

Tutor guide
M1 2022-2023

- Contents:

- 1-Guide lines (why P.B.L. “Problem Based Learning”) added to integrated system in October 6 university faculty of medicine (what the student & tutor will do this term) , (modules in this term & their general objectives)
- 2-Schedule for lectures , practicals , cases (small group teaching) , skill lab , & exams
- 3-Rubrics for grading assignments and presentations
- 4-Portfolio items
- 5-Cases with objectives

- PBL Philosophy:

In a world where available information is growing exponentially, we believe that the most important thing a student needs to know is how to learn. So the main learning goals of the PBL are a framework for looking at concepts, skills, and abilities and help guide the creation of personalized student curriculum. PBL offers unique environments where students can flourish as individuals within a community of learners.

- PBL Process:

The core of the PBL process is the tutorials that will be held once weekly beside the practical sessions and the interactive lectures. In each tutorial there will be a case scenario that is delivered to the students, where they collaborate together through the seven jumps process to point out the possible problems present in the case and to find out the intended learning objectives need to be known through this case. In the second tutorial, they will discuss the objectives of the case after self study, and a new case will be delivered. In PBL process the role for lectures aim at clarification of complicated areas of information or to integrate different areas of information. Practical sessions and clinical skill lab are included as educational activities in BPL. They act as tools for the students to gain the needed psychomotor skills and to attain the professional attitude and behavior.

- Student role:

The student is the center of the learning process in PBL. **Students will depend on themselves in finding out the learning objectives by brain storming in the case study session. Then they will go home and study and search in the texts for the information of the objectives they got. Then the following session they should try to present the information they gazed and summarized to their students in an easy palatable way.** In PBL the students have to work hard, prepare themselves well for every tutorial group meeting, collaborate with their colleagues and practice team work. They also will have their reflection about the process, their colleagues and the tutor.

- Tutors role:

- The tutor will work as a facilitator more than traditional teacher who delivers all the information to the students. Tutors role is to stimulate and motivate the students to learn and to search for the information and knowledge. During the case they will guide the students and redirect them towards the intended learning objectives. The tutors share in the assessment process. Moreover, the tutor together with the students has the responsibility of setting the roles of the tutorial session.

- The tutor will receive guide information for the objectives in each case from the departments at least one week before the case is to be discussed, he should read them and then in the discussion of the case he should see if the students had fulfilled all the needed items so as to approve their work or they need to search more for certain items and get them so as to complete their work completely or they got more or un needed items they should discard them. By the end of the cases of the module students will have their hand out covering all items needed in the objectives they searched for
- All staff members should have their official mails done by the beginning of the academic year so as good communication may be applicable and to facilitate uploading of their lectures every Wednesday of each week
- Concerning the module (BOS 101) which is the beginning module for M1 the academic year 2022-2023.
- In each session one of the students will be the reader (the one who reads the case) and another one will be the writer (the one who writes the objectives on the board after brain storming of the students with the tutor and collect them after that)
- In session (1) (week 1)
 - One case will be red by the students
 - They make brain storming with each other and with the tutor to get the objectives the case is talking about. They will go home to search for them and make presentation about them the coming session.
 - Weeks for reading of the cases and discussion of the objectives are written above each case.
 - The presentation have certain rubrics the tutor try that the students stick more and more to them each presentation then at the last presentation of the module they will have certain mark among their portfolio total mark about:
 - The presentation they showed along the module and their share in the discussions and preparation of the work needed (see professional behavior sheet included) (the mark is given by the tutor)
 - After they finish the presentation in each session they will read the following case and brain storm to get the objectives that they will go home to prepare them as presentation in the coming case session and so on all the sessions
 - If the case is long its presentation by the students may take two weeks not one week to ensure that the students presented the objectives in the case in a good way
- All students are to make their Emails in the first week so as to be able to have the on line information uploaded weekly concerning the following:
 - Lectures
 - Videos
 - Presentation done by their colleagues
 - On line exams formative and summative

- Scoring Rubric for Presentations:

Category	Scoring Criteria	Total Points	Score
Organization (15 %)	Were the main ideas presented in a clear manner?	5	
	Information is presented in a logical sequence.	5	
	Presentation appropriately cites requisite number of references.	5	
Content (45 %)	- The Introduction is attention-getting, - It lays out the problem well, - It establishes a framework for the rest of the presentation.	5	
	Technical terms are well-defined in language that is appropriate for the target audience.	5	
	The Presentation contains accurate information.	10	
	The material included is relevant to the overall message/purpose.	10	
	Appropriate amount of material is prepared, and the points made reflect well their relative importance.	10	
	There is an obvious conclusion summarizing the presentation.	5	
Presentation (40 %)	Speaker maintains good eye contact with the audience and is appropriately animated (e.g., gestures, moving around, etc.).	5	
	Speaker uses a clear, audible voice.	5	
	Delivery is poised, controlled, and smooth.	5	
	Good language skills and pronunciation are used.	5	
	Visual aids are well prepared, informative, effective, and not distracting.	5	
	Length of presentation is within the assigned time limits.	5	
	Information was well communicated.	10	
Score %	Total Points	100%	

Steps to register on the Moodle e-learning website for Faculty of Medicine

1. Open any browser e.g. Chrome, Firefox, Edge, Safari

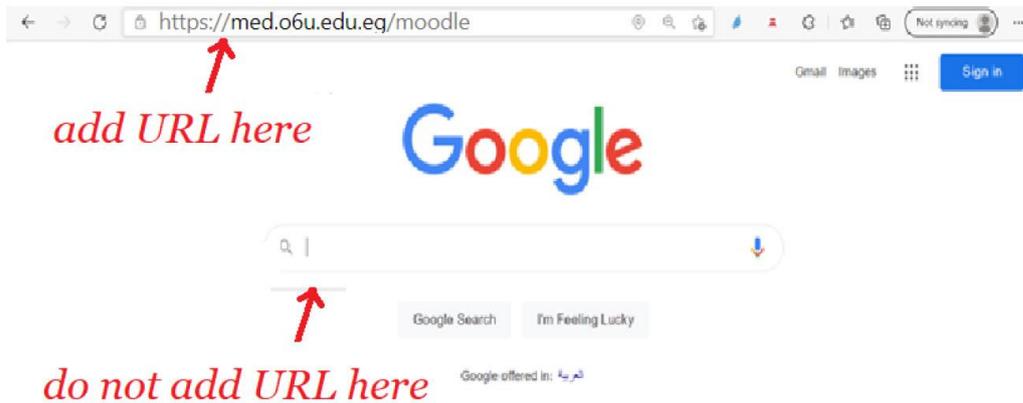


2. Then copy & paste this address in the URL box

<https://med.o6u.edu.eg/moodle>

N.B.

