FOUNDATION MODULE

Student Study Guide

First Year MBBS
Academic year 2021

Module details

Course	**MBBS**
Year	**One**
Duration of module	**09 weeks**
Learning outcomes Competencies covered	**the competent medical practitioner,** **I (Skillful), and II (Knowledgeable/ problem solver),**
Module assessment	**End-module assessment**
Assessment methods	**SBQs** **SEQs,** **OSPE** **VIVA**

The Foundation Module Committee:

Module integration committee will comprise members from all the faculties participating in the module.

Module Coordinator

1. Prof. Dr Samreen Memon — Chairperson Department of Anatomy

Committee Members

1. Prof. Dr Shahida Hassan Memon — Chairperson Department of Biochemistry
2. Prof. Dr Farzana Hassan Memon — Chairperson Department of Pathology
3. Prof. Dr Salma Farukh Memon — Chairperson Department of Physiology
4. Dr Muhammad Ilyas Siddiqui — Chairperson Department of Community Medicine
5. Dr Ganesh Kumar — Department of Pharmacology

Introduction

Welcome to the foundation module. This exciting module will serve as building block and is very essential to your future work as doctors. This module is designed to make your learning both interesting and productive by including several interactive activities.

During this module, students will be encouraged to learn basic organization of human body in terms of structure, function and biochemical properties in an integrated manner i.e. Basic subjects including Anatomy, Physiology, Biochemistry, Pharmacology and Pathology will be learned and assessed together. You will also learn to integrate basic knowledge with clinical relevance. By adopting this approach, you will be prepared for your future work as doctor, where patients will come to you with problems that are not categorized by discipline name.

In order to help you learn in an integrated manner, we have updated the learning of basic sciences around a few key health-related situations (real life situations), which you are likely to encounter as house officers. You will be expected to think about the scenarios and participate in case based learning sessions for clearing your concepts and better learning. It will also help you focus your attention on what you need to achieve from the lectures, practical and tutorials that have been scheduled during this module.

RATIONALE:

Orientation of medical sciences in respect to health and disease is the fundamental requirement of every medical student. Therefore, this module is designed to provide the integration of core concepts that underlie the foundation of basic sciences and their correlation and application in clinical sciences. Students also learn clinical skills such as how to communicate effectively with patients and their relatives with compassion and understanding their issues/problems and how to resolve in coming years. Working in groups will enhance students' team working skills and capacity and management skills. Along with interactive lectures, practical and demonstrations; through supplemented case-based learning they develop problem solving skills to apply their basic medical knowledge and skills to practical situations under supervision and subsequently in real life practice.

The learnings objectives of introductory session are

1. To familiarize students with the MBBS integrated modular system and Problem-based curriculum
2. To recognize the role of different disciplines in studying the human body, its function and disease process.
3. To describe the structure, function and biochemical composition of cell.
4. To keep and maintain discipline within the college, so as to sustain conducive environment for learning.
5. To follow the prescribed norms of the college properly

General learning outcomes

By the end of this foundation module, the students should be able to:

Knowledge

1. Describe the cell division, its types and genetic material along with its clinical correlation.
2. Describe the basic organization of the human body.
3. Describe the basic tissues of the human body
4. Explain the maintenance of homeostatic mechanism.
5. Describe the various malformations.

6. Describe the biochemistry of carbohydrates, nucleic acids and enzymes
7. Describe various cellular adaptations during cell growth, differentiation and cell injury
8. Describe the basic concepts of medical ethics, professionalism, clinical research, behavioral sciences, communication skills, information technology skills

Skills

1. Describe the basic laboratory techniques and demonstrate the use of microscope
2. Identify basic tissues under the microscope
3. Learn and follow the basic laboratory protocols
4. Perform biochemical analysis of carbohydrates
5. Prepare different solutions used in laboratory for tests

Attitude

1. Follow the basic laboratory protocols
2. Participate in class and practical work professionally
3. Communicate effectively in a team with pears, staff and teachers
4. Demonstrate professionalism and ethical values in dealing with patients, cadavers, pears, staff and teachers.
5. Communicate effectively in a team with pears and teachers.
6. Demonstrate the ability to reflect on the performance.

Structure of the Course:

THEMES

To achieve these overall aims, this module comprises nine weeks including an introductory week with a separate theme for almost each week for enhancing your learning around key basic foundation areas

Theme 1: Cell structure, Chemistry and Function

Theme 2: Cellular interactions, Cell injuries, Cellular responses and Adaptations

Theme 3: Body fluids: Composition, Function & Homeostasis

Theme 4: Macromolecules: Fundamental tissues/systems of the human body

Theme 5: Fundamental tissues/systems of the human body

Theme 6: Development, Differentiation and Growth

Theme 7: Genetics and Developmental anomalies

INTRODUCTORY WEEK LEARNING (1st Week)

S. NO	LEANING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
		ANATOMY		
1.	State the history subject of Anatomy including its various branches and practical applications of Anatomy as a foundation in different fields of medicine	**Int -S1-Ana-G1** Introduction to the subject of Anatomy and its subdivisions	Interactive Lecture	BCQs, SEQs
2.	Discuss the integration of structures and functions of human body by relating with the arrangement of different levels organization	**Int --S1-Ana-G2** The arrangement of different levels organization	Interactive Lecture	BCQs, SEQs
3.	Comprehend the exact location of dissected /prosecuted part /organ of human body with respect to various terms of positions, direction, and body planes	**Int --S1-Ana-G3** Anatomical positions, Terms of position, Anatomical planes	Interactive Lecture	BCQs, SEQs
4.	Interpret the movements of different parts of human body the knowledge of various terms of movement.	**Int --S1-Ana-G4** Terms of movements	Interactive Lecture	BCQs, SEQs
5.	Explain the appendicular and axial skeleton	**Int --S1-Ana-G5** Introduction to the parts of axial and appendicular skeleton	Interactive Lecture	BCQs, SEQs
		PHYSIOLOGY		
6.	Define physiology and enumerate the branches of physiology	**Int -S1-Phy-1** Introduction to Physiology and its sub branches	Interactive Lecture	BCQs, SEQs
7.	Discuss the integration of structures and functions of human body by relating with the arrangement of different levels organization	**Int -S1-Phy-2** Functional arrangement of different levels of organization		
		BIOCHEMISTRY		
8.	Define biochemistry and Discuss the role of biochemistry in medicine	**Int -S1-Bioc-1** Introduction to biochemistry and its implication in medicine	Interactive Lecture	BCQs, SEQs
9.	Discuss the integration of macromolecules in human body at different levels organization	**Int -S1-Bioc-2** Importance of macromolecules in organization of living system	Interactive Lecture	BCQs, SEQs
		PATHOLOGY		
10.	Define the pathology Enumerate the different branches of pathology in medicine Identify different sampling and processing techniques in different branches of pathology	**Int -S1-Path-1** Introduction to pathology and its implication in medicine sampling and processing techniques	Interactive Lecture	BCQs, SEQs
11.	Define the Microbiology Enumerate the different branches of Microbiology along with their role in	**Int -S1-Micb-1** Microbiology and different fields of microbiology and	Interactive Lecture	BCQs, SEQs

