IN THE NAME OF ALLĀH,
THE MERCIFUL,
THE MERCY-GIVING

King Abdulaziz University
Faculty of Medicine

BASIC SCIENCES
FOUNDATION MODULE

Study Guide [1]

Phase I, MBBS

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King Abdulaziz University Press

Welcome

Dear Students,

Welcome to the second year medicine. As you have already started in the Faculty curriculum (System- Based Curriculum), this year you are in Phase I of the program.

Phase I : Premedical Year (First Year)
Phase II : Second and Third Years
Phase III : Fourth, Fifth and Sixth Years

The aim of this phase is to lay down a solid foundation for the subsequent full-time clinical study in stage II and III of the MBBS program. This include knowledge, skill and attitudes, particularly attitudes towards the learning process. The curriculum philosophy in stage I is enforcing the development of a mixture of teaching approaches including Lectures, Practicals, also small group teaching. It is also stressing on the idea of "Student Self Directed Learning".

The department has the honor to introduce this study guide to you hoping that it may be helpful in making you oriented with the aims, objectives, contents of our courses, and through it, you will find the answers of the frequently asked questions.

All the Best

Department Chairman

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1 - 4	Anatomy Department	
5 - 7	C. Biochemistry Department	
8 -9	Physiology Department	
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13	Pharmacology	
14 - 15	Study Skills	

OUTCOMES OF THE MEDICAL UNDERGRADUATE CURRICULUM

1) Knowledge

Graduate should have sufficient knowledge and understanding of:

a. The normal structure, function and development of the human body and interaction between body and mind
b. The normal pregnancy and child birth, the principles of antenatal and postnatal care
c. The aetiology, pathogenesis, clinical presentation, natural history and prognosis of common physical and mental disease, particular those which pose acute danger to function, life or the community.
d. Common diagnostic tests and procedures, their uses, limitations and costs
e. The management of common conditions including pharmacological, psychological, physical and nutritional therapy
f. The principles of health education, disease prevention, rehabilitation and the care of the suffering and dying.
g. The principles and ethics related to health care and the Islamic and legal responsibilities of the medical profession

2) Skills

Graduate should acquire the skills of

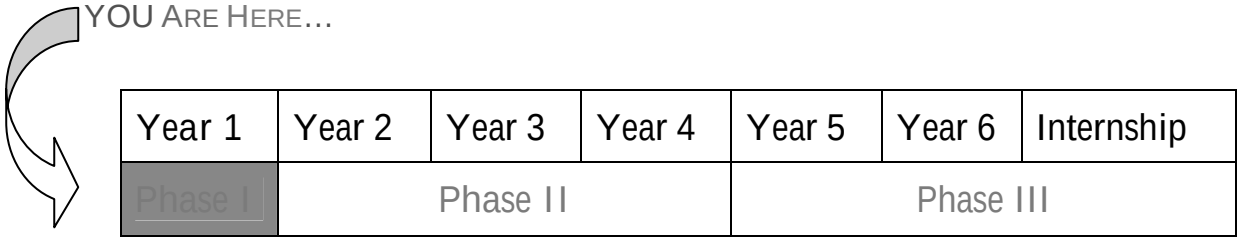
a. Take a tactful, accurate and organised medical history
b. Perform a gentle and accurate physical and mental examination
c. Integrate history and physical examination to reach a provisional diagnosis of differential diagnosis
d. Select the most appropriate and cost effective diagnostic procedures
e. Formulate a management plan
f. Counsel patients and families clearly regarding diagnostic and therapeutic procedures before eliciting consent
g. Perform common life-saving procedures
h. Use information resources to obtain further knowledge and interpret medical evidence critically and scientifically
i. Communicate clearly and considerately with other health professionals

3) Attitudes

Graduate should have the attitude of

a. Respect for every human being and abide by relevant Islamic ethics
b. A desire to ease pain and suffering
c. Willingness to work in a team with other health professionals
d. Responsibility to remain a life-long learner and maintain the highest ethical and professional standards
e. Referring patients to other health professional when needed
f. A realization that it is not always in the interest of patients to pursue every diagnostic or therapeutic possibility

CURRICULUM MAP



Phase 1, is the first stage towards achieving the objectives specified in the curriculum. The aim is to lay down a solid foundation for the subsequent full-time integrated study in phase 2 of the MBBS program. This foundation will include knowledge, skills and attitudes, particularly attitudes toward the learning process. The curriculum philosophy in Phase 1 is enforcing the development of a mixture of teaching approaches including "student-directed learning". By the end of Phase 1, you should be ready to be much more involved in the control of the learning process.

First Year Courses

Semester 1	Semester 2
English language	Human Biology
Computer for Health Sciences	Medical physics
Arabic Studies 101	Medical Chemistry
Islamic Studies 101	Foundation Course
Study Skills	

STRUCTURE OF THE MODULE

TIMETABLED HOURS:	45 Lectures, 15 tutorials
TEACHING DEPARTMENT:	Medical Education, Anatomy, Physiology, Biochemistry, Biology, Psychology, Pharmacology

INTRODUCTION

WELCOME to the basic science FOUNDATION module. This course aimed to introduce students you to the concepts, philosophy and objectives of medical school. The basic science foundation course is a multidisciplinary course covering both the needs of the students and the basic science department.

❖ Student needs:

a) Introduction to human psychology:

This lecture gives the students an understanding of the psychological mechanisms underlying his or her thinking and behaviour

b) Study skills:

Introduce the students to university life and how to utilize lecture, study, and utilize library and how to deal with examinations.

❖ Basic science department needs:

This section covers the prerequisites for core courses and modules for basic science departments: anatomy, physiology, pharmacology, biochemistry and biology

AIMS & OBJECTIVES

At the end of this course, you should be able to:

- Understand principles of adult education
- Describe the concepts of self-directed learning, PBL and students' centered learning
- Understand the principles of assessment and their different tools
- Outline the concepts of curriculum development and continuous medical education
- Appreciate the importance of multi-professional education, holistic approach, and interdisciplinary concepts
- Describe and demonstrates the basic knowledge and skills of basic medical sciences including Anatomy, Physiology, Biochemistry, Biology and Pharmacology.

TEACHERS CONTACTS

Name	Department	E-mail
Prof. Adil Abdulrafee Dr. Ferial Stattia	Coordinator Coordinator	adilrafee@yahoo.com 1080@yahoo
Dr. H. Saleh Dr. F. Negm	Anatomy Embryology Histology	Hsaleh@kau.edu.sa Fathianegm2003@yahoo.com
Dr. A. al hazimi Dr. H. Al. Kadi	Physiology	phsauu7@hotmail.com maryona-65@hotmail.com
Dr. M.Al.qahtani Dr. Ferial Stattia	Biology	mhalqahtani@kaau.edu.sa 1080@yahoo.com
Prof. M. Sulaiman Dr. M. Hagras	Pharmacology	misulaiman@hotmail.com magyhagras@hotmail.com
Prof. Adil Abdulrafee Dr. Ferial Stattia	Skills	adilrafee@yahoo.com 1080@yahoo.com
Dr. M. Hassanien Dr.A.Gharib	Biochemistry	mhassanien@kau.edu.sa amina1959@hotmail.com

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ASSESSMENT

1. Formative:

This form of assessment is designed to give you feedback to help you to identify areas for improvement. It includes a mixture of MCQs, short answer-questions (SAQs), extended matching questions (EMQs), problems-solving exercises and independent learning activities in all subjects. These will be given during tutorial sessions and practicals. The Answers are presented and discussed immediately with you after the assessment. The results will be made available to you.

