AJK Medical College, Muzaffarabad

Endocrinology & Reproduction(ER-0207)

3rd Year MBBS

Pre-requisite modules:

Foundation, Cell Injury, IHI, Legal Medicine, Genetics & Neoplasia, GIT-I, Nutritional Diseases

Duration= 3 weeks

DEPARTMENT OF MEDICAL EDUCATION

Table of Contents

Module Team

Prof. Sarosh Majid Salaria	(Planner)
Prof. Dr. Muhammad Arif	(Coordinator)
Brig (Rtd.) Prof. Dr. Ahmad Khan	(Member)
Dr. Ziyad Afzal Kayani	(DME)
Prof. Adnan Mehraj Qureshi	(Member)
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Dr. Zakir Naqvi	(Member)
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RATIONALE

Superb control and regulation of our metabolic functions on which our life and health depends is achieved through many mechanisms at cellular, tissue and organizational levels. For anyone this terrific command and control could be an eye opener to the superb wisdom, magnificent care and love of our Creator Allah Almighty! Endocrine & Reproductive (EMR) Module in 2nd spiral further builds up the knowledge and clinical skills based on the basic concepts learned in the first spiral! In the first spiral we learned how the major hormones are produced and how they each act to integrate metabolism and fluid balance and what was the role of selected endocrine axes in maintaining a stable environment for cells to function within the body. In this module we will consider in more details how the defects in hormone production and/or action can lead to profound clinical conditions and syndromes! How these disorders could be investigated, diagnosed and managed will *In Sha Allah* be the crux of the present module!

Organization of Module

The module consists of six themes, each based on a real life situation. The module will employ different modes of instruction, briefly described below. Major emphasis will be on discussion, analysis and deductions; all by the students and guided by the faculty.

Aims of the module:

The module aims to provide:

- Clinical relevance of endocrine disorders, including iatrogenic states, Growth disorders, thyroid disease, diabetes and other syndromes of hormonal dysfunction
- Knowledge and understanding of each of the major endocrine axes, emphasizing the clinical significance of normal and abnormal feedback loops
- Knowledge and understanding of the scientific basis of treatment options available for specified endocrine disorders
- Knowledge and understanding of the reproductive, developmental and genetic processes that contributes to the development of a healthy individual
- Clinical skills for understanding the basis of infertility, developmental anomalies and genetic disease.

Learning outcomes

Our intended learning outcomes, in terms of knowledge are:

By the end of the module students will be able to:

- Diagnose the changes in structure and/or functioning of the Endocrine system in disease states such as Diabetes mellitus, acromegaly, Cushing's syndrome, Conns syndrome, thyrotoxicosis and infertility.

In terms of psychomotor skills, our intended outcomes are:

- Identify abnormal findings related to the endocrine system on gross, microscopic and radiologic examination
- Interpret growth charts
- Elicit clinical history in a patient suspected of hormonal diseases
- Investigate abnormal secondary sexual characteristics

Our intended outcomes in terms of attitude are to sensitize the learners about:

- Importance of lifestyle modification in the prevention and control of endocrine diseases.
- Effective communication and counseling skills

Teaching Strategy

The content of this module will be delivered by a combination of different teaching strategies. These include small group discussions (SGD), large group interactive sessions (LGIS), demonstrations in dissection hall, lab practical and clinical skill sessions at skill lab. Group projects will be assessed at the end of the block.

Content Delivery

Entire curriculum will be delivered by clinical case scenarios each covering a theme. Read the cases and the objectives of the theme which you are supposed to encounter next day, understand and explain the case to yourself and read the relevant information. Following learning/teaching strategies will be employed to discuss the cases:

Small Group Discussion

Main bulk of the course content will be delivered in small group sessions. Each theme has an associated case. The case will be the centre around which learning will take place. Depending on the case you might be required to deduce objectives and learning issues or only learning issues. Every group will have a facilitator assigned to it. The facilitator will be there to keep you on

track, giving you maximum liberty to discuss and achieve the objectives as a group. Small groups in some cases may be followed by a wrap up session. Rest of the information will be there in the schedule.

Large group

Large group instruction will be employed at times sparingly. Attend large group sessions with the following focus

a. Identify important points

b. Ask questions of points not well understood in the text

c. Measure your learning comprehension

Videos

Video demonstrations on history taking and clinical examination, on diseases will be shown to give you an idea into the disease process, testing and practical aspect of communication with the patients.

Hands-on Activities/ Practical

Practical activities, linked with the case, will take place.

Lab:

Attend your scheduled lab and take advantage of free time for study .Use your labs to correlate text structures to actual specimens in lab practice.