	medicine	their role in diagnosis of infectious diseases		
PHARMACOLOGY				
12.	Define the pharmacology and role of pharmacology in medicine Discuss pharmaco- dynamics and pharmacokinetics	**Int -S1-Pharm-1** Introduction to pharmacology and its implication in medicine	Interactive Lecture	BCQs, SEQs
COMMUNITY MEDICINE				
13.	• To learn different definition of public health/Community Medicine • To learn evolution of public health, it importance in today's world • To learn basic functions of Public health/community Medicine • To differentiate between clinical and community medicine	**Int -S1-COM-M-1** Introduction to Community Medicine & public Health (introduction to course/ department/ faculty	Interactive Lecture	SEQs
FORENSIC MEDICINE				
14.	• Define Forensic Medicine, Forensic pathology and state Medicine • Know the branches of Forensic Medicine • Describe briefly the history of Forensic Medicine • Discuss the scope of Forensic Medicine in practice • Identify the essential facilities for medico legal investigation. • Define medical jurisprudence and differentiate it from Forensic medicine	**Pre-Fnd-S1-FOR-M-1** Introduction to forensic Medicine and Toxicology	Interactive Lecture	BCQs, SEQs
MEDICAL EDUCATION				
15.	• Describe the curriculum and modules under implementation • Describe the use of study guides (not to be assessed) • Differentiate between various teaching & learning strategies • Enlist various assessment tools, and assessment policy	**Int -S1-MED-E-1** Curriculum structure teaching learning strategies	Interactive Lecture	Workplace based assessment
16.	• Describe various study skills	**Int -S1-MED-E-2** Different study skills strategies	Interactive Lecture	Workplace based assessment
INFORMATION TECHNOLOGY				
17.	• Define IT and its importance in medicine	**Int -S1-IT-1** Importance of IT skills	Interactive Lecture	BCQs, SEQs
LIBRARY SCIENCES				
18.	• Learn literature search skills	**Int -S1-LIB-1** Literature search and library resources	Interactive Lecture	Workplace based assessment
BEHAVORIAL SCIENCES				
19.	• Learn the significance of communication skills in Medical Sciences	**Int -S1-BEH-S-1** Introduction to behavioral Sciences	Interactive Lecture	BCQs, SEQs

COMMUNICATION SKILLS				
20.	• Learn the significance of communication skills in Medical Sciences	**Int -S1-CS-1** Introduction to communication skills	Interactive Lecture	Workplace based assessment
BIOMEDICAL ETHICS				
21.	• Learn the significance of ethics in Medical Sciences	**Int -S1-BME-S-1** Introduction to Bio Medical ethics	Interactive Lecture	Workplace based assessment
RESEARCH METHODOLOGY				
22.	• Learn the significance of ethics in Medical Sciences	**Int -S1-Res-M-1** Introduction to research methodology	Interactive Lecture	Workplace based assessment

Theme 1: Cell Structure, Chemistry and Function

Real life Scenario

A 40 years American tourist lady was found in critical condition by rescue team in desert areas of Sindh. Physical examination showed all signs of dehydration such as sunken eyes, dry hair, dry and coated' tongue with thick fur, feeble voice, weak pulse and fruity smell on breathing. After resuscitation, she revealed that she have been lost in the desert for more than ten days.

And

Real life Scenario

A 3 year old mentally retarded child was brought to the GP with complaints of frequent bouts of loose motions cough and breathlessness. On physical examination, hepatosplenomegaly was present. Detailed investigations revealed a genetic abnormality with defects in the myelination in the CNS and compound lipid accumulation in cellular lysosomes with resultant malfunctioning of lysosomes.

Points to consider:

1. What is the importance of sunken eyes, dry hair and coated furry tongue, feeble voice and fruity smell in breathing? You must be able to understand the mechanism behind this phenomenon.
2. What are the reasons for regaining consciousness on resuscitation?. Discuss
   OR
3. Significance of structure, function and biochemical composition of cellular organelles in understanding the mechanism of recurrent infections and Organomegaly in this child

Now you wonder **how you can find out about the necessary information**.

- There are a number of lectures, small group discussions and clinical skills sessions scheduled in your module. You have to go through second week timetable to see whether they may be useful for exploring the answers.
- This will help you with some of the learning issues at this stage of medical education but you decide to concentrate on selected issues at this stage.
- You can decide to look for other sources of information that may be helpful, at a later stage.