2. Summative

This type of assessment is used for judgment or decisions to be made about your performance. It serves as:

a. Verification of achievement for the student satisfying requirement
b. Motivation of the student to maintain or improve performance
c. Certification of performance
d. Grades

In this Course your performance will be assessed according to the following:

1. Continuous Assessment	20 Marks
2. Assignment	20 Marks
3. Final End of Semester Exam (Two Hours)	60 Marks
	Total = 100 Marks

All grades will be assigned as follows:

85 - 100	A	Excellent
75 - 84	B	Very good
65 - 74	C	Good
60 - 64	D	Pass
Less than 60	F	Fail

Exams: Exams will include short answer and multiple choice questions (MCQs). They will cover material presented in lecture, readings, and discussion. All exams must be taken on the date scheduled. In case of an emergency, the coordinator must be notified. No make-up exams will be provided if you fail to notify and discuss your situation with the coordinator.

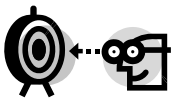
Assignment paper: The purpose of the work is to provide you with the opportunity to explore an area of basic medical sciences or medical education in depth. The paper is to be a 10-15 page literature review of the topic will constitute 20% of your final grade. Policy: Topics must be approved in writing by the coordinator. Directions for topic submission will be discussed during the first week of class. Topics that have not been approved will not be accepted.

All papers must reference a minimum of eight references from refereed journals. All papers must be typed, double-spaced, have 1 inch margins.

Note: We will be making the journey from "womb to tomb" in 15 weeks. Therefore, this course requires an intensive coursework load. Class attendance and participation are extremely important to your learning and as such are considered in the evaluation of your course grade. This course is recommended for students that can make the required time and energy commitment. If there is anything that the coordinator can do to assist you during the course, please feel free to contact him.

Icons (standards)

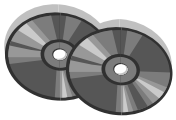
The following icons have been used to help you identify the various experiences you will be exposed to.



Learning objectives

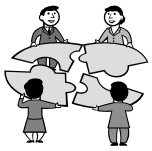
Content of the lecture

Independent learning from textbooks



Independent learning from the CD-ROM.
The computer cluster is in the 2nd floor of the medical library, building No. 7.

Independent learning from the Internet



Problem-Based Learning

Self- Assessment (the answer to self-assessment exercises will be discussed in tutorial sessions)

The main concepts

Lectures

Number of Lectures: 45

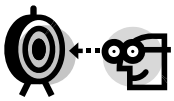
LECTURE # (1) : Culture and Diversity

Student Notes:

Department:

Lecturer: Prof. H. El.zaharani
Dr. W. El.khateeb

Teaching Location: Auditorium



After this lecture, you will be able to:

a) Understand the meaning of culture and diversity
b) Appreciate the cultural differences
c) Appreciate the criticism and the opposite opinions
d) Show the ability to accommodate different opinions

- Definition of culture
- Understanding culture and diversity
- Dealing with different opinions
- Appreciating and respecting the others and their opinions
- Accommodating differences in opinions
- Ability to compromise

1. Essential Psychology, 2nd Edition, R.B. Burns, Kluwer Academic Publisher, London.

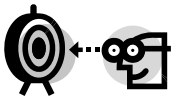
LECTURE # (2): Planning and Learning

Student Notes:

Department:

Lecturer: Prof. A. A. Al-Rafee
Dr. W. Nichlus

Teaching Location: Auditorium



By the end of this lecture, you will be able to:

a. Plan his study-leisure time.

b. Differentiate between deep and surface learning.

c. Use case-based and problem-based learning (PBL).

- Planning study and leisure time.
- Individual study.
  - Time or Topic
  - The bad times
- Deep and surface learning.
- Case-based problems-based learning

Study Skills: Tomorrow Doctors. David Bullimore, Saundres puplisher

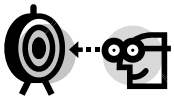
LECTURE # (3): Time Management

Student Notes:

Department:

Lecturer: Prof. A. A. Al-Rafee
Dr. M. Hegazi

Teaching Location: Auditorium



By the end of this lecture, you could:

1. Identify the symptoms of poor time management.
2. Identify time wasters.
3. Utilize time management guide.
4. Create good study habits.
5. Define procrastination and know how to overcome it.
6. Effectively utilize time management tools.

- Setting priorities
- Making sure you concentrate on the right things
- Setting goals
- Overcoming procrastination
- Setting planning
- Reducing stress

Study Skills : Handouts and Internet resources

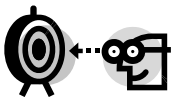
LECTURE # (4): Learning from lectures

Student Notes:

Department:

Lecturer: Dr. A. El . Hayani
Dr. F. El.Thebety

Teaching Location: Auditorium



By the end of this lecture, you could:

1. Effectively utilize the lecture.
2. Prepare and understand that "listening" is an active process.
3. Appreciate the basic considerations of the note taking.

- Uses of lectures.
- Preparations of lectures.
- Active listening
- Taking notes:
  - Preamble, orientation, key points, extensions, examples, asides, reservations and summaries.

Study Skills: Tomorrow Doctors. David Bullimore, Saundres puplisher

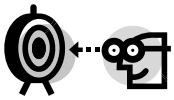
LECTURE # (5): Effective reading

Student Notes:

Department:

Lecturer: Dr. A. El . Hayani
Dr. H. El-Kadi

Teaching Location: Auditorium



By the end of this lecture, you will be able to:

1. Learn to study.
2. Be an effective reader.

- Effective reading.
  - Scanning
  - Questioning
  - Reading
  - Recall
  - Reviewing
  - Relating
- Note taking.

Study Skills: Tomorrow Doctors. David Bullimore, Saundres puplisher

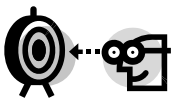
LECTURE # (6): Using the library and buying books

Student Notes:

Department:

Lecturer: Dr. A. El . Hayani
Dr. F. Stattia

Teaching Location: Auditorium



By the end of this lecture, you will be able to:

1. Use the library.
2. Choose and purchase books.

- Using the library:
  - Periodicals
  - Textbooks
  - Other services
- Buying books:
  - Choosing
  - Purchasing

Study Skills: Tomorrow Doctors. David Bullimore, Saundres puplisher

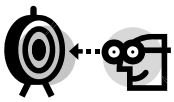
LECTURE # (7) : Tutorial and Small group work

Student Notes:

Department:

Lecturer:

Teaching Location: Auditorium



By the end of this lecture, you could:

1. Appreciate the goals of tutorials.
2. Use the dynamics of small groups.
3. Successfully participate in tutorials.
4. Realize the role of practical laboratory sessions in medical education.