Self-Directed Learning

A few SDLs have been added in between to create an environment for you to search literature as well as to deduce and synthesize information from different sources to meet the learning objectives. It will also help in breaking the monotonous / strenuous schedule and make you a life-long learner.

Assessment

A full-fledged formative assessment will be taken at the end of module. This will give you an idea about the format of the examination that you will go through at the end of the Block. Of course, this will be followed by feedback on your performance in the exam.

Marks obtained in the module examination will contribute 30% (internal assessment) towards end of year Professional University Examination.

Table of Specifications

#	Themes	Weight
1	Dwarf Child	10%
2	Anxious woman	10%
3	Severe Mental Illness	10%
4	Moon Face Lady	15%
5	Comatose Patient	15%
6	Infertility	30%
7	Sexual offences and law	10%

Learning Objectives

THEME-1

At the end of theme student should be able to:

1. Revisit Cortico-Hypothalamus-Pituitary-Target Organs axis
2. Correlate pathogenesis of hyper and hypopituitarism with clinical presentation.
3. Enumerate features of gigantism and acromegaly
4. Describe radiological, histopathological and clinical features of pituitary tumors.
5. Describe pharmacokinetics and pharmacodynamics of GnRH analogues along with GnRH receptor agonists and antagonists
6. Enlist clinical indications and adverse effects of GnRH analogs
7. Describe pharmacokinetics and pharmacodynamics of GHRH analogues along with GHRH receptor agonists and antagonists
8. Enlist clinical indications and adverse effects of GHRH analogs
9. Describe pharmacokinetics and pharmacodynamics of TRH analogues along with TRH receptor agonists and antagonists
10. Enlist clinical indications and adverse effects of TRH analogs
11. Describe pharmacokinetics and pharmacodynamics of CRH analogues along with CRH receptor agonists and antagonists
12. Enlist clinical indications and adverse effects of CRH analogs
13. Enlist anterior and posterior pituitary hormones
14. Describe the pharmacokinetics and pharmacodynamics of Growth hormone (Somatotropin; Somatostatin)
15. Discuss the mechanism of action, therapeutic uses, toxicity and contraindications of GH
16. Discuss the mechanism of action, therapeutic uses, toxicity and contraindications of different preparations of GH
17. Discuss the pharmacokinetics and pharmacodynamics of follicle stimulating hormone, lutenizing hormone and human chorionic gonadotropin hormone
18. Describe the clinical indications of FSH, LH, hCG, hMG along with their toxicity and contraindications
19. Describe the mechanism of action, clinical indications, contraindications and adverse effects of Prolactin and Dopamine agonists
20. Give the pharmacokinetics and pharmacodynamics of posterior pituitary hormones
21. Describe the mechanism of action, clinical indications, contraindications and adverse effects of oxytocin and ADH
22. Discuss the clinical implications of oxytocin and vasopressin antagonists.
23. Enlist various imaging modalities of pituitary
24. Counsel a family with dwarf child/Gigantism

Theme-2

Learning Objectives

At the end of theme student should be able to:

1. Describe etiology, pathophysiology and clinical features of hypothyroidism along with importance of postnatal diagnosis of congenital hypothyroidism
2. Describe etiology, pathophysiology and clinical features of hyperthyroidism
3. Classify thyroiditis on the basis of clinical presentation and diagnostic modalities.
4. Enumerate neoplastic lesions of thyroid gland and correlate to with clinical and microscopic features
5. Enlist thyroid preparations
6. Describe the pharmacokinetics, pharmacodynamics, mechanism of action, clinical indications, adverse effects of thyroid preparations
7. Classify anti-thyroid drugs and describe pharmacokinetics, pharmacodynamics, mechanism of action, clinical indications, adverse effects, contraindications/ Precautions and drug interactions of anti-thyroid drugs
8. Enumerate treatment options of grave's disease in neonates and adults. Give importance of thyrotoxicosis treatment in pregnancy
9. Describe the treatment of nontoxic goiter and thyroid neoplasms
10. Demonstrate examination skills on a patient with enlarged thyroid gland
11. Interpret the diagnostic modality for evaluation of hypothyroidism
12. Counsel of a goiter's patient presenting from endemic region.