SR. No.	Objectives	Topics	Teaching strategy	Assessment

ANATOMY				
1.	Demonstrate the parts and handling of light microscope	**(Fnd-S1-Ana-H1)** Microscope	Int. Lecture	BCQ, SEQ
2.	Enlist steps of tissue processing, Know the basic histological stains	**(Fnd-S1-Ana-H2)** Fixation, Embedding, Sectioning, Staining ,Steps of H&E staining	Lecture	BCQ, SEQ
3.	• Describe the structural Organization of different components of a cell • Show basic structure of cell membrane	**(Fnd-S1-Ana-H3)** Cell Introduction, Cell Organelles (Endoplasmic Reticulum, Golgi Apparatus, Ribosomes, Centrioles, Mitochondrion, Lysosomes, Peroxisomes & Nucleus)	Int. Lecture	BCQ, SEQ
		(Fnd-S1-Ana-H4) CELL MEMBRANE: Composition & Structure	Int. Lecture	BCQ, SEQ
		(Fnd-S1-Ana-H) Parts of Light microscope	Practical	BCQ, SEQ, OSPE
4.	Introduction to parts of appendicular and axial skeleton	**(Fnd-S1-Ana-G6)** Introduction to parts of appendicular and axial skeleton	Demonstratio n	BCQ, SEQ, OSPE
PHYSIOLOGY				
5.	Describe the Functional organization of different components of a cell	**(Fnd-S1-Phy-3)** General structure of cell Composition Cell organelles-I, Lysosomes Peroxisomes,Endoplasmic Reticulum,Golgi complex	Int. Lecture	BCQ, SEQ, OSPE
6.		**(Fnd-S1-Phy-4)** Cell organelles-II Mitochondria x Microtubules & Microfilaments Ribosomes Vaults Centromere,	Int. Lecture	BCQ, SEQ, OSPE
7.		**(Fnd-S1-Phy-5)** Nucleus & its Functions	Int. Lecture	BCQ, SEQ, OSPE
8.		**(Fnd-S1-Phy-6)** Sterlization, types and Methods	Practical	
BIOCHEMISTRY				
9.	Explain the Biochemical composition of cell organelles and cytoplasm	**Fnd-S1-Bioc-3** Biochemical structure of cell	Int. Lecture	BCQ, SEQ, OSPE
10.	Describe the chemical structure and significance of mitochondrial membrane	**FND-S1-Bioc-4** Biochemical structure of mitochondria	Int. Lecture	BCQ, SEQ, OSPE
11.	Describe Biochemistry of membrane transport mechanism, active transport, passive transport, simple and facilitated diffusion	**FND-S1-Bioc-5** Biochemistry of membrane transport mechanism, active transport, passive transport, simple and **facilitated diffusion**	Int. Lecture	BCQ, SEQ, OSPE
12.		FND-S1-Bioc-6 practical	Practical	BCQ, SEQ, OSPE, Viva
PATHOLOGY				
13.	Differentiate between eukaryote and prokaryote cells and the importance of	FND-S1-Mic-2 Basic bacteriology: Eukaryotes and	Int. Lecture	BCQ, SEQ, OSPE

	the morphological difference in disease and diagnosis of infections	Prokaryotes		
14.	Describe the important components of a typical bacterial cell Enlist the specialized structure of bacterial cell and their role in disease.	FND-S1-Mic-3 Structure of bacteria, virus, fungus and parasites, and specialized structure of bacterial cell and their role in disease.	Int. Lecture	BCQ, SEQ, OSPE
15.	State the differentiating characteristics of gram positive and gram negative bacteria and it's importance in diagnosis and vaccination.	FND-S1-Mic-4 Gram positive and gram negative bacteria and it's importance in diagnosis and vaccination.	Int. Lecture	BCQ, SEQ, OSPE
16			CBL	FEEDBACK

Theme 2: Cellular interactions, Cell injuries, cellular responses and adaptations

A 35 year old male smoker visited his GP with complaint of chronic cough and history of weight loss. Cytological examination of lung tissue showed metaplastic changes in epithelium due to cellular injury that ultimately leads to cellular adaptation (metaplasia). Due to cellular adaptations cell membrane physiology is also affected.

Points to consider:

1. What is mechanism or process regarding changes occurred in epithelium?

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- This will help you with some of the learning issues at this stage of medical education but you have to concentrate on selected issues at this stage.
- You can also decide to look for other sources of information that may be helpful, at a later stage.

SR. NO.	Objectives	Topics	Teaching Strategy	Assessment
		ANATOMY		
1	Describe components of cell surface modifications and junction complex	**FND-S1-Ana-H-5** Cell surface modifications and cell junctions	Int.Lecture	BCQs, SEQs
2	Differentiate between normal and abnormal cell division and their consequences	**FND-S1-Ana-E-1** Cell cycle, Mitosis and Meiosis cell divisions	Int. Lecture	BCQs, SEQs
4		**FND-S1-Ana-H** Slide preparation, artifacts, Cell membrane and cell organelles	Practical	BCQs, SEQs, OSPE, Viva
		PHYSIOLOGY		
4	Explain composition and basic structure of cell membrane functional importance and adaptation	**FND-S1- Phy-7** Plasma membrane & its functions Lipid bilayer Membrane proteins Membrane carbohydrates Functions of membrane	Int. Lecture	BCQs, SEQs
5	Describe types and process of transport across the membrane and their effects.	**FND-S1- Phy-8** Methods of transport Diffusion-Simple Caveoli	Int. Lecture	BCQs, SEQs, OSPE
6	Describe the Transport across cell membrane	**FND-S1- Phy-9** Protein mediated transport Facilitated diffusion Osmosis	Int. Lecture	BCQs, SEQs, OSPE
7	Explain the physiological mechanism and types of transport. (Passive & Active)	**FND-S1- Phy-10** Active transport Primary active transport Secondary active transport	Int. Lecture	BCQs, SEQs, OSPE
8		**FND-S1- Phy-11** Phagocytosis & pinocytosis Filtration	Int. Lecture	BCQs, SEQs, OSPE
9	▪ Describe the membrane potential its development & maintenance of resting membrane potential. ▪ Explain Permeability of cell membrane ▪ Explain the Propagation of action potential – I and its ionic basis	**FND-S1- Phy-12** Resting membrane potential Graded potential	Int. Lecture	BCQs, SEQs, OSPE
10		**FND-S1- Phy-13** Factors affecting membrane potential/Action Potential Propagation of action potential – I ar	Int. Lecture	BCQs, SEQs, OSPE
		PATHOLOGY		
11	Define and briefly describe the terms: Reversible cell injury Enumerate the Causes of Cell Injury Describes the sequential morphologic changes in Cell Injury Describe the light and electron microscopic morphology of Reversible injury. Explain ischemic injury, reperfusion injury and toxic injury with the help of selected Clinical examples of Cell Injury	**FND-S1- Path-2** Reversible cell injury the Causes of Cell Injury morphologic changes in Cell Injury the light and electron microscopic morphology of Reversible injury. ischemic injury, reperfusion injury and toxic injury with the help of selected Clinical examples	Int. Lecture	BCQs, SEQs, OSPE
12	Differentiate between Necrosis and	**FND-S1- Path-3**	Int. Lecture	BCQs, SEQs, OSPE

