

Dow University of Health Sciences



RENAL 01 MODULE

5 weeks, 4.5 credit hours

Second Year MBBS

5 YEAR CURRICULAR ORGANIZATION

Spiral	year	Modules				
First Spiral	I	FND1- Foundation Cell, Genetics & Cell Death (Basics of Anatomy, Physiology, Biochemistry, Gen. Pathology, Gen. Pharmacology, Community Medicine & Behavioral Sciences, 9 Weeks		HEM1- Blood Module Immunity, Inflammation, Tissue repair, Antimicrobials & Neoplasia 9Week		
		LCM1- Locomotion Bones, Joints, Nerves & Muscles, 9weeks		RSP1- Respiratory System 6 weeks	CVS1- Cardiovascular System 4 weeks	
	II	NEU1- Nervous System 8 weeks		HNN1- Head & Neck & Special 6 weeks	END1- Endocrinology 5weeks	
		GIL 1-GIT and Liver 8 weeks		EXC1- Renal and Excretory System 5 weeks	REP1- Reproductive System 5 weeks	
Second Spiral	III	IDD 1- Infectious diseases 5 weeks	HEM2- Hematology 5 weeks		RSP2- Respiratory System 5 weeks	CVS2- Cardiovascular System 5 weeks
		GIL 2-GIT and Liver (including Nutritional Disorders) 8weeks		EXC2- Renal & Excretory System 5 weeks	END2- Endocrinology 5 weeks	
	IV	ORT2- Orthopedics, Rheumatology, Trauma 7 weeks		REP2- Reproductive System 8 Weeks	PMR-Physical Medicine & Rehabilitation DPS-Dermatology Plastic Surgery / Burns GEN-Genetics 6 weeks	
		NEU2- Neurosciences and Psychiatry 8 weeks		OPH / ENT* 4 weeks	ENT/OPH * 4 weeks	
Third Spiral	V	Clinical Rotation 9:30 to 3:00 (with Ambulatory, Emergency, Intensive care) In Medicine, Pediatrics, Cardiology and Neurology units <ul style="list-style-type: none"> ▪ Lecture on problem based approach, twice a week ▪ Ward tutorial twice a week ▪ Student research presentation once a week 		Clinical Rotation 9:30 to 3:00 (Inpatient, Ambulatory, Emergency, Intensive care and Operation Theatres) In Surgery, Gynecology & Obstetrics, Orthopedics and Neurosurgery. <ul style="list-style-type: none"> ▪ Lecture on problem based approach, twice a week ▪ Ward tutorial twice a week ▪ Student research presentation once a week 		

RATIONALE:

Renal system is involved in the excretion of waste products especially nitrogenous end products of protein metabolism. It regulates normal hydrogen ion concentration, pH and acid base balance, maintains sodium and potassium and electrolyte balance of the body also maintain blood pressure, osmotic pressure, water balance, plasma / extra cellular fluid volume.

Renal diseases are common in the community and renal failure is a common end stage of most renal disorders. Understanding of the basic anatomy, physiology and biochemical processes is essential for dealing with the disease processes afflicting the renal system. This module provides this basic understanding.

TERMINAL OBJECTIVE:

At the end of this module student will be able to:

- Discuss anatomy of kidney and urinary tract
- Review embryological development of kidney and urinary tract
- Explain common developmental abnormalities of renal system
- Identify role of renal system in maintaining blood pressure and acid base balance
- Enlist functions of kidney and pathologies related to them.
- Explain method of electrolyte balance and pathologies related to it.
- Highlight pathologies related to kidneys and their distinctive clinical features
- Interpret investigations done to diagnose abnormal structural and functional presentations.

MODULE OBJECTIVES:

1. Describe the structure and functions of excretory system
2. Explain the development of kidneys and ureters with their related anomalies
3. Describe the histological and gross features of kidneys and ureters with its blood, lymphatic and nerve supply
4. Describe the biochemical and physiological aspects of GFR and role of pH and water
5. Recognize the normal gross structure of ureter, urinary bladder and urethra including topographical anatomy, its blood supply, nerve supply and histological features
6. Describe the development of urinary bladder and urethra with its related anomalies
7. Recognize the concept of electrolyte balance and imbalance and its correlation with other systems and its importance. (Biochemistry: pH, acid base balance, buffers, alkalosis, acidosis)
8. Perform the surface marking of urinary system
9. Describe the pathogenesis of glomerular diseases
10. Discuss Formation of urine, re-absorption and Excretion of urine
11. Discuss the importance of concentration and dilution of urine, acidification of urine
12. Comprehend the concepts and Importance of GFR and their regulating factors
13. Discuss normal and abnormal constituents of urine in relation with phosphaturia, glycosuria, and amino acid urea and interpret the biochemical reports
14. Classify diuretics related to their site of action and their adverse effects
15. Describe the biochemical aspects of purine metabolism with its related disorders
16. Explain the pathogenesis of nephritic and nephrotic syndrome
17. Discuss the process of micturition and micturition reflex

