antibiotics: antibiotic examples, targets and mode of action</p> <ul style="list-style-type: none"> - metabolism - replication and transcription - Ribosomes - cell wall synthesis - membranes <p>c. Antibiotic resistance</p> <ul style="list-style-type: none"> - antibiotic inactivation - target modification or overproduction - target replacement - efflux pumps <p>d. Abuse and misuse of antibiotics, and origin of resistances</p> <p>C. Virology</p> <p>1. General introduction</p> <p>a. Historical discoveries in Virology</p> <p>b. Virion morphology and structure (components : nucleic acids, capsid, envelope...)</p> <p>c. The viral cycle : Attachment, uncoating and entry, gene expression, réplication, assembly, egress (according to the nature of the virus)</p> <p>d. Transmission and propagation</p> <p>e. Classification</p> <p>2. Selected examples illustrating the diversity of replication cycles according to the genome and virion properties.</p> <p>a. SV40, a small non-enveloped DNA virus</p> <p>b. poliovirus, a positive-stranded non-enveloped RNA virus</p> <p>c. influenza, a segmented, negative-straded RNA virus</p> <p>d. HIV, a lentivirus (example of retrovirus)</p> <p>Practicals on bacteriology, gene transfer and antibiotic resistance are organized as part of this course</p>
<p>Learning outcomes</p>	<p>At the end of this learning unit, the student is able to :</p> <p>After the course, the student will be able to</p> <ul style="list-style-type: none"> - Define essential terms used in bacteriology and virology - Describe the morphology and components of Gram-positive and Gram-negative bacteria - List and explain the role of factors involved in protein, metabolites and nucleic acids transpopt in bacteria (import, secretion, gene transfer....) - Decipher and explain a regulation pathway similar to those explained in the course - Propose an hypothetical signal transduction pathway explaining a given bacterial property - Explain the principle of the activity and specificity of antibacterial and antiviral agents <p>1</p> <ul style="list-style-type: none"> - List a series of major antibiotics (penicillin, sulfonamides, aminogluocosides...) and explain there mode of action - Deduce some steps of the replication cycle of viruses, based on their nature (DNA versus RNA viruses, segmented versus non-segmented geneomes, enveloped versus non-enveloped....) <p>In addition, the student will develop an analytical spirit and be able to</p> <ul style="list-style-type: none"> - find the limitations of result interpretations and so called « scientific demonstrations » - define the logics behind regulation pathways ; - interpret simple data and calculations on bacterial growth, mutation rates...
<p>Evaluation methods</p>	<p>The exam is organized as a written exam. The exam includes a section with multiple choice questions, and a section with short open-ended questions and/or exercices in which students will be evaluated on their capacity to implement their knowledge.</p> <p>For the students who attended the practicals, 3 points will be devoted to the evaluation of these practicals in the global mark of the exam (on 20 points). Evaluation of the practicals will be based on the technical skill of the student, the quality of the report and on the quality of answers to questions related to the practicals in the general exam.</p>

Teaching methods	Lectures and tutorial classes (possibly by Teams or live+streaming in case of problem). Practicals are organized in the framework of this course. Attendance to the practical is mandatory to validate the course.
Content	Introduction to the world of viruses and bacteria. Topics include : - 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 - principles 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
Inline resources	Files with informations, exercices and with slides presented in the course are available on MoodleUCL (https://moodleucl.uclouvain.be/).
Bibliography	Syllabus (texte + illustrations présentées au cours), disponible sur Moodle Prescott, L. M., Harley, J. P. & D. A. Klein. Microbiologie. Bruxelles : De Boeck
Other infos	For students who can not document a previous attendance to equivalent practicals in Microbiology, attendance is mandatory. In cas of absence to the practicals, the global mark for the course (including the theoretical part) will be set to 0/20 for the entire academic year.
Faculty or entity in charge	FARM

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Bachelor in Biomedicine	SBIM1BA	3	WMD1120 AND WMD1006 AND WSBIM1001	
Bachelor in Pharmacy	FARM1BA	3	WMD1120P	