	Apoptosis Describe the nuclear and cytoplasmic features of necrosis. Define and briefly describe the Patterns of Tissue Necrosis including: Coagulative necrosis Liquefactive necrosis Gangrenous necrosis Caseous necrosis Fat necrosis Fibrinoid necrosis	Necrosis and Apoptosis, the nuclear and cytoplasmic features of necrosis. Tissue Necrosis including: Coagulative necrosis Liquefactive necrosis Gangrenous necrosis Caseous necrosis Fat necrosis Fibrinoid necrosis		
13	Define Apoptosis Enumerate pathological and physiological Causes of Apoptosis Describe Biochemical Features and Mechanism of Apoptosis Summarize the role of Apoptosis in health and disease	**FND-S1- Path-4** Apoptosis and Causes of Apoptosis, Biochemical Features and Mechanism of Apoptosis And the role of Apoptosis in health and disease	Int. Lecture	BCQs, SEQs, OSPE
	Define/Compare Hypertrophy, Hyperplasia, Atrophy and Metaplasia. Enlist physiological and pathological mechanisms of above mentioned types of adaptation.	**FND-S1- Path-5** Hypertrophy, Hyperplasia, Atrophy and Metaplasia and physiological and pathological mechanisms of above mentioned types of adaptation.	Int. Lecture	BCQs, SEQs, OSPE
PHARMACOLOGY				
14	Enlist different routes of drug administration& describe the merits & demerits of the different routes of drug administration	**FND-S1- Pharm-2** Routes of drug administration (entral, Par-entral) drugs	Int. Lecture	BCQs, SEQs, OSPE
15	Describe drug absorption & factors affecting rate and extent of drug absorption	**FND-S1- Pharm-3** Absorption: Process of absorption & Factors modifying drug absorption	Int. Lecture	BCQs, SEQs, OSPE

Theme 3: Body fluids: composition, function & homeostasis

A 33 year old female diabetic patient brought to the emergency department with complains of abdominal pain and vomiting after attending a party. Clinical examination revealed severe dehydration, low blood pressure and respiratory distress (respiratory rate: 40 beats/min). Biochemical analysis revealed severe metabolic acidosis and hyperglycemia. Ketone bodies were also positive on urine analysis.

Points to consider:

Now you wonder **how you can find out about the necessary information**.

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- This will help you with some of the learning issues at this stage of medical education but you decide to concentrate on selected issues at this stage.
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S. No	Objectives	Topics	Teaching Strategy	Assessment
		Physiology		
1	Describe the divisions of body fluids into intracellular, extracellular and intravascular compartments.	**FND-S1- Phy-13** Body water Extracellular fluid & internal environment (ICF & ECF)	Int. Lecture	BCQs, SEQs, OSPE
2	Recognize the physiochemical aspects for the maintenance of homeostasis	**FND-S1- Phy-14** Homeostasis ECF Internal environment Homeostasis Role of various body systems in homeostasis	Int. Lecture	BCQs, SEQs, OSPE
3	Explain the concepts of homeostasis and its regulation through feedback mechanism.	**FND-S1- Phy-15** Mechanisms of body control Negative feedback Positive feedback Feed-forward Stress & disease	Int. Lecture	BCQs, SEQs, OSPE
		BIOCHEMISTRY		
4	Discuss the role of Biochemical aspects for the maintenance of homeostasis.	**FND-S1-Bioc-6** Ionization of water & weak acids bases Illustrate Concept of pH and pH scale	Int. Lecture	BCQs, SEQs, OSPE
5		**FND-S1-Bioc-7** Dissociation constant & titration curve of weak acids, the concept of pK values	Int. Lecture	BCQs, SEQs, OSPE
6		**FND-S1-Bioc-8** Buffers and their mechanism of action, Henderson-Hesselbalch Equation	Int. Lecture	BCQs, SEQs, OSPE
7		**FND-S1-Bioc-9** selectively permeable membrane osmosis, osmotic pressure,	Int. Lecture	BCQs, SEQs, OSPE
8		**FND-S1-Bioc-10** surface tension, viscosity & their importance related to body fluids	Int. Lecture	BCQs, SEQs, OSPE
		PHARMACOLOGY		
9	Explain bioavailability & describe factors affecting bioavailability	**Fnd-S1-Phrm-4** Bioavailability +half-life + 1st Pass Effect	Int. Lecture	BCQs, SEQs, OSPE
10	Describe the distribution of a drug through various body compartments & explain clinical significance of Vd	**Fnd-S1-Phrm-5** Drug Distribution & Reservoir	Int. Lecture	BCQs, SEQs, OSPE
11	INTEGRATED LEARNING of Physiochemical aspects of Body Homeostasis	Fnd-S1-Cbl-2	CBL	
		PATHOLOGY		

12	Discuss the role of Intracellular Accumulations in metabolic derangements of cell.	**FND-S1- Path-6** Intracellular Accumulations in metabolic derangements of cell.	Int. Lecture	BCQs, SEQs, OSPE
13	Define and briefly describe the terms: Steatosis (Fatty Change) Cholesterol and Cholesterol Esters Proteins component accumulation Hyaline changes Pigments Glycogens	**FND-S1- Path-7** Steatosis (Fatty Change) Cholesterol and Cholesterol Esters Proteins component accumulation Hyaline changes Pigments Glycogens	Int. Lecture	BCQs, SEQs, OSPE
14	Define and describe Pathologic Calcification. Differentiate between Dystrophic calcification and Metastatic calcification Discuss events in Cellular Aging	**FND-S1- Path-8** Pathologic Calcification and Differences between Dystrophic calcification and Metastatic calcification Cellular Aging	Int. Lecture	BCQs, SEQs, OSPE
15	Discuss the events of Edema Congestion Haemorrhage	**FND-S1- Path-9** Edema Congestion Haemorrhage	Int. Lecture	BCQs, SEQs, OSPE

Theme 4: Macromolecules/ Fundamental tissues/systems of the human body

Salma, 2-years old girl, belongs to poor family and resident of urban slum is suffering from loose stools, and vomiting. She had experienced recurrent episodes of diarrhea and acute respiratory tract infections for last 1 year. Physical examination reveals under-nourished and underweight child with muscle wasting. She is treated as a case of Protein energy malnutrition.