- Goals
- Stages of small groups interactions:
  - Forming
  - Storming
  - Norming
  - Performing
- Requirement of successful tutorial.
  - Planning
  - Preparation
  - Participation
- Practical laboratory sessions.

READING: Study Skills: Tomorrow Doctors. David Bullimore, Saundres puplisher

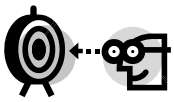
LECTURE # (8) : Medical Student Life

Student Notes:

Department:

Lecturer: Prof. A. A. Al-Rafee
Dr. A. Karamany

Teaching Location: Auditorium



By the end of this lecture the you will

1- Bridge the gap between Secondary school life and university school life
2- Achieve the right balance between work and social life
3- Appreciate the medical curriculum

- Difference between school life and university life
- Faculty and university activity
- Sources provided to medical students
- The curriculum

1. Essential Psychology, 2nd Edition, R.B. Burns, Kluwer Academic Publisher, London.

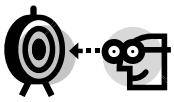
LECTURE # (9): Assessment

Student Notes:

Department:

Lecturer: Dr. A. El . Hazimi
Dr. H. El.Kadi

Teaching Location: Auditorium



By the end of this lecture, you will be able to:

1. Realize the reasons for assessment.
2. Use educational vocabulary.
3 Implement group project assessment.
4. Deal with MCQS.

- Reasons for assessment
  - Internal and External factors
  - Student feedback
- Educational vocabulary
  - Summative and formative assessment
  - Non-referenced or peer-referenced assessment
  - Criterion – refrenced assessment
  - Validity and reliability.
- Group project assessment
- Multiple choice questions.

Study Skills: Tomorrow Doctors. David Bullimore, Saundres puplisher

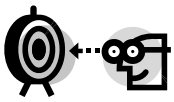
LECTURE # (10): Science & Medicine

Student Notes:

Department:

Lecturer: Dr. H. Saleh
Dr. F. Stattia

Teaching Location: Auditorium



By the end of this lecture, you will be able to:

1- Understand the definition of science
2- Study the history and philosophy of science
3- Understand the conceptual relation between medicine and science
4- Study the development of medicine , past, Present and the future
5- Have an idea about Arabic & Islamic Medicine, Western and Eastern medicine

- Definitions of science, art and medicine
- Philosophical issues in science
- The development of all branches of science including medicine
- Medicine, is it Art or Science?
- What art and science have in common?
- The difference between conventional Vs. Alternative Medicine

READING: Handout and slides will be provided.

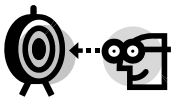
LECTURE # (11-15) : How To Learn New Skills

Student Notes:

Department:

Lecturer: Dr. M. Al- Saadi
Dr. H. Banjr

Teaching Location: Auditorium



By the end of this course you will be able to:

1- Has self awareness and wide perception.
2- Knows how to improve the self-concept.
3- Knows how to motivate his/her self.
4- Knows how to writ his/her goals.
5- Learn how to learn

Lecture# (11)

Introduction

- Multiple intelligent

Self-preparation

a. Self-Awareness
b. Self Concept: Self-Esteem and Self-Image
c. Self-Fulfilling

Lecture # (12)

Self Concept and Communication

Improving Self-concept

Self-Confidence

Lecture # (13)

Introduction to Perception

The Responding Skills:

a. Feedback

b. Constructive Evaluation

Goals and Self Motivation

Lecture # (14)

Learning how to learn

a. Learning Levels

b. Learning Carve

c. Learning Cycle ,TOTE

d. Learning Styles

Lecture # (15)

Communication and Learning

a. The Human Communication Process

b. Listening

- Stages of Effective Listening
- The Function of Listening
- Barriers to effective listening

Communication making connections, 6th edition. By William Seiler & Melissa Beall, Allyn & bacon.

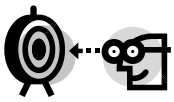
LECTURE # (16): Creative problem solving skills

Student Notes:

Department:

Lecturer: Prof. A. A.Al-Rafee
Dr. M. Gamgoom

Teaching Location: Auditorium



By the end of this lecture, you will be able to:

1. Breakdown a problem to identify its essential elements.
2. Apply their prior knowledge of topic to analyze a problem.
3. Generate and evaluate a range of strategies to address a problem.
4. Design a plan to solve a problem.
5. Determine what new information and resources are required in order to solve a problem.
6. Implement a planned solution that addresses a problem.
7. Evaluate a solution and reflect upon what has been accomplished.

- Personal barriers for problem solving
- Right direction push you up
- Problem solving-the most important skill
- What you feel directs what you do
- The importance of curiosity
- Design your brain map
- Compartive studies and discuussion
- Bridge between creativity and result
- Strategic plan for concuring difficulties

Essential Psychology, 2nd edition, R.B. Burns, Kluwer Academic Publisher, London.

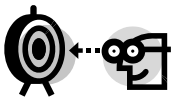
LECTURE # (17): Overview of Anatomy and introduction to Anatomy

Student Notes:

Department: Anatomy

Lecturer: Prof. A. Al. Hagagi
Dr. H. Saleh

Teaching Location: Auditorium



After this lecture, the student should be able to:

1. Know the anatomical position and terms.
2. Know the different types of movements of the human body.
3. Describe in simple terms the normal structure of the tissues, organs and systems individually and collectively.
4. Apply his knowledge to understand function of human body.
5. Understand important clinical conditions and their relevance to the anatomy of various systems studied.
6. Apply their knowledge of gross anatomy and structure of normal tissues to recognize their abnormal function in some pathological conditions.

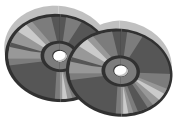
1. Definition of: Anatomical position, Anatomical lines & Anatomical planes.
2. Divisions of Anatomy: Gross Anatomy (Macroscopic Anatomy), Micro Anatomy (Histology), Embryology (Developmental Anatomy), Clinical Anatomy, Surface Anatomy & Radiological Anatomy.

3. Identification of different regions, system & tissues of the human body.

4. Explanation of different movements of the body:
    a. Flexion & Extension
    b. Adduction & Abduction
    c. Medial rotation & Lateral rotation
    d. Pronation & Supination
    e. Inversion & Eversion

1. Clinical Anatomy for Medical Students, 7th Edition, Richard Snell, Williams & Wilkins.

2. Grant's Atlas of Anatomy, 10th Edition, Grant J.C.B., Williams & Wilkins.



Try to access CD-ROM series about the anatomy from the computer cluster in the 2nd floor of the medical library, building No. 7.; just look to the introductory part of anatomy in each CD-ROM.

In the computer cluster, you the opportunity to see some useful web sites about the anatomy e.g. www.innerbody.com – www.netanatomy.com

Self- Assessment

The answer to self-assessment exercises will be discussed in tutorial sessions.