- It is https & not http
- There is no www in the address



3. Press "Enter" Key

o6u-med English (en) You are not logged in. (Log in)



جامعة 6 أكتوبر
October 6 University Egypt

الهيكل الإداري لجامعة 6 أكتوبر- كلية الطب

رئيس مجلس الأمناء



الأستاذ الدكتور أحمد زكي بدر

4. Click on "log in" in the upper right corner of the screen.



جامعة 6 أكتوبر
October 6 University Egypt

Username

Password

Remember username

Forgotten your username or password?

Cookies must be enabled in your browser ?

Some courses may allow guest access

Log in

Log in as a guest

5. Write your ID number twice: in the “Username” & in the “Password” here is an example:



Forgotten your username or password?

Cookies must be enabled in your browser [?](#)

Remember username

Some courses may allow guest access

6. Then click on “Log in” below. You will be asked to change your Password:

You must change your password to proceed. ×

Change password

Username

The password must have at least 8 characters, at least 1 digit(s), at least 1 lower case letter(s), at least 1 upper case letter(s), at least 1 non-alphanumeric character(s) such as as *, -, or #

Current password

New password

New password (again)

There are required fields in this form marked **i** .

The new password must have at least 8 characters, at least 1 digit(s), at least 1 lower case letter(s), at least 1 upper case letter(s), at least 1 non-alphanumeric character(s) such as as *, -, or #

Very Important: DO NOT FORGET THE NEW PASSWORD

How to enroll yourself in a Module?

Some modules need an “enrolment key” to enter it for the first time. Ask you teacher for this key.

Enrolment options

 Pediatrics-5

Teacher: Manar Aref

Teacher: Eman Sharaf

▼ Self enrolment (Student)

Enrolment key

Enrol me

Professional Behavior of student in the case checklist

Students Name:

Date:

End of module (Summative):

Module title:

Student's Signature :.....

Tutor's Name:.....

Criteria	Scale: 1 and 2 is unsatisfactory, 3, 4 and 5 is satisfactory performance					Comments
<p><u>Preparation:</u> Is well prepared with relevant information, uses a variety of references and summarizes key points</p>	1	2	3	4	5	
<p><u>Critical thinking:</u> Identifies problem, analyzes problem, suggests possible reasons for the problem, helps group to formulate learning objectives</p>	1	2	3	4	5	
<p><u>Participation:</u> Participates actively, talks on turn and listens attentively to others</p>	1	2	3	4	5	
<p><u>Communication Skill & Group Skills:</u> Respects tutor and colleagues, communicates well uses appropriate language, accepts feedback and responds appropriately. Contributes to group learning, shares information with others, demonstrates sensitivity to views and feeling of others, takes on assigned tasks willingly</p>	1	2	3	4	5	
<p><u>Presentation skills:</u> Presents the information relevant to the learning objective of the case, explains clearly the reasoning process with regard to solving the problem</p>	1	2	3	4	5	
	SATISFACTORY					UNSATISFACTORY

-The students portfolio (October 6 university - faculty of medicine - 2020 - 2021):

- Each student should go through one of the following links to make his google e-portfolio where he (she) will put the progression he will achieve in each module WEEK BY WEEK and e will send the link to the tutor to revise it. PAPER WORK OR CD OR E-MAIL ARE NOT ACCEPTED.

- Links to make e-portfolio using google sites

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwi9xOnhrYDzAhVERkEAHb_0DCgQFnoECC0QAQ&url=https%3A%2F%2Fwww.montclair.edu%2Fmedia%2Fmontclair.edu%2Foit%2Fdocumentation%2Fportfolios%2FGoogle-Sites-ePortfolio-3-13-PF-Final.pdf&usg=AOvVaw2PTNDhBjsWkTV75RJGCoen

https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwi9xOnhrYDzAhVERkEAHb_0DCgQFnoECC8QAQ&url=https%3A%2F%2Fshakeuplearning.com%2Fblog%2Fhow-to-create-powerful-student-eportfolios-with-google-sites%2F&usg=AOvVaw0koWnu2boD4ufVDvE_jtdo

- The student portfolio should contain the followings:

1- Paragraph that summarizes his learning experience and contain the followings in short:

- Resume of him
- Impact made by the education on him
- His present strengths
- His present weakness
- Future suggestions & goals

2- Any community medical work the student completed under supervision of a staff presenting the followings:

- Name of staff & position
- Date
- Site
- Results
- Obstacles

3- His cases , objectives he got by brain storming , presentations done by him , (power point)

4- Medical pics & posters done by him or his group if present

5- Web page , or brochure constructed by him or his group if present

6- Conferences attended by him if present

7- Visits done to clinical departments to see relevant experiments studied

8- Two to three education events attended by him

9- Two to three meetings with educational or clinical supervisors

10- Get started with scopus

1,2,3 SHOULD BE FORMED IN THE BOS MODULE

3, 4,5,6 SHOULD BE FORMED IN THE GMD MODULE

3, 7,8 SHOULD BE FORMED IN THE DRG MODULE

3 ,9,10 SHOULD BE FORMED IN THE MIP MODULE

BONUS MARKS ADDED TO THE PORTFOLIO MARK ONLY IF NEEDED

If any student shared in a paper with any of the staff

If any student constructed cases on secra table

If any student shared the activities of the quality unit
If any student shared in the electronic evaluations

- Portfolio scoring (Rubrics for evaluating portfolios):

- Each student should be rated as one of the followings :

- Out standing & he will be given 95% to 100% of the portfolio mark
- Acceptable & he will be given 70% to 75% of the portfolio mark
- Marginal & he will be given 60% to 65% of the portfolio mark
- Unacceptable & he will be given less than 60% of the portfolio mark

FIRST YEAR	MID MODULE	CONTINUOUS ASSESSMENT	END MODULE	OSPE
BOS 125	27 marks electronic	10 marks total 1.5 attendance sections 1.5 attendance cases 4 presentation 3 portfolio	50 marks total 40 MCQ 10 SAQs electronic	38 marks total -slides electronic and practical
GMD 125	27 marks electronic	10 marks total 1.5 attendance sections 1.5 attendance cases 4 presentation 3 portfolio	50 marks total 40 MCQ 10 SAQs electronic	38 marks total -slides electronic and practical
DRG 100	22 marks electronic	8 marks total 1.5 attendance sections 1.5 attendance cases 3 presentation 2 portfolio	40 marks total 30 MCQ 10 SAQs electronic	30 marks total -slides electronic and practical
MIP 125	27 marks electronic 16 micro 11 para	10 marks total 1.5 attendance sections 1.5 attendance cases 4 presentation 3 portfolio	50 marks total 30 micro 20 para 40 MCQ 10 SAQs electronic	38 marks total 22 micro 16 para -slides electronic and practical