Points to consider:

- What is the importance of macromolecules in growth and homeostasis of human body?You must be able to understand the mechanism behind this phenomenon.
- Why it is significant to provide her balanced diet containing carbohydrates, proteins and fats immediate basis

Now you wonder **how you can find out about the necessary information**.

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S. No	Objectives	Topics	Teaching Strategy	Assessment
		Anatomy		
1.	Classify bones on the basis of shape, development, region and structure	FND-S1- **Ana-G7** Divisions & functions of skeletal system, classification of bones. Gross structure of adult long bone. Parts of young long bone	Demonstration	BCQs, SEQs, OSPE, Viva, Feedback
2.	Describe general concepts of development, ossification and blood supply of bones	FND-S1- **Ana-G8** Bone development (ossification), blood supply of long bones	Demonstration	BCQs, SEQs, OSPE, Viva, Feedback
3.	Classify joints on the basis of structure, regions and functions, Discuss the characteristics of synovial joints and classify on basis of structure & movement	FND-S1- **Ana-G9** Describe the synovial joints, General description of the joints	Interactive Lecture	BCQs, SEQs, OSPE, Viva
4.	Define dislocation, sprain and inflammation of joints	FND-S1-ORT-1 Fractures	Int. Clinical Lecture	Feedback
5.	Describe the microscopic features of epithelial tissues, explain their functional importance and their surface modification	FND-S1- **Ana-H-7** Epithelium	Int. Lecture	BCQs, SEQs, OSPE, Viva
6.	Discuss gross and microscopic features of exocrine glands	FND-S1- **Ana-H-8** Exocrine glands	Int Lecture	BCQs, SEQs, OSPE, Viva
7.	Describe and differentiate the microscopic features of connective tissues	FND-S1- **Ana-H-9** Histology of Connective tissue, types of connective tissues: loose connective regular and irregular	Int.Lecture	BCQs, SEQs, OSPE, Viva
8.	Demonstrate histological features of cartilage	FND-S1- **Ana-H-10** Types of cartilage and histological features of cartilage	Int.Lecture	BCQs, SEQs, OSPE, Viva
9.	Demonstrate histological features of bones	FND-S1- **Ana-H-11** Histology of bones	Int.Lecture	BCQs, SEQs, OSPE, Viva
10.		FND-S1- **Ana-H-12** **Epithelium**	Practical	BCQs, SEQs, OSPE, Viva
		PHYSIOLOGY		
11.	Power Lab	**(Fnd-Phy-1)** Describe the emphasis of laboratory sessions in Physiology experiments and introduction to power-lab.	Practical	BCQs, SEQs, OSPE, Viva
12.	HAND WASHING	**(Fnd-Phy-2)** Identify the indications of hand washing / Demonstrate the protocols and steps of hand washing in sequential manner	Practical	BCQs, SEQs, OSPE, Viva
		BIOCHEMISTRY		
13.	Apply the basic knowledge of carbohydrates in chemistry for health	FND-S1- **Bioc-7** carbohydrate and its biochemical structure. Classification of	Inter.lecture	BCQs, SEQs, OSPE, Viva

		carbohydrates and their biochemical importance		
14.	Describe the Biochemical structure of polysaccharides with its clinical importance	FND-S1**- Bioc-8** the Biochemical structure of polysaccharides with its clinical importance	Inter.lecture	BCQs, SEQs, OSPE, Viva
15.	Discuss functions of carbohydrates in cell membrane, energy provision and nutrition supply to different parts of body	**FND-S1- Bioc-9** functions of carbohydrates in cell membrane, energy provision and nutrition supply to different parts of body	Inter.lecture	BCQs, SEQs, OSPE, Viva
16.	Describe Different isomers of monosaccharides e.g Glactose, mannose, fructose, dextrose.	**FND-S1- Bioc-10** Different isomers of monosaccharides e.g Glactose, mannose, fructose, dextrose.	Inter.lecture	BCQs, SEQs, OSPE, Viva
17.	Explain Structure of disaccharides and oligosaccharides	**FND-S1- Bioc-11** Structure of disaccharides and oligosaccharides	Inter.lecture	BCQs, SEQs, OSPE, Viva
18.	Classify protein on the basis of structure, function and chemical reactions and recognize their importance in balanced diet and health	**FND-S1- Bioc-12** Classification of protein on the basis of structure, function and chemical reactions and recognize their importance in balanced diet and health	Inter.lecture	BCQs, SEQs, OSPE, Viva
19.	Discuss the significance of Lipids for balanced diet and health	**FND-S1- Bioc-13** the significance of Lipids for balanced diet and health	Inter.lecture	BCQs, SEQs, OSPE, Viva
20.	Classify protein on the basis of physiochemical properties, functions and chemical reactions; and recognize their importance in balanced diet and health	**FND-S1- Bioc-14** Classification protein on the basis of physiochemical properties, functions and chemical reactions; and recognize their importance in balanced diet and health	Inter.lecture	BCQs, SEQs, OSPE, Viva
21.	Classify lipids & fatty acids. Discuss Chemistry and Biochemical function of fatty Acids and essential fatty Acids	**FND-S1- Bioc-15** Classification of lipids & fatty acids. Discuss Chemistry and Biochemical function of fatty Acids and essential fatty Acids	Inter.lecture	BCQs, SEQs, OSPE, Viva
22.	Classify Amino Acids on the basis of structure, properties, nutritional significance and their biological role	**FND-S1- Bioc-16** Classification of Amino Acids on the basis of structure, properties, nutritional significance and their biological role	Inter.lecture	BCQs, SEQs, OSPE, Viva
23.	Demonstrate Steroids, Sterol eg: Cholesterol, Describe chemistry, function and clinical significance of steroids	**FND-S1- Bioc-17** Describe chemistry, function and clinical significance of steroids	Inter.lecture	BCQs, SEQs, OSPE, Viva
24.	Define and discuss the Biomedical importance of peptides and polypeptides	**FND-S1- Bioc-18** Define and discuss the Biomedical importance of peptides and polypeptides	Inter.lecture	BCQs, SEQs, OSPE, Viva
25.	Discuss Phospholipids, Glycolipids, Sphingolipids and their Biochemical significance	**FND-S1- Bioc-19** Discuss Phospholipids, Glycolipids, Sphingolipids and their Biochemical significance	Inter.lecture	BCQs, SEQs, OSPE, Viva
26.	Explain biotransformation & enlist phase I and phase II	**Fnd-S1-Phrm-6** Drug Biotransformation Phase I	Inter.lecture	BCQs, SEQs, OSPE, Viva