Theme-3

Learning Objectives

At the end of theme student should be able to:

1. Correlate pathogenesis to protean manifestations of primary and secondary hyperparathyroidism
2. Correlate pathogenesis with causes and clinical features of hypoparathyroidism
3. Enlist vitamin D preparations. Compare and contrast the clinical uses and effects of the major forms of vitamin D and its active metabolites.
4. Describe the mechanism of action of FGF 23 and interaction of PTH, vitamin D with FGF 23
5. Describe the non-hormonal agents which affect bone mineral homeostasis
6. Describe the treatment of hypercalcemia and hypocalcemia
7. Describe the management of hyperphosphatemia and hypophosphatemia
8. Physical & radiological findings of a child with rickets.

THEME-4

Learning Objectives

At the end of theme student should be able to:

1. Describe pathogenesis, and correlate to clinical features and diagnostic modalities of Cushing syndrome and adrenal insufficiency
2. Describe Conn syndrome and discuss their clinical features, lab diagnosis and management
3. Describe congenital adrenal hyperplasia in terms of etiology, clinical features and lab diagnosis.
4. Enumerate different types of adrenal tumours along with clinical features and lab diagnosis
5. Classify Corticosteroids; glucocorticoids and mineralocorticoids.
6. Discuss pharmacokinetics, Pharmacodynamics, and mechanism of action and actions of glucocorticoids and mineralocorticoids.
7. Discuss clinical uses, adverse effects, contraindications/precautions and drug interactions of glucocorticoids and mineralocorticoids.
8. Enumerate various glucocorticoids and mineralocorticoids antagonists along with their Pharmacokinetics, mechanism of action, actions, clinical uses, adverse effects, contraindications/precautions and drug interactions.

THEME-5

Learning Objectives

At the end of theme student should be able to:

1. Describe metabolic syndrome
2. Compare and contrast between type I & type II diabetes mellitus on basis of pathogenesis, diagnosis and management.
3. Describe the neoplastic lesions and morphological features of Pancreas
4. Differentiate primary and secondary preventive measures for diabetes mellitus
5. Interpret diagnostic modalities for Diabetes and its complications.
6. Classify antidiabetic drugs and enlist various insulin preparations
7. Describe mechanism of action, clinical uses and adverse effects of various insulin preparations.
8. Describe pharmacokinetics and mechanism of action, clinical uses, adverse effects, contraindications/precautions and drug interactions of various Antidiabetic drugs other than Insulin
9. Discuss the difference between type1 and type 2 Diabetes mellitus treatment
10. Discuss the management of Diabetic Ketoacidosis and other acute complications of Diabetes mellitus.
11. Perform and interpret OGTT
12. Counsel a person with strong family history of diabetes/obesity

Theme-6

Learning Objectives

At the end of theme student should be able to:

1. Enumerate hormones of Ovary, testis in terms of their cell of origin, mode of action, pathological conditions associated with their abnormalities
2. Describe primary & secondary infertility in terms of hormonal and non-hormonal anomalies
3. Define Endometrial hyperplasia, it's types and potential to malignancy
4. Describe pharmacokinetics, actions, clinical uses and adverse effects of estrogens and progestins.

5. Describe contraindications/precautions, drug interactions of estrogens and progestins.
6. Classify Anti-estrogens and Anti-progestins.
7. Describe mechanism of action, clinical uses, adverse effects, contraindications/precautions, drug interactions of Anti-estrogens and Anti-progestins.
8. Give types of preparations used as contraceptive drugs.
9. Describe pharmacologic effects, clinical uses and adverse effects of contraceptive drugs.
10. Describe contraindications and cautions for the use of contraceptive drugs.
11. Describe postcoital contraception.
12. Describe pharmacologic actions, clinical uses and adverse effects of androgen & antiandrogens.
13. Discuss contraindications and cautions for the use of androgen & antiandrogens.
14. List the benefits and hazards of postmenopausal estrogen therapy.
15. Describe the use of gonadal hormones and their antagonists in the treatment of cancer in women and men.
16. Evaluate male and female infertility through flowchart
17. Interpretation of testicular biopsy in terms of fertility
18. Counsel infertile couple

Theme-7

At the end of theme student should be able to:

1. Describe impotence in terms of its causes, effects in males and females
2. Describe modes of determination of virginity.
3. Enumerate methods of Sterilization
4. Describe illegal pregnancy and miscarriages along with signs of recent and remote delivery.
5. Examine cases of sexual assault and collection of specimens, preservation and dispatch.
6. Describe relevant laws about sexual offences and differentiate between natural and unnatural sexual offenses.
7. Illustrate steps of medico-legal reporting of sexual offences with same and cross gender.
8. Describe medico-legal examination and findings in various types of adult and child victim.
9. Differentiate between feigned rape and actual rape
10. Describe incest in terms of Islamic & social and psychological perspectives