General objectives for the modules included in this term

General Objectives for the module (BOS 101)

(Biochemistry, physiology, Anatomy)

a1. Identify different anatomical position plane ,terms and nomenclature (anatomy)
A2 Describe the gross& microscopic structure of bone ,joint & muscles (anatomy)
A3 Classify different joints and muscles regarding their movements (anatomy)
A4 Describe the anatomical features of different body systems (GIT,CVS, respiratory , urogenital ,nervous) (anatomy)
A5 Discuss the sequence of events taking place during the early three weeks of prenatal human development, derivatives of each embryonic germ layer, fetal membranes and the causes of congenital malformations. (embryology)
A6 Determine the microscopic structure of epithelial tissue and connective tissues (histology)
A7 Describe general histological structure of cells & its organelles and different types of cell inclusions (histology)
A8 Determine the histological structure of the skin & it appendages (histology)
A10-Identify the structure and classification & function of carbohydrates, lipids amino acids and protein (biochemistry)
B2-Explain general principles of acid base balance and role of buffer system (physiology & biochemistry)
A9-Describe the function of cell membrane & method of membrane transport (physiology)
A11-Outline the mechanism of homeostasis, water volume and body compartment (physiology)
A12Describe the anatomical classification of the ANS and its function (physiology)
A13Summarize the function of neurotransmitters of the ANS (physiology)
Intellectual skills
B1Correlate the basic anatomical, physiological and biochemical molecular facts with the main clinical features of bone fractures. (anatomy and histology)
B2 Explain general principles of acid base balance and role of buffer system (physiology & biochemistry)
B3 Correlate signs and symptoms of some diseases with the presence of certain biochemical defects, (Acid- base imbalance) (biochemistry and physiology)
B4 Correlate physiological alterations of some autonomic disturbances with clinical data to reach etiology, diagnosis (physiology)
B5. Differentiate between types of epithelial & CT tissues (histology)
Practical skills
C1- Examine various types of special stains for cells and tissues (histology)
C2- Label and draw diagrams of different cells and tissues (histology)
C3- Examine the name and side (dexterity) of a given bone; and identify the structure attached/ related to a marked area of the bone (anatomy)
C4- Examine the marked structure (any muscle, artery, vein, nerve ... etc.) in a dissected region of a cadaver (anatomy).
C5- Demonstrate the measurement of z the pH of the biological fluids and demonstrate its medical significance (biochemistry)

C6- Detect the presence of different types of carbohydrates & protein and discriminate between them in an unknown sample depending on their biochemical structure.
(biochemistry)

Professional, & communication skills and attitude

D1- Demonstrate creativity and time management abilities

D2- Work constructively in a group, cooperating with their colleagues and use constructive feedback on his/her performance

D3- Show professional responsibility and respect the compliance to work through systems

D4- Communicate professionally with, colleagues and other members of the health care team.

D5- Gather, organize and appraise information including the use of information technology where applicable.

D6- Present the medical information in written, oral and electronic forms

D7- Be prepared for the lifelong learning needs of the medical profession.

DMG (pathology)

Knowledge & comprehension
a.1-Identify types, examples, etiology, pathogenesis and pathological features of Cell injury, adaptation ,apoptosis and cell death (pathology)
a.2-Describe types of inflammation., the pathogenesis, gross and microscopic features, systemic effects, fate and complications of each type (pathology) ----- cases
a.3- Determine types of tissue repair and factors affecting the process (pathology)
a.4- Differentiate between systemic types of infections as toxemia, bacteremia, septicemia and pyemia (pathology)
a.5- Describe pathological features of various bacterial (tuberculosis and syphilis), viral, mycotic and parasitic (Shistosomal) infections. (pathology)
a.6- Describe different forms of circulatory disturbances as thrombosis, embolism, infarction, congestion, edema, hemorrhage and shock (pathology)
a.6- Determine the basics of environmental &nutritional factors, and genetic anomalies. responsible for disease occurrence. (pathology)
a.7- Explain the molecular basis of carcinogenesis (pathology)
a.8- Summaries steps of carcinogenesis, origin and morphological features of different types of neoplasms (pathology)
a.9- Methods of treatment of brain abscess (surgery)--- cases
a.10- Identify the sources of infection, mode of transmission of gram negative bacilli infectious diseases (micro) --- cases
a.11- X ray findings and surgical treatment for pulmonary T.B. (internal medicine)
Professional and Practical Skills:
C.1- Diagnose the pathologic picture of a disorder based on gross and microscopic morphology (pathology)
C.2- Formulate a differential diagnosis
C.3- Choose the most appropriate cost effective pathologic procedures
C.4- Select the necessary techniques for sample reception and processing according to the nature of the specimen received
C.5- Apply suitable measures of lab safety and infection control

General objectives for the module MIP

Microbiology, and parasitology, community

Knowledge & comprehension
a.1- Identify the sources of infection, mode of transmission & causative organisms of various infectious diseases (micro ,para) ----cases
a.2- Determine the epidemiology of infectious diseases (micro ,para, community)
a.3- Point out the principles of disease surveillance and screening, , communicable disease control, health promotion and health needs assessment (micro ,para, community)
a.4- Illustrate the management plan, prophylaxis & simple prevention methods of clinical case subjected to certain bacterial viral, parasite & helmenthesis (micro < para) (micro, para)
a.5- Describe the mechanisms of of bacterial resistance to some antimicrobial agents (micro)
A6 Describe common arthropods & explain their medical importance the diseases transmitted by them & methods of control (para)--- cases
a.7- Differentiate between immune responses (micro ,)
a.8- Describe the different applications of cellular and humoral immunity (micro)
A.9- Illustrate the effect of immunodeficiency diseases (micro)
A.10 - Surgical approach in cases of hemothorax (surgery)---- cases
A.11 - Surgical diagnosis and treatment of hydatid cyst (surgery) ---- cases
A.12- Prevalance of T.B. in community
Intellectual skills
B.1- Select appropriate laboratory investigations to reach the proper diagnosis of common infectious disease (micro<para)
B.2- Differentiate between various infectious diseases of similar clinical manifestations to reach final diagnosis(micro<para)
B.3- Interpret the different laboratory finding about a clinical infectious case to reach diagnosis (micro<para)
B.4- Correlate the structural and functional alteration due to different infectious with the clinical picture of diseases (micro<para)
B.5- Compare between the innate and adaptive immunity of various infectious disease (micro)
B6 Choose the proper immunization & treatment of important infectious disease (micro < para) --case
Practical skills
C.1- Examine various agents directly in given specimens and in staining smears(micro)
C.2- examine different culture media and the effect of bacterial growth (micro)
C.3- examine serological tests to identify the causative agents of the disease(micro)
C.4- Differentiate the gross morphology of parasites (Boxes & Jars
C.5- Identify different stages of parasites (protozoal & helmenthesis) using simple or compound Microscope or diagrams and comment on diagnostic, infective Stages or vectors of disease transmission. (Para)
C7- Identify adult arthropods of medical importance & their life cycle stages (adult, egg, larva, pupa and nymph) using dissecting & compound microscopes(Para)
C.8- Apply suitable measures of lab safety and infection control (micro ,para)