	biotransformation reactions	reactions		
27.	Explain biotransformation & enlist phase I and phase II biotransformation reactions	**Fnd-S1-Phrm-7** Drug Biotransformation Phase II reactions	Inter.lecture	BCQs, SEQs, OSPE, Viva

Theme 5: Fundamental tissues/systems of the human body

Real Life Scenario

A new born baby examined by Pediatrician found to have a lump at the level of lumber 4 vertebrae with bilateral talipes equino varus. The defect is most commonly due to Spina bifida with meningomylocele, one of the congenital anomaly resulted from abnormal development of neural tube. Mother gave history of having a previous child born with similar defect and despite advice by her GP she never took folic acid during her pregnancies.

Points to consider:

- Development of neural tube is complicated process where closure of neuropores is significant event. What are the common sites of failure of neural tube to close? What are the types of spina bifida along with functional impairments and management options with prognosis?
- Why it is significant to provide her balanced diet containing folic acid along with carbohydrates, proteins and fats immediate basis

Now you wonder **how you can find out about the necessary information**.

- There are a number of lectures, small group discussions and clinical skills sessions scheduled in your module. You may go through second week timetable to see whether they may be useful.
- This will help you with some of the learning issues at this stage of medical education but you decide to concentrate on selected issues at this stage.
- You can decide to look for other sources of information that may be helpful, at a later stage.

S. No	Objectives	Topics	Teaching Strategy	Assessment
Anatomy				
1.	Recognize the role of Skin, fascia, cartilage and bones and their component tissues in Support and Protection	**(Fnd-S1-Ana-H-13)** Introduction to Integumentary system: Microscopic anatomy of skin and fascia	Int. Lecture	SBQs, SEQs, OSPE
2.	Describe the histological features of muscular tissue	**(Fnd-S1-Ana-H-14)** Histology of the Muscular tissue	Int. Lecture	SBQs, SEQs, OSPE
3.	Explain the basic structure and functions of blood vessels.	**(Fnd-S1-Ana-H-15)** Blood vascular system (CAPILLARIES, ARTERIES, VEINS, ANASTOMOSIS)	Int. Lecture	SBQs, SEQs, OSPE
4.	Correlate Movement and Posture of human body with the structure of muscles and joints.	**(Fnd-S1-Ana-G-10)** Definition and classification of muscles	Demonstration	SBQs, SEQs, OSPE, Viva
5.	Integrate the function of Defense with the structure of lymph nodes and lymphatics	**(Fnd-S1-Ana-G-11)** Introduction to lymphoid system:	Int. Lecture	SBQs, SEQs, OSPE
6.	Correlate the functions of Control and Regulation with the knowledge of arrangement and Distribution of NERVOUS SYSTEM.	**(Fnd-S1-Ana-G-12)** Nervous System Division CNS, PNS Neurons: Types Classification, Nerve (With Its Covering) & Myelin	Int. Lecture	SBQs, SEQs, OSPE
7.		**(Fnd-S1-Ana-G-13)** Formation and structure of Typical Spinal Nerve	Int. Lecture	SBQs, SEQs, OSPE
8.		**(Fnd-S1-Ana-G-14)** General Concepts of Autonomic nervous system	Int. Lecture	SBQs, SEQs, OSPE
9.		**(Fnd-S1-Ana-H-16)** Histology of nerve cells	Int. Lecture	SBQs, SEQs, OSPE
10.		**(Fnd-S1-Ana-E-02)** Overview of Male and female reproductive system	Int. Lecture	SBQs, SEQs, OSPE
11.	Describe the process of Gametogenesis	**(Fnd-S1-Ana-E-3)** Gametogenesis	Int. Lecture	SBQs, SEQs, OSPE
12.	Discuss ovulation and phases and outcomes of fertilization	**(Fnd-S1-Ana-E-4)** Ovulation fertilization	Int. Lecture	SBQs, SEQs, OSPE
13.	Enumerate the events of first week of development	**(Fnd-S1-Ana-E-5)** First week of development(cleavage and blastocyst formation and implantation)	Int. Lecture	SBQs, SEQs, OSPE
14.		**(Fnd-S1-Ana-E-6)** the second week of development (Formation of amniotic cavity, amnion, bilaminar embryonic disc, yolk sac, chorionic sac and primary chorionic villi)	Int. Lecture	SBQs, SEQs, OSPE
15.		**Gynecology** Clinical Lecture	Int. Lecture	SBQs, SEQs, OSPE
PHYSIOLOGY				
16.	Describe the Physiological Concepts and organization of nervous system	**FND-S1- Phy-16** Introduction	Int. Lecture	SBQs, SEQs, OSPE