The main concepts

This study guide aims to communicate a knowledge about the definitions and introduction of anatomy

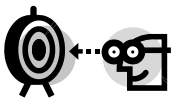
LECTURE # (18): Overview of Systemic Anatomy

Student Notes:

Department: Anatomy

Lecturer: Prof. A. Al. Hagagi
Dr. H. Saleh

Teaching Location: Auditorium



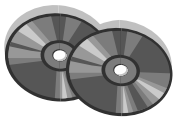
After this lecture, the student should be able to:

1. Know the different systems of the body.
2. Know the components of different systems of the body.
3. Know the different components and types of the skeletal system.
4. Know the different components and types of the articular system.
5. Know the different components and types of the muscular system.
6. Know the different components and types of the nervous system.

1. Identification of the types of skeletal system, names and types of bones, types of ossification, features of bones.
2. Identification of the types of the joints, structure of the synovial joint.
3. Identification of the types of the muscular tissues, types of muscular fibers, types of muscular attachment.
4. Identification of the division of the nervous system, different components of each division.

1. Clinical Anatomy for Medical Students, 7th Edition, Richard Snell, Williams & Wilkins.

2. Grant's Atlas of Anatomy, 10th Edition, Grant J.C.B., Williams & Wilkins.



Try to access CD-ROM series about the anatomy from the computer cluster in the 2nd floor of the medical library, building No. 7.; just look to the introductory part of anatomy in each CD-ROM.

In the computer cluster, you the opportunity to see some useful web sites about the anatomy e.g. www.innerbody.com – www.netanatomy.com

Self- Assessment

The answer to self-assessment exercises will be discussed in tutorial sessions.

The main concepts

This study guide aims to communicate a knowledge about the definitions and introduction of anatomy

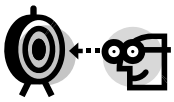
LECTURE # (19): Overview of Human Embryology

Student Notes:

Department: Anatomy

Lecturer: Prof. A. Al. Hagagi
Dr. H.Saleh

Teaching Location: Auditorium



After this lecture, student should be able to:

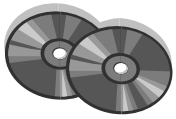
1. Define the listed key terms of embryology.
2. Compare stem cells and terminology differentiated cells.
3. Name the three germ layers and define tissues derived from each of these three layers.
4. Understand environmental and genetic factors which may impair human development.

1. Terms of terminology.
2. Major events during development through the embryonic and fetal periods; including implantation, germ layers formation.
3. Major morphological external changes as the fertilized ovum are transformed into fetus till the time of birth.

Langman's Medical Embryology, 9th Edition, T.W. Saddler, Williams & Wilkins.

Continue … LECTURE # (19): Overview of Human Embryology

Student Notes:



Try to access CD-ROM series about the embryology from the computer cluster in the 2nd floor of the medical library, building No. 7.; just look to the process of gametogenesis in each CD-ROM.

In the computer cluster, you the opportunity to see some useful web sites about the embryology e.g. www.embyologymed.unsw.edu.au

Self- Assessment

The answer to self-assessment exercises will be discussed in tutorial sessions.

The main concepts

This study guide aims to communicate knowledge about the gametogenesis.

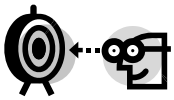
LECTURE # (20): Overview of Histology (Histology of the Cell)

Student Notes:

Department: Anatomy

Lecturer: Prof. A. Al. Hagagi
Dr. H. Saleh

Teaching Location: Auditorium



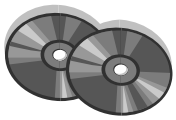
After this lecture, student should be able to:

1. Describe the cell as a functional unit
2. Describe microscopic features of the cell membrane
3. Describe the microscopic features of the cell organelles
4. Define the different types of cell junctions and the functions of each one
5. Describe the microscopic features of the cell junctions

- The structural complexity of the human body
- The cell as a functional unit
- The cell membrane (light and electron microscopic features)
- The cell organelles (light and electron microscopic features)
- Junctional complexes between cells and their functions

1. Color Textbook of Histology, 2nd Edition, Gartner, L.P. & Hiatt, J.L. , W.B. Saunders.

2. Di Fiore's Atlas of Histology with Functional Correlations, 9th Edition, Eroschenko, V.P., Williams & Wilkins.



Try to access CD-ROM series about the embryology from the computer cluster in the 2nd floor of the medical library, building No. 7.; just look to the part of cytology in each CD-ROM.

In the computer cluster, you the opportunity to see some useful web sites about the cytology and structure of the cell e.g. www.innerbody.com – www.netanatomy.com

Self- Assessment

The answer to self-assessment exercises will be discussed in tutorial sessions.

The main concepts

This study guide aims to communicate knowledge about the gametogenesis.

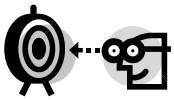
LECTURE # (21): Overview of the Human Histology

Student Notes:

Department: Anatomy

Lecturer: Prof. A. Al. Hagagi
Dr. H. Saleh

Teaching Location: Auditorium



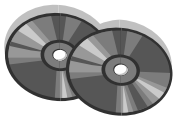
After this lecture, student should be able to:

1. Define the tissue
2. Define histology
3. Describe the structural complexity of the human body
4. Understand the general classification of human tissues
5. Describe the general characteristics of epithelial, connective, muscular, nervous, integument and lymphoid tissues

- ❖ Definition of histology and normal tissues
- ❖ The structural complexity of the human body
- ❖ General classifications of the tissues of the human body
- ❖ General characteristics of epithelial tissue
- ❖ General characteristics of connective tissue
- ❖ General characteristics of muscular tissue
- ❖ General characteristics of nervous tissue
- ❖ General characteristics of skin tissue
- ❖ General characteristics of lymphoid tissue

1. Color Textbook of Histology, 2nd Edition, Gartner, L.P. & Hiatt, J.L. , W.B. Saunders.

2. Di Fiore's Atlas of Histology with Functional Correlations, 9th Edition, Eroschenko, V.P., Williams & Wilkins.


Try to access CD-ROM series about the embryology from the computer cluster in the 2nd floor of the medical library, building No. 7.; just look to the part of cytology in each CD-ROM.


In the computer cluster, you the opportunity to see some useful web sites about the cytology and structure of the cell e.g. www.innerbody.com – www.netanatomy.com


Self- Assessment

The answer to self-assessment exercises will be discussed in tutorial sessions.

The main concepts

This study guide aims to communicate knowledge about the gametogenesis.

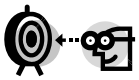
LECTURE# (22): Water the medium of life

Student Notes:

Department: Clinical Biochemistry

Lecturer: Dr. M. Hassanien
Dr. A. Gharib

Teaching Location: Auditorium



By the end of this lecture, you will be able to:

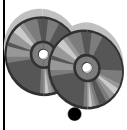
1. Compare between water and other solvents.
2. Recognize water properties which make the universal solvent.
3. Appreciate the role of buffer in human body homeostasis

- Molecular structure of water
- Non-covalent forces
- Properties of water
- Ionization of water
- Buffers

- Water is essential for life. It covers 2/3 of the earth's surface and every living thing is dependent upon it. The human body is comprised of over 70% water, and it is a major component of many bodily fluids including blood, urine, and saliva.