DRG

(Pharmacology , internal medicine)

Knowledge & comprehension
a.1- Identify the pharmacokinetic, pharmacodynamics properties of different drugs affecting body systems.
a.2- Determine clinically relevant age, sex and genetic related variations that affect response to drugs
A.3- Determine the efficacy of drugs in the management of diseases
A.4- Explain mechanism of drug action
A.5- Point out the indications, the relative advantages and disadvantages of pharmacotherapy modalities affecting autonomic nervous, skeletal muscles & ocular system
A.6- Summarize the adverse effects of drugs , & contraindications of the studied drugs
A.7- Causes and types of coma and coma scale (internal medicine)---cases
A.8- Determine the different classifications, toxicokinetics & dynamics of common toxic substances (toxicology)-----cases
Intellectual skills
b.1- Select the proper drug for a certain disease in the context of case study
b.2- Interpret the use of selected drug in proper way including: dose- interval-duration-route of administration
b.3- Distinguish between drug - drug interactions in the prescription
b.5- illustrate management of adverse drug reactions.& detect earliest manifestations of side effects
Practical skills
C.1- Calculate accurately drug's dosage, bioavailability, plasma half life and volume of distribution in different patient populations - put in consideration - appropriate route of administration, age, sex & associated diseases
C.2- Perform experiment on isolated tissues to detect the effect of certain drugs & site of action
C.3- Choose the proper drugs to treat particular patient.
C.4- Write a prescription for selected important diseases

Cases for the first year students (first term 2022-2023)

Cases for the module (BOS 101)

1-case (1) (First day in medical school)

(Red on week 2 and discussed in weeks 3)

Alia is a student in the first year medicine at the faculty of medicine October 6 University. In her first lecture Dr Amira the Biochemistry assistant lecturer began to talk about the homeostasis in the human body and how it affects the body systems and how it is maintained in the body. In the first lecture of physiology Prof Dr Ahmed began to talk about the methods of transport across the cell membrane and water and molecule transport across it. She was really excited and returned home to search for the new information and prepare herself for the presentation that will be held after two days.

- Objectives for brain storming :

- Discuss homeostasis (definition, aim to have homeostasis, how homeostasis is maintained in the body and conditions at which homeostasis is altered (biochemistry))
- Mention the chemical structure of cell membrane (biochemistry)
- Discuss the methods of transport across the cell membrane for ions, and water, effect of this on injecting fluids in the human body (physiology)
- Mention function of each component of the components of the cell membrane (physiology)

Tutor guide

Objective : Homeostasis

BUFFERS AND BUFFERING

Definition : buffers are systems that tend to keep their pH constant in spite of addition of **moderate amounts** of acid or alkali.

Composition : They are formed of a mixture of a **weak acid and its salt** with a strong base e.g. H_2CO_3 and NaHCO_3 or a **weak base and its salt** with a strong acid e.g. ammonium hydroxide (NH_4OH) and ammonium chloride (NH_4Cl).

Mechanism of Action :

When an acid is added to blood it will be corrected by the basic part of the buffer, while adding a strong base will be corrected by acidic part of the buffer.

A. By addition of strong acid e.g. HCl :

1. $\text{HCl} + \text{NaHCO}_3 \rightarrow \text{NaCl} + \text{H}_2\text{CO}_3$ (weak acid)
2. $\text{HCl} + \text{Na}_2\text{HPO}_4 \rightarrow \text{NaCl} + \text{NaH}_2\text{PO}_4$ (weak acid)
3. $\text{HCl} + \text{Na proteinate} \rightarrow \text{NaCl} + \text{Proteinic acid}$ (weak acid)

These weak acids do not affect much the pH of solutions.

B. By addition of strong base e.g. NaOH :

1. $\text{Na OH} + \text{H}_2\text{CO}_3 \rightarrow \text{H}_2\text{O} + \text{NaHCO}_3$ (weak base)
2. $\text{Na OH} + \text{NaH}_2\text{PO}_4 \rightarrow \text{H}_2\text{O} + \text{Na}_2\text{HPO}_4$ (weak base)
3. $\text{Na OH} + \text{Proteinic acid} \rightarrow \text{Na proteinate} + \text{H}_2\text{O}$

Thus, the OH of NaOH is neutralized to form H₂O with no change in pH.

PHYSIOLOGICAL BUFFER SYSTEMS

Enzymes control the homeostasis in the body. They are sensitive to changes to in the PH. So, any acid or base formed inside the body should be rapidly and effectively buffered .This is the function of the physiological buffer systems.

The important physiological buffer systems present in various tissues, plasma and body fluids are:

1) Bicarbonate buffer 2) Phosphate buffer 3) Protein buffer Systems including albumin and globulins.

Bicarbonate buffer is the most important system in the body

It is formed of carbonic acid and bicarbonate salt. The ratio of components in Bicarbonate system (H_2CO_3 / Base HCO_3^-) is 1/20. Bicarbonate system is **termed as the alkali reserve** because:

- a) It is easily produced from CO₂ of metabolic reactions.
- b) It is easily excreted by action of carbonic anhydrase in lung as CO₂ and H₂O.
- c) It is present in high concentrations

BLOOD BUFFERS :

The hemoglobin and oxyhemoglobin systems (inside RBCs) are responsible for the buffering of most of the CO₂ added to the blood by tissues.