		Organization of the nervous system		
17.	Describe the basic Structure and function of neuron Describe the Excitable cells and their types(Synapse)	**FND-S1- Phy-17** Neuron Neuroglia Synapses and neural integration Types of synapses Structure of synapses Synaptic transmission	Int. Lecture	SBQs, SEQs, OSPE
18.	Describe the general organization of Autonomic Nervous System	**FND-S1- Phy-18** General Physiological concepts Autonomic nervous system	Int. Lecture	SBQs, SEQs, OSPE
19.	Enumerate the different organ systems and basic functions and mechanism of specialized cells such as skin and muscle	**FND-S1- Phy-19** Skin Muscle	Int. Lecture	SBQs, SEQs, OSPE
BIOCHEMISTRY				
20.	Classifiy Biochemical role of Macro minerals (Na, K, Ca, Cl, PO4) Micro minerals (Fe, Zn, Mg, Se, I, Cu, Cr, Cd, Mn)	**FND-S1- Bioc-20** Classification and Biochemical role of Macro minerals (Na, K, Ca, Cl, PO4) Micro minerals (Fe, Zn, Mg, Se, I, Cu, Cr, Cd, Mn)	Int. Lecture	SBQs, SEQs, OSPE
21.	Describe drug excretion & enlist routes of drug excretion	**Fnd-S1-Phrm-8** Drug Excretion	Int. Lecture	SBQs, SEQs, OSPE

Theme 6: Development, differentiation and Growth

Real Life Scenario

A young lady brought to emergency with severe abdominal pain and vaginal bleeding, also give the history of amenorrhea since two months. Her ultrasound scan reveals empty uterus and a mass in right fallopian tube suggestive of ectopic pregnancy?

Points to consider:

- What are the normal and abnormal sites of implantation?
- How and when implantation occurs?
- Why graft versus host reaction does not occur during implantation?

Now you wonder **how you can find out about the necessary information**.

- There are a number of lectures, small group discussions and clinical skills sessions scheduled in your module. You may go through second week timetable to see whether they may be useful.
- This will help you with some of the learning issues at this stage of medical education but you decide to concentrate on selected issues at this stage.
- You can decide to look for other sources of information that may be helpful, at a later stage.

S. No	Objectives	Topics	Teaching strategy	Assessment
ANATOMY				
1.		Ectopic pregnancy	Int. Clinical lecture	
2.	Explain main events of third week of development	**(Fnd-S1-Ana-E-7)** Formation of primitive streak, Gastrulation and notochord	Int. Lecture	SBQs, SEQs, OSPE
3.		**(Fnd-S1-Ana-E-8)** Formation of neural tube and Formation of somites	Int. Lecture	SBQs, SEQs, OSPE
4.	Describe the process of folding of embryo, Formation of intra embryonic coelom and its outcomes	**(Fnd-S1-Ana-E-9)** the process of folding of embryo, Formation of intra embryonic coelom and its outcomes	Int. Lecture	SBQs, SEQs, OSPE
5.	Enlist the derivatives of three germ layers	**(Fnd-S1-Ana-E-10)** Derivatives of ectodermal germ layers and neural crest cells	Int. Lecture	SBQs, SEQs, OSPE
6.	Enlist the derivatives of mesodermal and endodermal germ layers	**(Fnd-S1-Ana-E-11)** Derivatives of mesodermal germ layers and neural crest cells Derivatives of endodermal germ layers and neural crest cells	Int. Lecture	SBQs, SEQs, OSPE
7.	Discuss the significant weekly events of embryonic period from 4th week to 8th week and during the organogenesis period Discuss the major events of fetal period	**(Fnd-S1-Ana-E-12)** 4th week to 8th week and during the organogenesis period, the major events of fetal period	Int. Lecture	SBQs, SEQs, OSPE
8.	Explain the interchange of substances between maternal and fetal blood by applying the knowledge of structure and functions of placenta and fetal membranes	**(Fnd-S1-Ana-E-13)** Placenta and fetal membranes	Int. Lecture	SBQs, SEQs, OSPE

Theme 7: Genetics and developmental anomalies

Real Life Scenario
40-years old pregnant lady, after having 12 weeks ultrasound was advised for further investigations to rule out chromosomal and genetic abnormalities in developing fetus due her advancing age and abnormalities in nuchal translucency measurements on ultrasonography.

Points to consider:

- What is the most common cause of abnormal chromosome number? Give example of a clinical syndrome involving abnormal numbers of chromosomes.
- In addition to numerical abnormalities, what types of chromosomal alterations occur?
- What investigations are useful for screening and diagnosis of chromosomal abnormalities?

Now you wonder **how you can find out about the necessary information**.

- There are a number of lectures, small group discussions and clinical skills sessions scheduled in your module. You may go through second week timetable to see whether they may be useful.
- This will help you with some of the learning issues at this stage of medical education but you decide to concentrate on selected issues at this stage.
- You can decide to look for other sources of information that may be helpful, at a later stage.

S. No	Objectives	Topics	Teaching strategy	Assessment
		ANATOMY		
1.	Define teratogenesis and the basic principles of teratogenesis. Categorize the common teratogens	**(Fnd-S1-Ana-E-14)** Teratogenesis	Intr.lecture	BCQs, SEQs, OSPE, Viva
2.	Explain the types of twin / multiple pregnancies and clinical significance	**(Fnd-S1-Ana-E-15)** Twin pregnancy	Intr.lecture	BCQs, SEQs, OSPE, Viva
3.	Calculate the expected date of delivery (EDD) and describe various methods used to assess fetal wellbeing	FND-S1-OBGY-1	Int. Clinical lecture	
		BIOCHEMISTRY		
4.	Apply the basic concepts of Chemistry of Nucleic acids and their types for understanding the mechanism of transfer of genetic characters and for protein synthesis	**FND-S1- Bioc-20** Apply the basic concepts of Chemistry of Nucleic acids and their types for understanding the mechanism of transfer of genetic characters and for protein synthesis.	Intr.lecture	BCQs, SEQs, OSPE, Viva
5.	Describe Synthetic derivatives of purine and pyrimidine's their role in health and disease	**FND-S1- Bioc-21** Synthetic derivatives of purine and pyrimidine's their role in health and disease	Intr.lecture	BCQs, SEQs, OSPE, Viva
		PHYSIOLOGY		
6.	Describe Physiological basis of gene and functions of DNA and RNA	**FND-S1- Phy-19** DNA ,Gene, Genetic code RNA ,Types,codan ,anti codan	Intr.lecture	BCQs, SEQs, OSPE
7.		**FND-S1- Phy-20** Control of gene functions	Intr.lecture	BCQs, SEQs, OSPE
		PHARMACOLOGY		
8.	Explain the term 'pharmacodynamics &Explain the terms affinity, efficacy, intrinsic activity & potency	**Fnd-S1-Pharm-09** Introduction to Dynamics&**Drug Receptors** A. Relation between drug concentration & response & signaling mechanism	Inter.lecture	BCQs, SEQs, OSPE
9.		**Fnd-S1-Pharm-10 Drug Receptors** B. Second messengers & receptor regulation	Inter.lecture	BCQs, SEQs, OSPE
10.	Describe the general mechanisms by which drugs act	**Fnd-S1-Phrm-11** Factors Modifying drug	Inter.lecture	BCQs, SEQs, OSPE

