

## Module XXIX: Impact and Application IIIB

### 1.1. Module Objectives

On completion of this module, the students will be able to:

- Explain various diagnostic techniques (culture, immunology and molecular methods)
- Explain the clinical application
- Describe the relationship between microbial pathogenesis with the development of products which are then used to prevent and treat disease, as well as products which are then used to detect disease. These include anti-virulence, anti-resistance, virulence-based products, vaccine development and diagnostic kits.
- Define the benefits and applications in the field of biotechnology related to products in the health sector

### 1.2. Module Data

Person in charge	Azzani Fibriani, PhD
Credits	3
Course	BM 4203 Diagnostic Microbiology BM 4207 Application of microbial pathogenesis in biotechnology
Module examination	Written test

#### 1.2.1. Sub-module I: Diagnostic Microbiology

Lecturer	Azzani Fibriani, PhD
Semester	8
Type of submodule / course	Elective
Credits	2
Workload - class lecture (hr/sem)	2 hours lectures, 2 hours structured activities, 2 hours individual study, 16 weeks per semester, and total 96 hours a semester
Workload details	Textbook reading assignment, group discussion, paper review, presentation
Classification within the curriculum:	General Studies / Compulsory Course/ Elective Course
Type of examination	Written
Language	Bahasa Indonesia
Course Target / Outcome	A. <u>Conceptual knowledge and Competence:</u> - Explain various diagnostic techniques (culture, immunology and molecular methods) - Explain the clinical application  B. <u>Scientific Skills:</u> - Determine the techniques to detect a pathogen
Teaching methods	Interactive Teaching

Contents (SAP)	
1	Detection with culture
2	Detection with biochemical test
3	Detection with immunological test : Rapid TEST and ELISA
4	Detection with molecular technique : PCR, Reverse Transcriptase (RT) PCR, quantitative PCR dan Real time PCR
5	PCR, sequencing, polimorphism and genotype determination
6	Transcription-Mediated Assay (TMA), Branched DNA, Microarray DNA
7	Mid-Term Test
8	Microarray protein
9	Pathogen in digestive system
10	Pathogen in respiration system
11	Pathogen in recirculation system (blood)
12	Easy cultivate pathogen in laboratorium
13	Hard cultivate pathogen in laboratorium
14	Presentation
15	Presentation
16	Final Test
Literature / Sources	<ul style="list-style-type: none"> <li>• Persing, D (editor). 2003. Molecular Microbiology : Diagnostic Principle and practise, ASM Press, Washington DC</li> <li>• Brooks G.F, Butel JS, Morse SA. 2004. Medical Microbiology. Mc Graw Hill. Singapore</li> <li>• Nath, SK, Revankar SG. 2006. Problem Based Microbiology. Elseiver. Philadelphia</li> <li>• Recent Papers</li> </ul>
Other specialties	

### 1.2.2. Sub-module II: Application of microbial pathogenesis in biotechnology

Lecturer	Ernawati A.Giri-Rachman, PhD; Azzani Fibriani, PhD; Dr. Debbie S. Retnoningrum
Semester	8
Type of submodule / course	Elective
Credits	2
Workload - class lecture (hr/sem)	2 hours lectures, 2 hours structured activities, 2 hours individual study, 16 weeks per semester, and total 96 hours a semester
Workload details	Textbook reading assignment, group discussion, paper review, presentation

Classification within the curriculum:	General Studies / Compulsory Course/ Elective Course
Type of examination	Written
Language	Bahasa Indonesia
Course Target / Outcome	<ul style="list-style-type: none"> <li>Describe the relationship between microbial pathogenesis with the development of products which are then used to prevent and treat disease, as well as products which are then used to detect disease. These include anti-virulence, anti-resistance, virulence-based products, vaccine development and diagnostic kits.</li> <li>Define the benefits and applications in the field of biotechnology related to products in the health sector.</li> </ul>
Teaching methods	Interactive Teaching
Contents (SAP)	
	1 introduction
	2 Anti-virulence Therapeutic Strategies
	3 Anti-virulence Therapeutic Strategies
	4 Molecules that Inhibit Bacterial Resistance Enzymes
	5 Efflux pump inhibitor, two component system inhibitor, and regulatory RNA
	6 Botulinum toxin and clostridium toxin as therapeutic agent
	7 Streptokinase as protein therapeutic
	8 Mid-Term Test
	9 Toxin subunits as adjuvants
	10 Virus like particle
	11 Vaccine development
	12
	13 Development of diagnostic kits
	14
	15 Group presentation
	16 Final Test
Literature / Sources	<p>Kenneth Murphy, Janeway's Immunobiology, 9th, Garland Science, 2017</p> <p>Osmel Fleitas Martínez, Marlon Henrique Cardoso, Suzana Meira Ribeiro and Octavio Luiz Franco, Recent Advances in Anti-virulence Therapeutic Strategies With a Focus on Dismantling Bacterial Membrane Microdomains, Toxin Neutralization, Quorum-Sensing Interference and Biofilm Inhibition, , Front. Cell. Infect. Microbiol, 2019</p> <p>Liu Y, Li R, Xiao X, Wang Z, Molecules that Inhibit Bacterial Resistance Enzymes., , Molecules, 2019</p>

	Xian-Zhi Li, Patrick Plésiat, Hiroshi Nikaido, The Challenge of Efflux-Mediated Antibiotic Resistance in Gram-Negative Bacteria, , Clinical Biology Reviews, 2015
	Brice Felden, Vincent Cattoir, Bacterial Adaptation to Antibiotics through Regulatory RNAs, Antimicrobial agents and chemotherapy, 2018
	<ul style="list-style-type: none"> <li>• he Botulinum Toxin as a Therapeutic Agent: Molecular Structure and Mechanism of Action in Motor and Sensory Systems.</li> </ul>
Other specialties	