PBL-1

A 56-year-old woman presents to her medical practitioner with symptoms of fatigue, increased thirst, frequent urination, and exercise intolerance with shortness of breath of many months' duration. She does not get regular medical care and is unaware of any medical problems. Her family history is significant for obesity, diabetes, high blood pressure, and coronary artery disease in both parents and several siblings. She is not taking any medications. Five of her six children had a birthweight of over 9 pounds. Physical examination reveals a BMI (body mass index) of 34, blood pressure of 150/90 mm Hg, and evidence of mild peripheral neuropathy. Laboratory tests reveal a random blood sugar of 261 mg/dL; this is confirmed with a fasting plasma glucose of 192 mg/dL. A fasting lipid panel reveals total cholesterol 264 mg/dL, triglycerides 255 mg/dL, high-density lipoproteins 43 mg/dL, and low density lipoproteins 170 mg/dL. What type of diabetes does this woman have? What further evaluations should be obtained? How would you treat her diabetes?

PBL-2

A fifteen-year-old girl was brought to SKBZ Hospital Muzaffarabad by Police Thana Athmaqam on 6th August 2014 at 6:00 PM with the claim of sexual assault. The police requested medico-legal examination for suspicious case. You have to give Medico-legal report to Police along with the specimens collected for dispatch to Forensic Laboratory.

Resources for learning & reference books

- Robin's Textbook of Pathology
- Medscape.com
- Cleveland clinic.com
- Tietz (Fundamentals of clinical chemistry)
- Kaplan book of clinical chemistry
- Text Book of Forensic Medicine and Toxicology By Negash Kumar Rao
- Parekh
- Naseeb Awan
- Saddique Hussan

- Basic and Clinical Pharmacology by Katzung BG, Masters SB, Trevor AJ, 12th Ed, 2012.
- Katzung & Trevor's Pharmacology by Trevor AJ, Katzung BG, Kruidering-Hall M, Masters SB, , 10th Ed, 2013
- Lippincott's Illustrated Reviews: Pharmacology, Clark MA, Finkel R, Rey JA, Whalen K, 6th Ed, 2012
- Goodman & Gilman: The Pharmacological Basis of Therapeutics, Brunton LL, 12th Ed, 2012
- Pretest Pharmacology. MCQs with explanatory answer

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Endocrine & Reproduction Module - 3rd Year

Week-I

DATE→					
TIME↓	**MONDAY**	**TUESDAY**	**WEDNESDAY**	**THURSDAY**	**FRIDAY**
8:00am-09:00am	**Assessment GIT & Respiratory**	**SGD** Pituitary Disorders **Dr. Wafa & Team-3**	**LGIS** Thyroid Hormones **Dr. Arif**	**LGIS** Thyroid Disorders Medical & Surgical Aspect **Dr. Adnan Mehraj/ Dr. Munazza Nazir**	**SGD** Drugs Affecting Bone & Mineral Homeostasis **Dr. Arif & Team-4**
9:00am-10:00am			**PBL-1A Dr. Arif & Team**	**CLINICAL ROTATION**	
10:00am-10:30am		**TEA BREAK**			**TEA BREAK**
10:30am-11:30am	**CLINICAL ROTATION**	**LGIS** Pituitary Disorders; Medical & Surgical Aspect **Dr. Liaqat Awan/ Dr. Ashfaq**	**SGD** Anti-Thyroid Drugs **Dr. Arif & Team**		**LGIS** Pancreas **Dr. Sarosh Majid**
11:30am-12:30am		**LGIS** Post. Pituitary Agonists & Antagonists **Dr. Arif**			**LGIS** Diabetes Mellitus **Dr. Saba Irum**
12:30pm – 1:30pm	**LGIS** Introduction to Module **Dr. Sarosh Majid & Module Team**	**LGIS** Thyroid Pathology **Dr. Anwar Ul Haque**	**LGIS** Parathyroid Disorders **Dr. Sarosh Majid**	**LGIS** Other Anti-Thyroid Drugs **Dr. Arif**	**DSL**
1:30pm – 2:00pm		**LUNCH BREAK**			
2:00pm – 3:00pm	**LGIS** Pituitary + hypothalamic hormones; agonists & antagonists- I **Dr. Arif/Dr. Inayat**	**SGD** Hypthalamic + Ant. Pituitary Hormone Agonists & Antagonists **Dr. Arif & Team-4**	**LGIS** Reproductive Health **Brig. (R) Ahmed Khan**	**LGIS** Parathyroid Hormone, Vitamin-D Metabolites/Analogs **Dr. Arif/ Dr. Inayat**	**SDL**
3:00pm – 4:00pm	**SDL**		**DSL**	**SDL**	