1- Required Texts And Resources: Lippincott Illustrated Reviews, 3rd edition, Champe & Harvey
2- Reading Handouts will be distributed

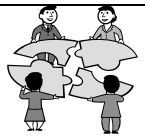
3- Lectures and power point presentation will be published on department website: www.kaau.edu.sa/faculties/medicine/dcbcweb



You have the opportunity to watch the CD-ROM about Water & Chemical Bonds. You can access the CD-ROM during your spare time.

1- Biochemistry of water: http://library.thinkquest.org/28751/review/biochem/2.html
2- Water http://www.chm.bris.ac.uk/motm/water/water.htm
3- Water animation http://www.rkm.com.au/ANIMATIONS/animation-water-molecule.html
4- Hydrogen bonding animation www.elmhurst.edu/~chm/vchembook/163boilingpt.html
5- All about chemical bonding http://www.promotega.org/UGA06004/covalent_bonds.html

1- List different types of chemical bonds. In a table form compare different types of bonds and their biological importance.



Clinical Question

The human body is greater than 80% water, but a relatively small loss of water content, such as that created by vigorous exercise or diarrhea, can have profound physiologic consequences. From a biochemical point of view, and from what you have learned in this course so far, why would small changes in water content alter biochemical processes?

I- MCQ:

Which of the following is NOT a "weak" interaction?

A. hydrogen bonds
B. van der Waals forces
C. disulfide bonds
D. ionic interactions

2- What is the maximum number of hydrogen bonds that one water molecule can have with neighboring water molecules?

A. 1
B. 2
C. 3
D. 4

3- The pH of a 10^{-4} M solution of HCl is

A. 3
B. 10
C. 4
D. 4.5

III- True / False

a. Electrostatic interactions occur between atoms have the same charge
b. In water molecule, Oxygen is highly electrophilic.
c. Water molecules are bound together through Ionic bonds.
d. Buffers are made up of a mixture of a weak acid with its conjugate base or a weak base with its conjugate acid.
e. pH + pOH = 10 For any substance dissolved in water

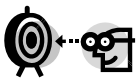
LECTURE # (23): Structure of carbohydrates

Student Notes:

Department: Clin. Biochemistry

Lecturer: Dr. M. Hassanien
Dr. A. Gharib

Teaching Location: Auditorium



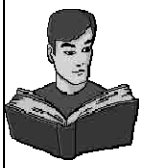
By the end of this lecture, you will be able to:

1- Identify the wide range of functions of carbohydrates.
2- Classify carbohydrates.
3- Differentiate isomers, epimers and enantiomers.
4- Identify cyclization of manosaccharides to know anomers, mutarotation and glycosides.
5- Discuss some important chemical reactions of manosaccharides.

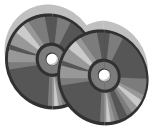
- Introduction
- Functions of carbohydrates
- Classification:
  - Monosaccharides
  - Disaccharides
  - Polysaccharides
    - Homopolysaccharides
    - Heterapolysaccharides

Carbohydrates are aldhyde or ketone derivatives of polyhydric alcohol, they contain the elements carbon, hydrogen and oxygen. Hydrogen and oxygen are present in the same ratio as water 2:1.

Carbohydrates are important biomolecules performing several Biological functions



1- Required Texts And Resources: Lippincott Illustrated Reviews, 3rd edition, Champe & Harvey
2- Reading Handouts will be distributed
3- Lectures and power point presentation will be published on department website: www.kaau.edu.sa/faculties/medicine/dcbcweb



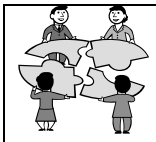
You have the opportunity to watch the CD-ROM about Carbohydrate Chemistry. You can access the CD-ROM during your spare time.

1- Properties of Biomolecules
http://www.phschool.com/science/biology_place/biocoach/bioprop/intro.html

2- Animated Biomolecules
http://www.umass.edu/microbio/rasmol/scripts.htm

3- Basic Biochemistry of Biomolecules:
http://web.indstate.edu/thcme/mwking/biomolecules.html

1. Describe and compare the structures of cellulose and amylopectin. What is the general function of each of these polymers? How are their polymeric structures suited to their cellular functions? How does glycogen structure differ from amylopectin? How is this important to the role of glycogen.



1- Both glycogen and cellulose are polymers of glucose, however glycogen forms an open, water-filled structure, while cellulose is linear and rigid. Compare the sructures of these molecules and explain how they suit their respective functions.

2- Cellulose and starch are both polymers of glucose, yet most mammals can use starch, but not cellulose, as a source of fuel. Explain.

I- Short Questions:

A- Describe the following, explain the difference between each pair:

1. D versus L sugars (give an example of each)
2. Aldose versus ketose (give an example of each)
3. α and β anomers of D-glucose (give an example of each)
4. Glucose versus glucosamine.

B- Give one example for each of the following:

1- Ketohexose
2- Aldopentose
3- Aldotriose
4- Heteropolysaccharide
5- Homopolysaccharide

II- MCQ:

1- The sugar residues of amylose are:

(A) Glucose units liked in β-1,4 linkages

(B) Glucose units liked in α l,4-linkages

(C) Both galactose and fructose units liked in α l,4-linkages

(D) fructose units liked in α l,4-linkages

2. Which of the following contains ketone group?

(A) Glucose

(B) Mannose

(C) Ribulose

(D) Galactose

3. Hydrolysis of sucrose yields:

(A) Two moles of glucose

(B) Glucose and fructose

(C) Galactose and fructose

(D) Glucose and mannose

III- True / False

1. The chemical formula of a monosaccharide is $C_6H_{12}O_6$

2. Monosaccharides are classified according to the functional group into trioses, tetroses, pentoses, hexoses, ….etc.

3. Carbohydrates are hydrates of carbon in which hydrogen and oxygen are present with the same ratio in water (2:1)

4. Oligosaccharides contains more than 10 sugar units.

5. Asymmetric carbon atom is the carbon atom attached to four different atoms or groups.

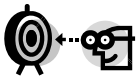
LECTURE # (24-25): Structure of lipids

Student Notes:

Department: Clin. Biochemistry

Lecturer: Dr. M. Hassanien
Dr. A. Gharib

Teaching Location: Auditorium



By the end of this lecture, you will be able to:

1. Identify the functions of lipids
2. Classify lipids.
3. Discuss the different basis for classification of fatty acids.
4. Identify the structure of different substances of compound lipids.
5. Discuss the structure and functions of different steroid compounds.
6. Identify caratenoids and their importance to human body.

