

## Gene regulation and epigenetics; Code: PM E08C

### A- Basic Information

<b>Programme(s) on which the course is given:</b>	Bachelor of Pharmacy (Pharm D clinical)
<b>Department responsible for offering the course:</b>	Microbiology and Immunology
<b>Department responsible for teaching the course:</b>	Microbiology and Immunology
<b>Academic year:</b>	Level four- spring semester- (2022-2023)- elective
<b>Course title and code:</b>	Gene regulation and epigenetics, PM E08C
<b>Prerequisite:</b>	Registration
<b>Credit hours:</b>	Lectures: 2, Practical: 0, Total: 2
<b>Course Coordinator:</b>	

### B- Professional Information

#### 1 - Overall Aim of the Course

This course will give an introduction to the fundamentals of epigenetic control. It will examine epigenetic phenomena that are manifestations of epigenetic control in several organisms and the interplay between epigenetic control and the environment. The course will emphasise how epigenetic regulates gene expression and heritable phenotypes without changes in the underlying DNA sequence

#### 2 - Course learning outcomes

##### Domain 1: Fundamental knowledge

The students should be able to:

Program key elements	Course learning outcomes
1.1.1.1. Explain basics of bioinformatics, biotechnology, and epigenetics.	1.1.1.1. Explain the fundamental of epigenetics. 1.1.1.1.a. Illustrate the knowledge of epigenetics 1.1.1.1.b. Understand how it regulates gene expression and heritable phenotypes without changes in the underlying DNA sequence.
1.1.2.2. Integrate medical, pharmaceutical and pharmacological terms in pharmacy practice for effective scientific communication.	1.1.2.2. Understand the epigenetic basis of numerous developmental abnormalities, the natural ageing process, environmental exposures, and pertinent human diseases such as cancer, obesity, neurological disorders, and infections by using the right pharmaceutical and medical terminology, abbreviations, and symbols.

### Domain 3: Pharmaceutical care

The students should be able to:

Program key elements	Course learning outcomes
3.1.1.1. Adopt the fundamentals of body function in health & disease states.	3.1.1.1. Apply the principles of body function in health and disease states.
3.1.1.2. Apply the basis of genomics in health state and clinical management of body disorders.	3.1.1.2. Adopt the fundamentals of genomics in health states to manage different diseases.

### 3- Course Contents

Week	Lectures	
	Topic	Credit hrs. (2)
1	Introduction to Epigenetics and the nucleosome as the basic unit of chromatin	2
2	DNA modifications (part 1)	2
3	DNA modifications (part 2)	2
4	Histone modifications (part 1)	2
5	Histone modifications (part 2)	2
6	<b>Midterm</b>	
7	Non-coding RNAs (part 1)	2
8	Non-coding RNAs (part 2)	2
9	Epitranscriptomics: RNA modifications	2
10	Chromatin remodelling	2
11	Histone variants	2
12	Prions	2
13		
14	<b>Written exam</b>	

### 4- Teaching and Learning Methods:

- Lectures (Tools: board, overhead projector, data show).
- Tutorials in labs for the theoretical parts.
- E-learning and class Activities

### 5- Student Assessment Methods:

Written Midterm exam	To assess	The ability of students to follow-up the course subjects.
Written final exam	To assess	The overall outcomes.

### Assessment Schedule

Assessment 1	Periodic exams	Week 6
Assessment 2	Final written exam	Week 14

### Weighting of Assessments

Periodical examination	15%
Final-term Examination	85%
Oral Examination	--- %
Practical Examination	--- %
<u>Other types of assessment</u>	<u>--- %</u>
<b>Total</b>	<b>100 %</b>

### 6- List of Reference

### 7- Facilities Required for Teaching and Learning

Modern libraries, audiovisual tools, chemicals, cooperative assistants, glassware and instruments

**Course members:**

**Course Coordinator:**

**Head of Department:** Prof. Dr. Khaled Anwar Aboshanab

*Khaled Aboshanab*

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### Course Plan & Matrices

Course Contents		Program Key Elements	Course learning outcomes	Teaching and Learning Methods	Student Assessment Methods
Week # 1	Introduction to Epigenetics and the nucleosome as the basic unit of chromatin	1.1.1.1 1.1.2.2	1.1.1.1.a 1.1.1.1.b 1.1.2.2	Lectures	Written
Week # 2	DNA modifications (part 1)	1.1.2.2	1.1.2.2	Lectures	Written
Week # 3	DNA modifications (part 2)	1.1.2.2	1.1.2.2	Lectures Open discussion brain storming Assignments,	Written
Week # 4	Histone modifications (part 1)	1.1.1.1 1.1.2.2	1.1.1.1.a 1.1.1.1.b 1.1.2.2	Lectures	Written
Week # 5	Histone modifications (part 2)	1.1.1.1 1.1.2.2	1.1.1.1.a 1.1.1.1.b 1.1.2.2	Lectures,	Written
Week # 6	<b>Midterm</b>				
Week # 7	Non-coding RNAs (part 1)	3.1.1.1 3.1.1.2	3.1.1.1 3.1.1.2	Lectures Assignments, Self-learning	Written
Week # 8	Non-coding RNAs (part 2)	3.1.1.1 3.1.1.2	3.1.1.1 3.1.1.2	Lectures	Written
Week # 9	Epitranscriptomics: RNA modifications	1.1.1.1 1.1.2.2	1.1.1.1.a 1.1.1.1.b 1.1.2.2	Lectures	Written
Week # 10	Chromatin remodeling	1.1.2.2 3.1.1.1 3.1.1.2	1.1.2.2 3.1.1.1 3.1.1.2	Lectures	Written
Week # 11	Histone variants	1.1.2.2 3.1.1.1 3.1.1.2	1.1.2.2 3.1.1.1 3.1.1.2	Lectures Assignments	Written
Week # 12	Prions	1.1.2.2	1.1.2.2	Open discussion brain storming Assignments	Written