Difference between buffers in plasma and buffers in RBCs

	Plasma buffers	RBCs buffers
Type of cation	They Contain sodium	They Contain potassium
Chief buffer	Bicarbonate	hemoglobin

The normal pH of arterial blood is kept around: 7.35 to 7.45.

Disturbances in buffering system produce either acidosis or alkalosis

Objective : Methods of transport across cell membrane

- *Method of transport across cell membrane:*
- **1-simple diffusion:**



- Passage of MOLECULES from high concentration of molecules to low concentration of molecules
- *rate of diffusion is **directly proportional** with -concentration gradient (the more the concentration the more the diffusion)
- -surface area (the more the surface area the more the diffusion)
- -temperature
- -solubility of the substance

*simple diffusion need no energy & no carrier

- **2-facilitated diffusion:**

- -it is the transport of the molecules from high concentration to low concentration but the **molecules are large in size** so they **need carrier** to carry them but **no need for energy**

- -the carriers needed in facilitated diffusion are

- ***specific:** (there is carrier for each kind of molecules not used for other kind)

- ***have the saturation property:** the diffusion stops when all carriers are fully saturated

- **NB:**

- *if molecule X have same structure as another molecule Y and they try to pass through same membrane , they may compete with for the same carrier and facilitated diffusion may stop (competitive inhibition)

- *facilitated diffusion is affected by temperature

- **3-Active transport:**

- Passage of MOLECULES from low concentration of molecules to high concentration of molecules

- -against concentration gradient

- -need energy

- -need carrier

- -need enzymes

- -Affected by temperature

- -has the same saturation property & competitive inhibition

- **4-Osmosis :**

- It is the passage of H₂O from high concentration of WATER to low concentration of water through semipermeable membrane.

*along concentration gradient (from high to low)

5-vesicular transport:

*Cell engulf particles

*large substances come in contact with cell membrane

*cell membrane invaginate around substance

*substance enter inside cell

*it is either phagocytosis or pinocytosis

Objective : Chemical structure of cell membrane

biochemical structure of membrane:

Membrane lipids

It includes

- 1) Membrane phospholipids
- 2) Membrane cholesterol
- 3) Glycolipids.

Membrane phospholipids ;

They are the main lipids of the membrane. They are formed of Phosphatidyl serine, Phosphatidyl inositol and lecithin (phosphatidyl choline).

It contains poly unsaturated fatty acids (PUFA). The polar groups are towards the surface and non polar towards the inside. The lipids are stabilized by non covalent bonds as ionic and hydrogen bonds between polar and hydrophobic between non polar.

Membrane cholesterol is present in outer layer of membrane.

Membrane glycolipids are present in gangliosides and cerebroside

Importance of membrane phospholipids;

- 1) it gives the membrane its fluidity.
- 2) it gives the membrane its asymmetry.
- 3) it gives arachidonic acid for synthesis of eicosanoids.
- 4) Phosphatidyl inositol acts as second messenger of hormones

Membrane fluidity

Membrane fluidity is due to many factors (PUFA ,temperature and presence of cholesterol)

1. Increase of phospholipids containing unsaturated fatty acids , increases the fluidity. It can move within the same layer (lateral movement).
2. Rise of temperature, increases fluidity.
3. Increase of cholesterol, decreases fluidity.(due to its solid ring)

Membrane proteins:

It is of 2 types; 1-Integral 2-Peripheral protein

Importance of membrane proteins:

- 1) It gives the cell its shape and structure.
- 2) Many enzymes(involved in energy production) are protein in nature.

- 3) Many hormone receptors are protein in nature (insulin receptor).
- 4) It allows the exchange of substances in the cell with outside.

Disorders of the membrane Proteins

1-Cystic fibrosis :

It is a genetic disease due to mutation affecting chloride ion channels in lung alveoli. This will decrease the permeability to chlorides and will lead to viscous secretions and repeated infections.

2-Familial hypercholesterolemia ;

It is a genetic disease due to mutation affecting LDL- receptor. Defect in this receptor leads to increase of cholesterol level (N:100-200 mg\dl) in blood. Complications are: atherosclerosis hypertension and myocardial infarction.

3-Congenital Spherocytosis :

it is a genetic disease due to mutation affecting synthesis of spectrin (forming biconcave shape of RBCs).RBCs become spherical and easily hemolysed.

Membrane carbohydrates

There are many carbohydrates expressed on the surface of the cell and include: glycolipids and glycoproteins

Objective - Mention function of each component of the components of the cell membrane (physiology)

- **The cell:**
 - Def: it is the basic structure of the body
 - it is surrounded by cell membrane
 - it is formed of *cytoplasm
 - *nucleus
- **The cell membrane:**
 - -it is very elastic
 - -surround the cell
 - -separate the intra cellular fluid (ICF)from the extra cellular fluid (ECF)
 - -it is semipermeable (allow some substances to pass and others not pass)
 - -it is made of *protein (mainly 55%)
 - *phospholipid & carbohydrates

Function of cell membrane protein: •

- 1-structure of cellmembrane (structural proteins) •
- 2-act as channels for water, and ions •

3-act as pump for active transport of ions (pump ions against concentration gradient •
whether into cell or out of it)

4- act as receptors for hormones and chemical transmitters •

5-act as enzymes to catalyze (make it rapid) the reactions •

6-act as intercellular connections •

7-identity proteins •

- **Total body water**

- 60% of body weight in adults

- 75% of body weight in infants

- 40% intracellular

- 60% water

- 20% extracellular

*Inside cell

*out side cell

*Main cation +ve—K+

*main cation +ve—Na+

*Mg⁺⁺ is high

*Ca⁺⁺ is low

Case – (2) (Non steroidal anti-inflammatory hazards)

(Red on week 3 and discussed in week 4)

(biochemistry, physiology, anatomy and histology integrated case)

Mr Akram is a 52 years old man, he suffers from arthralgia (pain in joints) and he used to take non steroidal anti-inflammatory drugs daily for the last year without medical consultation just by consulting one of his friends. Last week he began to suffer rapid breathing, fatigue and confusion. He was taken by his colleagues to the emergency unit where the doctors insisted that he should be hospitalized in the intensive care unit (I.C.U.) to correct his metabolic acidosis.

- Objectives for brain storming:

- Determine the normal Ph of the body and what is acid base balance and how it is maintained (biochemistry)
- Mention the types of acid base imbalance (metabolic acidosis) (biochemistry, physiology) (tutor should help students to think about the types and subtypes)
- Mention how the acidosis is corrected by the body (role of kidney) (physiology)
- Describe the gross & microscopic structure of bone, joint (anatomy and Histology) and Classify different joints regarding their movements (anatomy)

Tutor guide:

Objective : Acid – Base balance

Definition : The body balance between acidity and alkalinity .Normally it ranges from 7.35-7.45 .