- Introduction
- Functions of lipids
- Fatty acids:
  - Saturated
  - Unsaturated
- Simple lipids
- Conjugated lipids:
  - phospholipids
  - glycolipids
  - lipoproteins
- Derived lipids
  - steroids
  - caratenoids

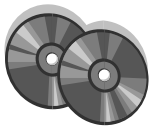
Lipids are substances insoluble in water and soluble in fat solvents. They are utilized in the body. They are classified into simple, conjugated and derived Lipids

1. Required Texts And Resources: Lippincott Illustrated Reviews, 3rd edition, Champe & Harvey

2. Reading Handouts will be distributed

3. Lectures and power point presentation will be published on department website:

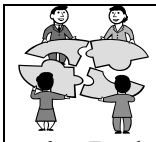
   www.kaau.edu.sa/faculties/medicine/dcbcweb



You have the opportunity to watch the CD-ROM about Lipid Structure. You can access the CD-ROM during your spare time.

1- Properties of Biomolecules
http://www.phschool.com/science/biology_place/biocoach/bioprop/intro.html
2- Animated Biomolecules
http://www.umass.edu/microbio/rasmol/scripts.htm
3- Basic Biochemistry of Biomolecules:
http://web.indstate.edu/thcme/mwking/biomolecules.html

1- In table form, describe different types of conjugated lipids, mention their biological importance



1- Both Lipids and Carbohydrates are organic compounds, formed mainly from Hydrogen, Oxygen and Carbon, Explain why energy content of lipids is greater than carbohydrates.

I- Short Questions:

1. How can you tell whether a particular fatty acid is, or is not, essential?
2. How many fatty acids contain 18 carbon atoms, enumerate?
3. Enumerate different types of glycerophospholipids.
4. What is main differences between HDL and LDL?
5. Give 2 example for hormones derived from cholesterol.

II- MCQ:

1. True statements about lipids include the following except:

(a) They are an intracellular energy source
(b) They are poorly soluble in water
(c) They are structural components of membranes
(d) They are composed of only carbon, hydrogen and oxygen

2. Fatty acids that are dietary essentials in humans include which of the following:

(a) Palmitic acid
(b) Stearic acid
(c) Oleic acid
(d) Linoleic

3. A choline residue is present in which of the following lipids?

(a) Phosphatidic acid
(b) Ganglioside
(c) Cholesterol
(d) Sphingomyelin

III- True / False

1- Sphingosine is the backbone of lecithin
2- Palmitic acid is an essential fatty acid
3- Stearic acid is non essential fatty acid
4- Chylomicrons are synthesized in the small intestine, formed mainly of triglyceride.
5- Vitamin E is one of cholesterol derivatives

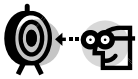
LECTURE # (26-28): Proteins structure

Student Notes:

Department: Clin. Biochemistry

Lecturer: Dr. M. Hassanien
Dr. A. Gharib

Teaching Location: Auditorium



By the end of this lecture, you will be able to:

1. Identify the diverse functions of proteins.
2. Classify the protein amino acids on different basis.
3. Identify the non-common amino acids.
4. Discuss the acid-base properties of amino acid.
5. Describe the three dimentional structure of proteins (primary, secondary, and tertiary structure) and the presence of quaterary in some proteins.
6. Identify the different chemical bonds responsible for stabiity of protein structure.
7. Describe protein denaturation and its causes.

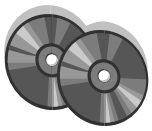
- Introduction
- Functions of proteins
- Chemistry of amino acids
- Classification of amino acids
- Chemistry of proteins
- Levels of protein structure: primary, secondary, tertiary and quaternary
- Denaturation of proteins

- Classification of proteins: simple, conjugated and derived

All biologically known protein are polymers of a set of twenty known amino acids. All biologically known amino acids are α L amino acids. They are composed of carboxylic end COOH and amino end NH2 and α carbon attached to both of them and special side chain (R) attached to this α carbon . This side chain is characteristic of every amino acid.

1. Required Texts And Resources: Lippincott Illustrated Reviews, 3rd edition, Champe & Harvey
2. Reading Handouts will be distributed
3. Lectures and power point presentation will be published on department website:

   www.kaau.edu.sa/faculties/medicine/dcbcweb

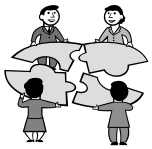


You have the opportunity to watch the CD-ROM about protein structure. You can access the CD-ROM during your spare time.

1- Properties of Biomolecules
   http://www.phschool.com/science/biology_place/biocoach/bioprop/intro.html
2- Animated Biomolecules
   http://www.umass.edu/microbio/rasmol/scripts.htm
3- Basic Biochemistry of Biomolecules:
   http://web.indstate.edu/thcme/mwking/biomolecules.html
4- Biomolecule, Protein learning activity

http://www.wisc-online.com/objects/index_tj.asp?objID=AP13304

i. Enumerate different classification of amino acids, in a table form list the 20 known amino acids according to their classification.



ii. The pKa of charged amino-acid side chains within proteins is highly influenced by its local environment. From the data presented in the table below for residues within a fictitious protein at pH 7, calculate the pKa of each amino-acid side chain. If the pKa differs greatly from that given in the Table describe a local environment that could produce this change.

amino acid	% charged
lys142	50%
his195	10%
glu259	15%
glu392	95%

2- A recent study described the rate of folding of a denatured protein that contained both alpha-helical and beta-sheet domains. It was found that the alpha helical segments folded faster than the beta-sheet segments. Explain this result.

I- Short Questions:

A- Give one example to the following:

a- Essential amino acids
b- Ketogenic amino acids
c- Sulphur containing amino acids
d- Non essential amino acids

B- Give the definition for the following:
- a- Isoelectrical point
- b- Denaturation
- c- Primary structure of protein

C- Enumerate the forces that stabilize the tertiary structure of protein

II- MCQ:

1- The primary structure of a protein is best described by the term:

a. alpha helix
b. beta sheet
c. amino acid composition
d. amino acid sequence

3. The bond or interaction between two cysteines that form a cystine is:

a. ionic interaction
b. hydrophobic interaction
c. Van der Waals interaction
d. Disulfide bonds

4. The information that determines how a protein folds correctly is containe in its:

a. primary structure
b. secondary structure
c. tertiary structure
d. quaternary structure

III- True / False

1. In Beta-sheet, hydrogen bonds are parallel to the axis of polypeptide chain.
2. Secondary structure of a protein is not related to its primary structure.
3. Peptide bond is a weak bond that can be broken by the usual denaturing agents.
4. Tertiary structure of protein occurs when the protein consists of more than one subunit.
5. Beta-sheet is formed of one or more polypeptide chain

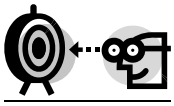
Lecture# 29: An Introduction to Human Physiology

Student Notes:

Department: Physiology

Lecturer: Prof. Mohammed Hanafi
Dr. Maha Hejazi

Teaching Location:



At the end of this lecture the student should be able to:-

1. Understand the outlines of various body systems taught in physiology, the integration and functional relationship between the various organ systems of the body.
2. To understand the concept of the constancy of the internal environment and its regulation by homeostatic mechanism
3. Describe the distribution, composition and function of various body fluid compartments.
4. To understand the mechanism of body fluid exchanges in relation to applied physiology.
5. Define the feedback control mechanisms and identify the various components of the control systems.

- To understand the physiological functions of the various body systems, their integration and inter relationships giving examples.

- To describe the theory of constancy of internal environment for the tissue cells and the homeostatic control mechanism.