18. Interpret the ABG reports for the diagnosis of acidosis and alkalosis
19. Describe the pathogenesis of tubulointerstitial diseases and Pyelonephritis
20. Explain the relation of urea uric acid, creatinine, calcium and albumin and other electrolytes with renal disorders
21. Relate pyrimidine metabolism with renal functions
22. Recognize the importance of dialysis in the cases of renal failure
23. Discuss the pathogenesis of lower urinary tract infections
24. Discuss the dehydrated and overhydrated conditions
25. Interpret the radiographs of urinary system
26. Regulation of water and electrolyte balance by various hormones (ADH, Aldosterone, rennin, etc. Abnormalities: Hyper-aldosteronism, Diabetes Insipidus)
27. Define the Plasma clearance and its relation with clinical disorders

MODULE CONTENTS:

ANATOMY

Gross Anatomy:

1. [EXC1 ANG 1](#) Overview of excretory system of the body and structure of kidney
2. [EXC1 ANG 2](#) Details of gross anatomical features of kidney
3. [EXC1 ANG 3](#) Details of blood and nerve supply and lymphatic drainage of kidney
4. [EXC1 ANG 4](#) Gross anatomical features of ureter, urinary bladder and urethra
5. [EXC1 ANG 5](#) Blood supply, lymphatic drainage and nerve supply of ureter, urinary bladder and urethra
6. [EXC1 ANG 6](#) Surface Anatomy of Urinary system

General Histology:

1. [EXC1 ANH 1](#) Features of kidney: (detailed microscopic features of nephron and collecting ducts)
2. [EXC1 ANH 2](#) Microscopic features of nephron, collecting ducts ureter, urinary bladder & Urethra (Practical)

General Embryology:

1. [EXC1 ANE 1](#) Development of Kidney & Ureter
2. [EXC1 ANE 2](#) Development of urinary bladder and urethra
3. [EXC1 ANE 3](#) Congenital anomalies of kidney and urinary tract

PHYSIOLOGY

1. [EXC1 PHY 1](#) General functions of the kidneys and excretory system
2. [EXC1 PHY 2](#) GFR and factors affecting GFR
3. [EXC1 PHY 3](#) Tubular Re-absorption and secretion
4. [EXC1 PHY 4](#) Renal clearance
5. [EXC1 PHY 5](#) Concentration & dilution of urine

6. [EXC1 PHY 6](#) Renal regulation of acid base balance
7. [EXC1 PHY 7](#) Endocrine functions of kidney & hormones acting on kidney
8. [EXC1 PHY 8](#) Micturition reflex
9. [EXC1 PHY 9](#) GFR regulation (Tutorial)
10. [EXC1 PHY 10](#) Role of kidneys in regulation of Acid base balance (Tutorial)

BIOCHEMISTRY

1. [EXC1 BIO 1](#) Water Distribution & Regulation
2. [EXC1 BIO 2](#) Renal Control of PH
3. [EXC1 BIO 3](#) Formation of Urine
4. [EXC1 BIO 4](#) Dehydration & Over hydration (Tutorial)
5. [EXC1 BIO 5](#) Role of Kidney in Electrolyte Balance Potassium and Bicarbonate
6. [EXC1 BIO 6](#) Role of Kidney in Electrolyte Balance Sodium and chloride
7. [EXC1 BIO 7](#) Role of Kidney in Acid Base Balance
8. [EXC1 BIO 8](#) Nucleic acid – Purine Metabolism
9. [EXC1 BIO 9](#) Pyrimidine Metabolism
10. [EXC1 BIO 10](#) Abnormalities related to Nucleic acid metabolism: GOUT
11. [EXC1 BIO 11](#) Creatinine Clearance and its Significance
12. [EXC1 BIO 12](#) Interpretation of Electrolyte Imbalance
13. [EXC1 BIO 13](#) Normal constituents of urine (Practical)
14. [EXC1 BIO14](#) Renal function tests (Tutorial)

Pathology

1. [END1 PTH 1](#) Pathogenesis Of Glomerular Diseases
2. [END1 PTH 2](#) Nephritic Syndrome
3. [END1 PTH 3](#) Lower urinary tract infections
4. [END1 PTH 4](#) Tubulo-interstitial diseases
5. [END1 PTH 5](#) Nephrotic syndrome
6. [END1 PTH 6](#) Obstructive Uropathy- Hydronephrosis

7. [END1 PTH 7](#) Pyelonephritis
8. [EXC1 PTH 8](#) Introduction to Renal Transplant

BEHAVIORAL SCIENCES

1. [END1 BHE 1](#) Happiness
2. [END1 BHE 2](#) Informational Care
3. [EXC1 BHE3](#) Application of client's rights and provider responsibility