Body acidity increases by increase acid intake & formation or decrease excretion or decrease in alkaline products

Change of acid / base balance affect many organs and enzymes leading to loss of optimal function of the body.

Control of acid base balance

1. Role of lungs (Rapid) :they increase the rate and depth of respiration. Also, they increase excretion of CO₂ from lungs in exhalation and decrease of carbonic acid (acidity decreases).
2. Role of kidneys(slow): they excrete excess acids in urine but this takes several days.
3. Role of Buffers :they guard against change in acidity or alkalinity.

Objective : Describe the gross & microscopic structure of bone, joint (anatomy and Histology) and Classify different joints regarding their movements (anatomy)

Anatomy:

A – Morphological types of bones:

1. Long bones: each has a shaft and two large ends as humerus and femur. (each has two epiphyses), (fig.17)
- 2- Short bones: as carpal and tarsal bones. (fig.18)

3- Short long bones is the term applied to metacarpals and metatarsals (each has a *single* epiphysis)

4- Flat bones: as bones of the skull vault and scapula. (*fig.20*)

5- Irregular bones: as vertebrae and hip bone. (*fig.21*)

6- Pneumatic bones: Whose cavities are filled with *air* as maxilla of the skull.

7- Sesamoid bones: are small bones develop *within* tendons of some muscles as patella.

B- Types of joints

A. Fibrous joints

- The two bones are connected by fibrous tissue.

- Examples are:

- Sutures of the skull : the two skull bones are connected by fibrous tissue which ossifies with age. (*fig .28*)
- Gomphosis (peg and socket) as tooth in the upper and lower jaws. It does *not* ossify with age. (*fig.29*)
- Syndesmosis: bones are connected by interosseous ligament or membrane which does *not* ossify and slight movement is allowed as the inferior tibio-fibular joint. (*fig.30*)

B. Cartilaginous joints

- The two bones are connected by cartilage and further classified into:

1. Primary cartilaginous joints (synchondrosis) , (*fig.31*)

- Bones are connected by *hyaline* cartilage which ossifies with age (it is a *temporal* joint).

- It does not allow movements.

- Example : epiphyseal plate of cartilage of the growing long bones.

2. Secondary cartilaginous joints (symphysis) .(*fig.32*)

- The two bones are connected by a disc of fibrocartilage which do *not* ossify so that these joints are (usually) *permanent* joints
- They allow slight degree of movements.

C. Synovial joints:

- These are freely mobile joints which have the following general structures. (*fig.33,34*)

1. The articular surfaces are covered by *hyaline* cartilage.

2. The articular surfaces are surrounded all around by a fibrous capsule.

3. Externally, the capsule is supported by strong ligaments.

4. Internally, the capsule is lined by synovial membrane which has the following features:

- It lines the capsule.
 - It *never* covers the articular surfaces of bones.
 - It secretes synovial fluid which lubricates movements of the joints.

5. Some synovial joints contain intra-capsular structures like:

a. Tendons of muscles: tendon of the long head of biceps brachii *inside* the shoulder joint.

(*fig.35*)

b. Ligaments: cruciate ligaments *inside* the knee joint. (*fig.36*)

c. Labrum : in the shoulder joint.(*fig.37*)

d. Discs and menisci: Intra-articular menisci *inside* the knee joint. (*slide,24*).

ample is: intervertebral discs of the vertebral column

C- Functional types of synovial joints

1. 1- Plane synovial joints (Articular surfaces are flat. Only gliding movement permitted as the acromio-clavicular. *(fig.39)*)
 2. 2- Hinge synovial joint: allows *only* flexion and extension as the elbow joint. *(fig.40)*
 3. 3- Pivot synovial joints allows *only* rotation as superior and inferior radio-ulnar joints. *(fig.41)*

 - 4- Bicondylar synovial (modified hinge) joints: two *convex* condyles articulate with two *concave* condyles. Allows flexion and extension with *some* rotation as the knee joint. *(fig.42)*
 4. 5- Ellipsoid synovial joints: movements are allowed freely at *two* axes: flexion and extension and
 5. 6- Saddle synovial joints: allow flexion, extension, adduction, abduction and *some* rotation as the carpo-metacarpal joint of the thumb. *(fig.44)*
 6. 7- Ball and socket synovial joints: movements occur freely on *three* axes as the shoulder joint. *(fig.45)* adduction and abduction as the wrist joint. *(fig.43)*
-

Cases for the (DRG) module:

Case (one) addiction :

Read Week (12) and discussed on week (13) :

A male Student in the Faculty of Education, 20 years old. He started two years ago, to take an addictive substance by snuffing and sometimes by injection. He was presented to the emergency room with, coma, narrow pupil, and difficulty in breathing.

- Objectives (for brain storming) :

- Determine the different classifications, toxicokinetics & dynamics of common toxic substances (pharmacology)
- Causes and types of coma and coma scale (internal medicine)
- Mode of action and effects of different addictive agents (pharmacology)

Tutor guide: -

Objective : Determine the different classifications, kinetics & dynamics of common toxic substances

Classifications of opioid analgesics

First classifications

- I. Phenanthrene group of alkaloids
 - a- Phenanthrene group: Morphine-Codeine
 - b- Benzylisoquinoline: Papaverine – Noscopine
- II. Semi-synthetic Morphine derivatives: (Di-Acetyl morphine (Heroin)

Morphine substitutes (synthetic derivatives): Meperidine and methadone*

Pharmacokinetics:

• Absorption:

- Well absorbed when given oral, SC. or IM.
- In shock state, it is given slowly IV.
- Nasal insufflation .

• Distribution:

- Morphine pass BBB & placental barrier to affect fetus thus, congenital anomalies may occur. - It causes respiratory depression of fetus during labour.

• Metabolism:

- It is conjugated with glucuronic acid in liver
- Children and old can not metabolize it.
- 10% metabolized to Morphine 3 glucuronide (Inactive metabolite) and 70% metabolized to Morphine-6-glucuronide (more active)..

• Excretion

- Excreted in urine "30%", milk and saliva.

- Reexcreted in stomach so, gastric lavage is done in overdose even if it is given by injection.