- To describe the total body water and its measurement. The organic and inorganic components of various body fluids: The intracellular fluid and the extracellular fluids including the interstitial fluid, transvascular fluid and transcellular fluid

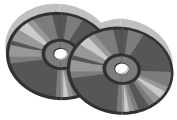
- To describe the dynamics of fluid exchange mechanisms and their control related to applied physiology.

- To understand the various biological control systems, the control thoery: input and output integration, the feedback control mechanisms giving examples of body temprature regulation, body water regulation and/or hormonal regulation.

1. Gyuton, A.C. & Hall, J.E. (2000). Textbook of Medical Physiology. 10th edition (2000) W.B. Saunders comp.

2. Sherwood, L. (2001) Human Physiology from Cells to Systems 4th edition (2001) Brooks-Cole: USA.

3. Roddie, I.C. & Wallace W.F.M. (2000) MCQ's in Human Physiology 5th edition (2000) Oxford Univ. Press.



Independent learning from the CD-ROM.

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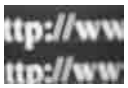


MCQ on lecturer # 1:

1. Concerning homeostasis:

   a) Is the maintenance of external environment constant despite changes in internal environment.

   b) Is not essential for maintenance of life.

   c) Temperature homeostasis is of prime importance.

   d) The renal and endocrine systems are only systems working for homeostasis.

2. Regarding fluid exchange between plasma and interstitial fluid:

   a) At arterial end of capillaries osmotic pressure is higher than hydrostatic pressure.

   b) At arterial end of capillaries filtration occurs.

   c) The amount of fluid reabsorbed more than amount of fluid filtered.

   d) Osmotic pressure of plasma protein is high at arterial end than at venous end of capillaries.

3. Excessive formation of a substance/ secretion in body is controlled in order to maintain homeostasis by:

   a) +ve feedback mechanism.

   b) –ve feedback.

   c) Osmosis.

   d) Hemodynamic.

4. The rate of diffusion of a substance from a region of higher concentration to a region of lower concentration is:

   a) Directly proportional to cross sectional area between regions.

   b) Directly proportional to molecular size.

   c) Directly proportional to distance through which diffusion occurs.

   d) Inversely proportional to concentration gradient.

5. Regarding body fluids:

   a) Intracellular fluid constituent about 1/5 of total body fluid.

   b) Extracellular fluid constituent about 1/3 of total body fluid.

   c) Plasma is considered as intracellular fluid.

   d) Transcellular fluid volume is usually Large

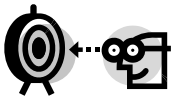
Lecture # :(30-33): The Autonomic Nervous System

Student Notes:

Department: Physiology

Lecturer: Prof. Mohammed Hanafi
Dr. Maha Hejazi

Teaching Location:



At the end of these 4 lectures 'course' the student will:

1. Understand the basic organization of the nervous system, the distinction between central and peripheral N.S. and he functional relationship between somatic and autonomic N.S. in order to differentiate and understand somatic and autonomic dysfunction.

2. Appreciate the function and integration of the various parts of the autonomic N.S. in order to detect manifestations of visceral dysfunction.

3. Understand the theory of chemical transmission in order to identify the indications, mechanism of actions and side effects of drugs acting on autonomic N.S.

4. Describe the higher control of autonomic N.S. in order to appreciate the inter- relation between psychological factors and visceral disorders in patient management.

Lecture # 30:

Introduction

a) Physiological organization of the nervous system:

- The somatic and the autonomic N.S.
- Basic functions of the autonomic N.S.

b) General organization of the autonomic N.S.:
   - The parasympathetic and sympathetic N.S.
   - Characteristics of the efferent autonomic pathway.
   - Differentiation between somatic and autonomic efferent pathways.

c) The autonomic ganglia (types and functions)

Lecture # 31:

The Sympathetic and Parasympathetic N.S.

a) Origin and ganglia of relay
b) Effect of stimulation (functions) for sympathetic and parasympathetic nerves
c) Integration of the autonomic functions
d) Higher control of the autonomic N.S.

Lecture # 32

Chemical Transmission in ANS: Cholinergic Transmission

a) Acetylcholine: synthesis, storage and release
b) Acetylcholine receptors: nicotinic & muscarinic actions
c) Actions of acetylcholine: nicotinic and muscarinic actions.

Lecture # 33:

Chemical Transmission in ANS: Adernergic Transmissions

a) Epinephrine and norepinphrine
b) Adrenergic receptors

1. Gyuton, A.C. & Hall, J.E. (2000). Textbook of Medical Physiology. 10th edition (2000) W.B. Saunders comp.
2. Sherwood, L. (2001) Human Physiology from Cells to Systems 4th edition (2001) Brooks-Cole: USA.
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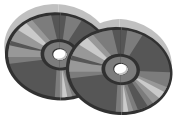

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MCQ on lecturer # 30

Select only one best answer:

1. The following are autonomic reflex EXCEPT:

a. Withdrawal of the arm or leg after pricking it due to contraction of skeletal muscles
b. Salivary secretion.
c. Defecation.
d. Cardiac acceleration during haemorrhage.

2. The autonomic nervous system differs from the somatic nervous system in:

a. Having one efferent neuron.
b. Preganglionic neurons are located in the anterior horn of the spinal cord.
c. Efferent nerves have preganglionic and postganglionic nerve fibers.
d. Post ganglionic neurons are located in the dorsal horn cells of spinal cord.

3. The autonomic reflex arc is characterized by:

a. Its motor neuron is located in the anterior horn of the spinal cord.
b. Its sensory neuron is located in the lateral horn cell of spinal nerve.
c. Its efferent limb is composed of 2 neurons communicating outside of CNS.
d. Its motor neuron, supplies all the types of body muscles.

4. Concerning the autonomic outflow to the body organs:

a. Thoracic and abdominal organs are innervated by both divisions of the autonomic nervous system.
b. Pelvic organs are innervated by sympathetic neurons located in the sacral segments of the spinal cord.
c. Limbs are innervated only by parasympathetic neurons.
d. Head is innervated by sympathetic neurons located in the lumber ganglia.

5. Regarding autonomic ganglia:

a. They function as distributing centers.
b. The chemical transmitter in sympathetic ganglia is norepinepherine.
c. Lateral ganglia belong to the parasympathetic nervous system.
d. Terminal ganglia belong to the sympathetic nervous system.

6. Which of the following effects may be produced by sympathetic stimulation:

a. Increased gastric secretion.
b. Pupilloconstriction.
c. Relaxation of gastrointestinal wall.
d. Contraction of plain muscles in the wall of urinary bladder.

7. Stimulation of sympathetic nervous system causes:

a. Contraction of ciliary muscle for near vision.
b. Generalized actions affecting many systems.
c. Bronchoconstriction.
d. Decreased glycogenolysis and lipolysis.

EMQ on lecturer # 31

a. Somatic nervous system.
b. Autonomic nervous system.