		action &Therapeutics Index		
11.	Correlate the principles of general pharmacology for the appropriate therapy of disorders / diseases	**Fnd-S1-Phrm-12** Adverse drug reaction (ADR)	Inter.lecture	BCQs, SEQs, OSPE
12.		**Fnd-S1-Phrm-13** Teratogenic drugs	Inter.lecture	BCQs, SEQs, OSPE
		PATHOLOGY		
13.	Define Mutations Review principals relating to the effects of gene mutations including: Point mutations within coding sequences. Mutations within noncoding sequences Deletions and insertions Frameshift mutation	**FND-S1- Path-10** Mutations and Review principals relating to the effects of gene mutations including: Point mutations within coding sequences. Mutations within noncoding sequences	Inter.lecture	BCQs, SEQs, OSPE
14.	1. Discuss the postulates of Mendelian Disorders 2. Explore the pattern of inheritance in Autosomal Dominant Disorders, Autosomal Recessive Disorders and X-Linked Disorders 3. List the examples of autosomal and x linked disorders	**FND-S1- Path-11** Mendelian Disorders and the pattern of inheritance in Autosomal Dominant Disorders, Autosomal Recessive Disorders and X-Linked Disorders	Inter.lecture	BCQs, SEQs, OSPE
15.	Enumerate the biochemical and molecular basis of single gene (Mendelian) disorders.	**FND-S1- Path-12** biochemical and molecular basis of single gene (Mendelian) disorders.	Inter.lecture	BCQs, SEQs, OSPE
16.	1. Describe the normal Karyotype 2. Define various types of structural abnormalities of chromosomes including: Deletion, ring chromosome, Inversion, Isochromosome and Translocations.	**FND-S1- Path-13** normal Karyotype and various types of structural abnormalities of chromosomes including: Deletion, ring chromosome, Inversion, Isochromosome and Translocations.	Inter.lecture	BCQs, SEQs, OSPE
17.	Discuss the cytogenetic disorder involving autosomes, Trisomy 21 (Down Syndrome)	**FND-S1- Path-14** the cytogenetic disorder involving autosomes, Trisomy 21 (Down Syndrome)	Inter.lecture	BCQs, SEQs, OSPE
18.	Discuss the cytogenetic disorder involving sex chromosomes (Klinefelter Syndrome, Turner Syndrome)	**FND-S1- Path-15** the cytogenetic disorder involving sex chromosomes (Klinefelter Syndrome, Turner Syndrome)	Inter.lecture	BCQs, SEQs, OSPE
19.	Discuss the role of Molecular Diagnosis of Genetic Diseases especially germline mutations and	**FND-S1- Path-16** Molecular Diagnosis of Genetic Diseases	Inter.lecture	BCQs, SEQs, OSPE

	acquired genetic alterations.	especially germline mutations and acquired genetic alterations.		
20.	Describe the significance of PCR analysis, Southern Blotting, Fluorescence in Situ Hybridization, Array-Based Comparative Genomic Hybridization as future diagnostic tools	**FND-S1- Path-17** PCR analysis, Southern Blotting, Fluorescence in Situ Hybridization, Array-Based Comparative Genomic Hybridization as future diagnostic tools	Inter.lecture	BCQs, SEQs, OSPE
21.	1. Enlist the methods of DNA transfer in microorganisms 2. State the significance of DNA transfer in drug resistance 3. Enlist and describe the types of mutations in bacteria. 4. Describe the process of lysogeny . 5. Describe the role of mutations in drug resistance in infectious diseases.	**FND-S1- Path-18** the methods of DNA transfer in microorganisms and the significance of DNA transfer in drug resistance	Inter.lecture	BCQs, SEQs, OSPE
22.		Types of mutations in bacteria, the process of lysogeny the role of mutations in drug resistance in infectious diseases.	Inter.lecture	BCQs, SEQs, OSPE
23.	Congenital fetal abnormalities	**FND-S1- Path-19** Congenital fetal abnormalities	Inter.lecture	BCQs, SEQs, OSPE, Viva

BOOKS RECOMMENDED

ANATOMY

- Clinical Anatomy by Richard S Snell, Cunningham's Manual of Anatomy
- Wheatears Histology, Langman's Embryology, Keith L. Moore Embryology

PHYSIOLOGY

- Text Book of Physiology by Guyton & Hall, Review of Physiology by Ganong
- Physiology Journal for Practical

BIOCHEMISTRY

- Harper's Illustrated Biochemistry. By: Robert k. Murray.
- Textbook of Medical Biochemistry. By: Chatterjee.
- Lippincott's Illustrated Review Biochemistry. By: Champe
- Textbook of Biochemistry with clinical correlations. By: Devin TM.

PHARMACOLOGY

- Text book of Pharmacology by Katzung Latest Edition
- Review of Katzung
- Illustrated Review of Pharmacology by Lippincott Latest Edition

GENERAL PATHOLOGY

- Basic of Pathology Latest Edition (Robbins)
- Basis of Disease of Pathology Latest Edition (Robbins)

MICROBIOLOGY

- Textbook by Levenson
- Textbook by Jawetz

PARASITOLOGY

- Text book by Chatterjee
- Text book by Black Lock

COMMUNITY MEDICINE

- Text book of Community Medicine & public health by Ilyas
- Text Book of Prevention & Social Medicine by J E PARK