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Endocrine & Reproduction Module - 3rd Year

Week-2

DATE→					
TIME↓	**MONDAY**	**TUESDAY**	**WEDNESDAY**	**THURSDAY**	**FRIDAY**
8:00am-09:00am	**LGIS** Anti-third Drugs **Dr. Arif**	**SGD** Biguanides, Thiazolidinediones **Dr. Arif**	**SGD** Cushing's & Conn's Syndrome **Dr. Wafa Omer & team-3**	**LGIS** Dysfunction Uterine Bleeding **Dr. Maryam Zubair**	**SGD** Parathyroid Disorders Medical & Surgical Aspect **Dr. Ziyad/Dr. Imtiaz Team-4**
9:00am-10:00am	**CLINICAL ROTATION**			**CLINICAL ROTATION**	
10:00am-10:30am		**TEA BREAK**			
10:30am-11:30am		**PBL-1B Dr. Arif & Team-4**	**LGIS** Adrenal Disorders Surgical and Medical accepts **Dr. Khalid Awan**		**LGIS** Imaging in Endocrinology **Maj. Hussain**
11:30am-12:30am			**SGD** Family Planning **Dr. Uzma & Team-3**		**LGIS** Investigation female Infertility **Dr. Noshina**
12:30pm – 1:30pm	**LGIS** Medical aspect of Diabetes Mellitus **Dr. Bashir Trumbo**	**LGIS** Surgical Complications of Diabetes Mellitus **Prof. Nizam ud Din**		**LGIS** Investigation Male Infertility **Dr. Mehmood**	**`DSL**
1:30pm – 2:00pm	**LUNCH BREAK**				
2:00pm – 3:00pm	**SGD** Insulin & Anti-Diabetic Drugs **Dr. Arif & Team-4**	**Practical** Thyroid lesions **Prof. Saroosh**	**PBL-2A Forensic Medicine**	**SGD** Alpha Glucosidase Inhibitors **Dr. Arif/Dr. Inayat**	**SDL**
3:00pm – 4:00pm			**SDL**		

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Endocrine & Reproduction Module - 3rd Year

Week-3

DATE→					
TIME↓	**MONDAY**	**TUESDAY**	**WEDNESDAY**	**THURSDAY**	**FRIDAY**
8:00am-09:00am	**LGIS** Family Planning **Dr. Uzma Hafeez/ Dr. Murtaza Gillani**	**SGD** Combination Therapy in DM **Dr. Arif & Team-4**	**LGIS** Medicolegal Exam in Sexual Offences Victims **Dr. Humayun/ Dr. Naseer**	**LGIS** Introduction to NEU Module & Introduction to CNS Pharmacology **Dr. Arif & Module Team**	**LGIS** Antidepressants-2 **Prof. Arif /Dr. Inayat**
9:00am-10:00am	**CLINICAL ROTATION**			**CLINICAL ROTATION**	**LGIS** Management Anxiety Disorder and depression **Dr. Hamid Rasheed**
10:00am-10:30am		**TEA BREAK**			**TEA BREAK**
10:30am-11:30am		**LGIS** Imaging in Reproductive System **Dr. shaukat Dar**	**LGIS** Estrogens, Progesterones Agonists & Antagonists **Dr. Arif/Dr. Inayat**		**SGD** Sedative hypnotics and anxiolytics **Prof. Arif**
11:30am-12:30am		**SGD** Corticosteroids Agonists **Dr. Arif & Team-4**	**SGD** Corticosteroids Antagonists **Dr. Arif & Team-4**		
12:30pm-1:30pm	**LGIS** STDs/HIV **Brig (R) Ahmed Khan**			**LGIS** History taking and Mental Stage Examination **Dr. Hamid Rasheed**	**PBL-1A Prof. Arif & Team**
1:30pm-2:00pm		**LUNCH BREAK**			
2:00pm-3:00pm	**LGIS** Estrogens, Progesterones Antagonists **Dr. Arif**	**LGIS** Pathology of Female Genital Tract **Dr. Sarosh Majid**	**SGD** Ovulation Inducting Agents Androgens & Anti-Androgens **Dr. Arif & Team-4**	**SGD** Antidepressants-1 **Prof. Arif / Dr. Inayat**	**SDL**
3:00pm-4:00pm	**LGIS** Ovarian Pathology **Dr. Anwar Ul Haque**	**PBL-2B Dr. Humayun/ Dr. Naseer & Team-4** **SDL**			

Inquires & trouble shooting

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