*** Pharmacodynamics:**

- 1-Stimulation of opioid receptors will inhibit release of substance P with closing the gates for pain and modulating the release of serotonin, dopamine and Ac.ch.
- 2- G-protein coupled receptors inhibit adenyl cyclase and decrease cAMP.
- 3- They close voltage gated Ca^{++} channels causing decrease in transmitters and mediator release and open K^{+} channels leading to Hyperpolarization.

Objective : Mode of action and effects of different addictive agents (pharmacology). * Actions: CNS: mixture of CNS depression and stimulation

Depressant effects

1. A → ACTH, FSH and LH.
2. P → pain and polysynaptic reflexes.
3. C → conscious "narcosis", cough centre.
4. Respiratory and vasomotor centre (V.M.C.)

Stimulant effects

1. Mood → Euphoria, excitation.
2. Miosis pin point pupil (PPP) (↑ 3rd cranial nerve).
3. Cardiac inhibitory center.
4. Chemoreceptor trigger zone → vomiting
5. Monosynaptic reflexes.

B. CVS

Large dose → Bradycardia and hypotension.

C. Respiratory system:

1. Large dose: inhibit RC (inhibit its sensitivity to CO_2 and ↓ tidal volume).
2. Bronchospasm.
3. Inhibits cough center (antitussive).
4. Release Histamine. So, attacks of bronchial asthma may occur.

D. GIT:

1. Marked constipation
2. Decrease all secretions except salivary secretion.
3. Biliary tract: morphine causes spasm of sphincter of Oddi .

E. Renal effect : urine retention

F. Other actions:

1. **Smooth muscles:** morphine is spasmogenic to smooth muscle.
2. **Immune system:** Opiates modulate the immune system with affection of lymphocyte production, and natural killer cells activity.
3. **Uterus:** no effect but pass placenta → neonatal asphyxia treated by nalorphine.
4. **Skin:** Histamine release with vasodilation, itching and wheal formation.
5. **Basal metabolic rate :** Decrease.
6. **Autonomic action.**
 - Increases parasympathetic activity.
 - Hyperglycemia due to release of catecholamine from adrenal medulla.

7. Eye: -Miosis (PPP)- Decrease IOP. and loss of accommodation to near object due to contraction of ciliary muscle.

Cases for the module (GMD):

Case (TWO) (brain abscess) :

Read in week (9) and discussed on weeks (11, 12):

A 5 years old female patient was admitted to the emergency unit suffering from severe headache, after investigation she was diagnosed to have brain abscess. Aspiration of pus from the abscess was done and transported to the laboratory in a special transport media. Gram stain was done and revealed gram negative bacilli. By doing culture on blood agar under aerobic condition, no growth was obtained

- Objectives (for brain storming) :

- Describe gross and microscopic features, of brain abscess (pathology)
- Methods of treatment of brain abscess (internal medicine)
- Identify the sources of infection, mode of transmission of gram negative bacilli infectious diseases (micro)

Guide information for the module GMD :

Sources of infection , mode of transmission of gram negative bacilli infectious diseases

Gram-negative bacilli are responsible for numerous diseases. Some are commensal organisms present among normal intestinal flora. These commensal organisms plus others from animal or environmental reservoirs may cause disease.

- The most frequent infections caused by GNB are UTIs.
- Urinary tract infections usually happen when a GNB colonising the GI tract ascends through the urinary tract (endogenous infection). Nevertheless, GNB can also access the urinary tract through healthcare hands and/or devices (exogenous infections).
- The presence of bacteria in the urinary tract is called **bacteriuria**. Bacteriuria does not equal a UTI, since many people may have asymptomatic bacteriuria. Most patients with **asymptomatic bacteriuria** do not benefit from antibiotic therapy.
- (Symptomatic) UTI are classified into low UTI (cystitis, prostatitis) and high UTI (pyelonephritis, renal abscess). Some might have systemic signs and symptoms, such as fever, chills, sepsis and some might have only local signs and symptoms (e.g. cystitis).

Intra-abdominal infections

Many GNB, mainly Enterobacteriaceae, can colonise the GI tract without causing disease. Indeed, the GI tract is their normal habitat.

- Whenever the GI tract is disrupted due to inflammation, ischemia or perforation of any cause, the bacteria usually found in the GI tract can cause harm (infection). Although these infections are usually polymicrobial, Enterobacteriaceae are among the most relevant pathogens involved.

- These infections can be limited to the GI tract wall (**diverticulitis, cholecystitis, appendicitis...**) but they can spread to the peritoneum (**peritonitis**) and form **abscesses** (pus collections) within the abdominal cavity.
- Overall, intra-abdominal infections, especially in the case of abscesses, have high bacterial inoculum (high amounts of bacteria) and antibiotics frequently do not suffice for their management, requiring surgical or percutaneous source control (i.e. abscess drainage).

Respiratory infections

- Both Enterobacteriaceae and non-fermenters (**Pseudomonas aeruginosa, Acinetobacter baumannii, Stenotrophomonas maltophilia...**) can colonise the respiratory tract and they can cause respiratory infections. This usually happens in hospitalised patients or individuals who have been exposed to antibiotics.
- Respiratory tract infections caused by GNB such as Enterobacteriaceae or non-fermenters can range from tracheobronchitis to pneumonia, either ventilator or non-ventilator associated. Pneumonia caused by GNB is associated with significant morbidity and mortality.
- Not infrequently, pneumonia is difficult to diagnose since its presentation (clinical and radiological) is nonspecific and GNB can colonise the respiratory tract without causing disease.
- Treatment of Gram-negative infection is usually guided empirically by an antibiogram specific for the unit or hospital, until culture and sensitivity reports become available.
- The aminoglycosides, particularly gentamicin, were historically the antibiotics of choice in the treatment of Gram-negative infections; however, some Gram-negative bacteria encountered in the burn unit are now resistant to all the aforementioned antibiotic classes and often the treatment option is relegated older drug classes, namely the polymyxins.

Objective : Describe gross and microscopic features, of brain abscess (pathology)

Define abscess (pathology)

Describe gross and microscopic features, of brain abscess (pathology)

Describe Composition of pus (pathology)

Enumerate complication of abscess (pathology)

- Treatment of brain abscess:(pharmacology)

1-Combination of high dose parental antibiotics and neurosurgical drainage.

2-Third\fourth generation.

3-Patients with neurodurgery \head trauma

#Vancomycin+ Cefiazidine

Meropenem +Vancomycin

#Modify antibiotics as per culture results.

Duration: in 6-8 weeks.