MEDICINE

1. [EXC1 MED 1](#) Dehydration/ over-hydration (Part 1)
2. [EXC1 MED 2](#) Dehydration/ over-hydration (Part 2)
3. [EXC1 MED 3](#) Urine detailed report sample collection and biochemical analysis
4. [EXC1 MED4](#) Interpret the ABG reports for the diagnosis of acidosis and alkalosis
5. [EXC1 MED5](#) Renal failure clinical picture and presentation (Part I)
6. [EXC1 MED6](#) Renal failure clinical picture and presentation (Part II)

Radiology

1. [EXC1 RAD1](#) Radiographs + other imaging techniques of urinary system

COMMUNITY MEDICINE

1. [EXC1 COM 1](#) Research Methodology

The contents are subjected to be altered according to requirement of academic calendar

TEACHING STRATEGIES

LARGE CLASS FORMATS

- Lectures

SMALL GROUP DISCUSSION

- Demonstrations
- Tutorial
- Practical
- Skill labs
- Case based learning sessions

CASE BASED LEARNING

1. CBL :1

Learning Objectives:

By the end of the CBL, students will be able to

- The anatomical correlate of obstructive conditions of urinary tract
- Classification of obstructive Disorders of urinary tract
- The signs and symptoms of urinary tract obstruction
- Be able to understand the significance of hematuria, bacteriuria and leukocyturia in a patient with history suggestive of renal colic
- Be able to understand the chemical composition of renal stones.

1. CBL :2

Learning Objectives:

By the end of the CBL, students will be able to

- Describe the anatomical relations of right and left kidneys
- Identify different causes of flank pain
- Correlation of hypertension and kidney diseases

LEARNING OBJECTIVES OF SKILL LAB

❖ Renal and excretory Module:

I. MALE AND FEMALE URETHRAL CATHETERIZATION

INTRODUCTION/RATIONALE:

Urethral catheterization is an invasive procedure with several potential hazards if not performed proficiently, like trauma to the urethra and infection. It is imperative that all health professionals be thoroughly versed with the procedure.

LEARNING OBJECTIVES:

After the session students should be able to:

- List the equipment required for the procedure.
1. Demonstrate correct aseptic techniques and the procedure for urinary catheterization in males & females.

ASSESSMENT PLAN

Renal-1 MODULE

	WEIGHTAGE
ANNUAL EXAM	80%
MODULE EXAM (Internal Evaluation)	
Theory	10%
Practical	10%

CREDIT HOURS

Renal-1 MODULE	4.5
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Contact HOURS (DISCIPLINE WISE)

Discipline	Contact Hours
Gross Anatomy	6
Histology	2.5
Embryology	3
Biochemistry	15.5
Physiology	11
Medicine	6
Behavioral Sciences	3
Community Medicine	1
Pathology	8
Radiology	1
CBL	3
Skill Lab	1.5

BOOKS

ANATOMY

- **CLINICALLY ORIENTED ANATOMY**
KEITH.L.MOORE, Arthur F. Dalley, Anne M.R. Agur
7th or Latest EDITION
- **GRAY'S ANATOMY FOR STUDENTS**
Drake & Vogl & Mitchell
3rd or Latest EDITION
- **CLINICAL ANATOMY BY REGIONS (REFERENCE BOOK)**
Richard S. SNELL
9th EDITION
- **LAST'S ANATOMY: REGIONAL & APPLIED (REFERENCE BOOK)**
Chummy S. Sinnatamby
12th or Latest EDITION
- **ATLAS OF HUMAN ANATOMY**
FRANK H.NETTER
6th EDITION

EMBRYOLOGY

- **LANGMAN'S MEDICAL EMBRYOLOGY**
T.W.SADLER
13th EDITION
- **THE DEVELOPING HUMAN CLINICALLY ORIENTED EMBRYOLOGY (REFERENCE BOOK)**
MOORE & PERSAUD & TORCHIA
10th EDITION

HISTOLOGY

- **MEDICAL HISTOLOGY**
LAIQ HUSSAIN SIDDIQUI
5TH or Latest EDITION
- **WHEATERS FUNCTIONAL HISTOLOGY**
BARBARA YOUNG
5th EDITION
- **BASIC HISTOLOGY(TEXT AND ATLAS) (REFERENCE BOOK)**
LUIZ JUNQUEIRA, JOSE CARNEIRO
11th or Latest EDITION

PHYSIOLOGY

- **GUYTON AND HALL TEXTBOOK OF MEDICAL PHYSIOLOGY**
GUYTON AND HALL
13th EDITION

BIOCHEMISTRY

- **LIPPINCOTT'S ILLUSTRATED REVIEWS SERIES**
DENISE R. FERRIER
6th EDITION
- **HARPERS ILLUSTRATED BIOCHEMISTRY (REFERENCE BOOK)**
VICTOR RODWELL, DAVID BENDER, KATHLEEN M. BOTHAM, PETER J. KENNELLY,
P. ANTHONY WEIL
28th EDITION

For Query

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