Cases for the module (MIP)

Case (THREE) : (Haemothorax) :

Read on week (6) and discussed on weeks (7,8):

A 17-year-old woman presented to the clinic with a history of dry cough, sore throat and mild fever. She was diagnosed to be having upper airway infection. She confirmed that she had had similar attacks in the previous 3 years. Chest X-ray revealed nearly complete replacement of the right hemithorax with a dense homogenous opacity.

The patient was then referred to the surgical clinic. Additional clinical imaging showed an impaired percussion note and diminished air entry over the right hemithorax. The chest X-ray was repeated and showed a very large, dense homogenous opacity occupying nearly 90% of the right lung. The preliminary initial diagnosis was *Echinococcus* of the lung. After a week of preparatory albendazole treatment, the patient underwent parenchyma-preserving surgery.

- Objectives (for brain storming) :

- X ray picture and surgical approach in cases of hemothorax (surgery)
- Identify the sources of infection, mode of transmission of *Echinococcus* of the lungs (parasitology)

Tutor guide :

Objective : Haemothorax is most frequently related to open or closed chest trauma or to invasive procedures of the chest.

Spontaneous haemothorax is less common and can have various causes, such as the use of anticoagulants, neoplasia, and rupture of pleural adhesions.

treatment of the underlying trauma should start immediately.

After insertion of a large chest tube, antibiotic prophylaxis in trauma patients should be administered for 24 h.

Further treatment depends on the haemodynamic stability of the patient, the volume of evacuated blood and the occurrence of persistent blood loss.

Surgical exploration by thoracotomy is necessary if > 1.500 ml of blood has accumulated and/or an ongoing production of > 200 ml of blood per hour is observed.

If the haemorrhage is less severe, careful investigation into the underlying cause must be performed and blood should be evacuated by tube thoracostomy..

-Objective : Identify the sources of infection, mode of transmission of *Echinococcus* of the lungs (parasitology)

Answer:

a- the sources of infection :

- The adult worm lives in small intestine of dogs
- Mature eggs pass in stool

- Eggs are ingested by intermediate host (herbivorous and occasionally man)
- In small intestine , onchosphere penetrates intestinal wall then to blood then to different tissues to develops into hydatid cyst .

b- mode of transmission of Echinococcus of the lungs:

1) ingestion of raw vegetables or drinking water contaminated with eggs of *E.granulosus* (infective stage).**2)** handling infected dogs where the hairs are usually contaminated with eggs.

Case (FOUR) : (pulmonary T.B.)**Read on week 5 of the module and discussed on weeks (6 , 7 , 8) :**

A 50 years old man was brought to the emergency department with productive cough and bloody sputum. The patient complained from shortness of breath, and reported having lost 20 Kgs of his weight in a short period of time without being on any regimen to decrease weight. He also complained from night sweats two or three nights a week for the past month. The patient was heavy smoker. On examination the patient appeared thin, and tall, his vital signs were normal. His lung examination was notable for decreased breath sounds diffusely. Chest X ray revealed a cavity in the left upper lobe. The patient was diagnosed as having pulmonary T.B.

- Objectives (for brain storming) :

- X ray findings and treatment for pulmonary T.B. (internal medicine)
- Identify the sources of infection, mode of transmission of pulmonary T.B. (parasitology)
- Mention the proper immunization for the T.B. (micro)
- Prevalance of T.B. in community (community)
- Medical treatment of T.B. (pharmacology)

Tutor guide:**-Objective : Medical treatment of T.B. (pharmacology).****Anti-Tuberculous :First line Drugs (drugs with high efficacy)**

1. Isoniazid (INH): 5 mg/kg orally (300 mg/d)
2. Rifampicin: 10 mg/kg orally (600 mg/d)
3. Streptomycin: 15 mg/kg IM. (1g/day)
4. Ethambutol: 25 mg/kg orally
5. Pyrazinamide: 30 mg/kg orally

Second line Drugs (less effective and more toxic)

1. Ethionamide: 1g/d orally
2. Paraaminosalicylic acid (PAS): 10 mg/kg orally.
3. Cycloserine 10-20 mg/kg/d
4. Capreomycin, Kanmycin and Amikacin

Isoniazid (INH)

It is the **most effective** drug used in T.B. treatment

Side effects:

1. Peripheral neuritis: give vit B6 (more with slow acetylator)
2. Hepatotoxic (more with rapid acetylator)
3. Hemolysis in G-6-PD deficiency
4. Hypersensitivity
5. Tinnitus, GIT discomfort.

Rifampicin (Rimactan) : Antibacterial activity



- **Bactericidal antibiotic:** Inhibit DNA dependent RNA polymerase and decrease RNA synthesis.
- **Spectrum:** T.B., leprosy, Gm -ve and Gm +ve bacteria, Chlamydia, pox viruses.

Uses:

1. T.B.: First line drug in combination with Isoniazid.
2. Meningitis: chemoprophylaxis in meningococcal meningitis 600 mg/day for 4 days (drug of choice).
3. Leprosy: 4-Resistant bacterial infection: e.g., staph.

Side effects:

1. Hepatotoxicity: impaired liver function, jaundice.
2. GIT disturbance: nausea, vomiting.
3. Hypersensitivity: *Flu like syndrome*
4. Orange red discoloration of all secretion
5. CNS: Headache, Ataxia, confusion
6. Hepatic microsomal enzyme inducer: increase metabolism and decrease actions of: oral anticoagulants, oral hypoglycemics, contraceptive pills and digoxin.

Dosage schedules:

1. Start with Rifampicin + Isoniazid + Pyrazinamide for 2 months, then, Isoniazide + Rifampicin for the next 4 months.
2. Isoniazide + Rifampicin + pyrazinamide + Ethambutol or Streptomycin for 2 months. Then, give Rifampicin and Isoniazid for 4 months.

Case (FIVE) : stomach upset**Read on week (12) and discussed on weeks (13, 14):**

A patient was admitted to the internal medicine clinic complaining from stomach upset, diarrhea, swollen abdomen cough, weakness and fatigue. Investigations revealed anemia and unexplained weight loss. The patient was diagnosed to be having hydatid cyst.

- Objectives (for brain storming) :

- Diagnosis and treatment of hydatid cyst (surgery & internal medicine)
- Causative agent for hydatid cyst and mode of transmission (parasitology)

Tutor guide:

-Objective : Causative agent for hydatid cyst and mode of transmission (parasitology)

Answer: hydatid disease: is caused by infection of human tissues by unilocular cyst, the larval stage of *Echinococcus granulosus*.

1) ingestion of raw vegetables or drinking water contaminated with eggs of *E.granulosus* (infective stage).**2)** handling infected dogs where the hairs are usually contaminated with eggs.