1. Cell body in the anterior horn cell. (a)
2. Efferent one type of fibre. (a)
3. Efferent two types of fibres (pre and postganglionic fibres. (b)
4. Effective organs cardiac muscles, smooth muscles and glands. (b)
5. Neurotransmitter is either acetylcholine or noradrenaline. (b)
6. Withdrawal reflex. (a)
7. Gastrointestinal tract secretion. (b)

a. Sympathetic nervous system.
b. Parasympathetic nervous system.

1. Origin from thoracico- lumber segment of the spinal cord. (a)
2. Wide in distribution. (a)
3. Catabolic (energy consume). (a)
4. Its receptor are α1, α2, β1, β2. (a)
5. Terminal ganglia and other ganglia. (b)
6. Lateral and collateral ganglia. (a)
7. Dilatation of the pupil. (a)
8. Sweet secretion. (a)
9. Decreased heart rate. (b)

MCQ on lecturer # 32

1. The autonomic ganglia:

a. Are the site of relay of the postganglionic nerve fibres.
b. Function as distributing centres.
c. Are located only lateral to the spinal cord.
d. All preganglionic fibres passing through an autonomic ganglion relay in it.

2. With regards to autonomic ganglia. The following are true statement EXCEPT:

a. They function as distributing centres.
b. Parasympathetic fibres relay in terminal ganglion.
c. All the preganglionic fibres pass through them without relay.
d. Sympathetic fibres relay in lateral ganglia.

3. Sympathetic preganglionic nerve fibers:

a. Are usually longer than parasympathetic preganglionic fibers.
b. To the viscus, terminate in ganglia near or on their effector organs.
c. Originate from cranio and sacral regions of the spinal cord.
d. Are cholinergic nerve fibers.

4. Sympathetic supply cannot be responsible for:

a. Constriction of the pupil.
b. Erection of the hair.
c. Secretion of eccrine sweat glands.
d. Spleen contraction.

5. Sympathetic activation of pelvic organs would cause:

a. Contraction of internal anal sphincter.
b. Contraction of external urinary sphincter.
c. Contraction of wall of rectum.
d. Relaxation of wall of reproductive duct.

6. Vagal stimulation produces:

a. Tachycardia.
b. Inhibition of intestinal motility.
c. An increase in gastric secretion.
d. Dilatation of bronchi.

7. Stimulation of sacral autonomic outflow causes:

a. Micturation.
b. Contraction of seminal vesicles.
c. Vasodilatation of the blood vessels of lower limbs.
d. Vasoconstriction of the blood vessels of external genitalia.

8. Parasympathetic supply to pelvic organs causes all the following EXCEPT:

a. Defecation.
b. Micturition.
c. Erection of external genitalia.
d. Emission and ejaculation of semen.

EMQ on lecturer # 31

a. Terminal ganglia.
b. Lateral ganglia.
c. Collateral ganglia.
d. Adrenal medulla.

1. Present inside the organ or on its surface. (a)
2. Present on both sides of spinal cord. (b)
3. On its stimulation produce adrenaline and noradrenaline. (d)
4. Present at origin of big vessels. (c)
5. Postganglionic fibres is very short. (a)
6. Sit of relay of parasympathetic fibres only. (a)

MCQ on lecturer # 32

1. The nicotine like action of acetylcholine is present at:
   a. The postganglionic parasympathetic endings at the target organ.
   b. The sympathetic postganglionic nerve endings to sweat glands.
   c. The sympathetic postganglionic nerve endings to blood vessels of skeletal muscles.
   d. All autonomic ganglia.

2. Concerning acetyl choline:
   a. Is released by parasympathetic nerve endings to sweat gland.
   b. Is the neurotransmitter in suprarenal medulla.
   c. Increases the force of cardiac contraction.
   d. Increases the diameter of bronchi and bronchioles.

3. Concerning the sites of secretion of acetylcholine, the following statements are true EXCEPT:
   a. At the postganglionic parasympathetic nerve endings.
   b. At the postganglionic sympathetic nerve ending to skeletal muscles.
   c. At all preganglionic sympathetic and parasympathetic nerve endings.
   d. At the neuromuscular junction.

4. The nicotinic action of acetylcholine:
   a. Is excitatory to both intestinal movements and secretion.
   b. Is stimulatory to the autonomic ganglia.
   c. Is blocked by atropine.
   d. Has no effect on the neuromuscular junction.

5. Muscarinic receptors are:
   a. Structural similar to nicotinic receptors.
   b. Stimulated by acetylcholine.
   c. Present in cardiac but not smooth muscles.
   d. Present in adrenal medulla.

6. Sites of release of acetylcholine, include all the following EXCEPT:
   a. All postganglionic sympathetic fibers nerve endings.
   b. All postganglionic parasympathetic fibers nerve endings.
   c. Nerve ending supply adrenal medulla.
   d. Postganglionic sympathetic fibers to sweet glands.

7. Cholinergic receptors in the:
   a. Adrenal medulla, are stimulated by muscarine.
   b. Smooth muscle of bronchi, are stimulated by nicotine.
   c. Atria of the heart are stimulated by muscarine.
   d. Skeletal muscle end plate is blocked by muscarine.

8. Both autonomic ganglia and neuromuscular junction:
   a. Have nerve endings that release adrenaline.
   b. Have nicotinic acetyl choline receptors.
   c. Have interneurons.
   d. Are inhibitory synapses.

9. Acetylcholine stimulation of its nicotinic receptors with produce:
   a. A decrease in heart rate.
   b. Evacuation of the urinary bladder.
   c. Constriction of pupils.
   d. An increase in blood catecholamine level.

10. Acetyl choline is the neurotransmitter release in all the following EXCEPT:

    a. All skeletal muscle neuromuscular junctions.
    b. All sympathetic and parasympathetic ganglia.
    c. All preganglionic nerve endings.
    d. All postganglionic nerve endings.

EMQ on lecturer # 32

a. Nicotinic receptor.
b. Muscarinic receptor.
c. Acetyl choline.

1. Found on surface of all ganglia either sympathetic or parasympathetic. (a)
2. Destructed by hydrolysis. (c)
3. Present on the surface of the sweet glands. (b)
4. Stimulated by small doses of nicotine. (a)
5. Present in neuromuscular junction (motor end plate). (a)
6. Present on the blood vessels of skeletal muscles. (b)
7. Secreted at all postganglionic parasympathetic fibres. (c)

MCQ on lecturer # 33

1. Norepinepherine:

    a. Is released by both pre and postganglionic sympathetic nerve endings.
    b. Is a potent vasodilator.
    c. Is the neurotransmitter in the alpha adrenergic receptors.
    d. Increases intestinal motility.

2. About chemical transmission in the sympathetic nervous system:

   a. Noradrenalin is released by both preganglionic and postganglionic sympathetic nerve endings.
   b. Noradrenalin acts mainly on B adrenergic receptors
   c. Noradrenalin contributed to more than 80% of the secretion of adrenal medulla.
   d. The alpha adrenergic stimulators cause contraction of the plain muscles in the seminal vesicles and vas deferens.

3. Increase secretion of epinephrine causes:

   a. Increased cardiac output and decreased peripheral resistance.
   b. Decreased cardiac output and increased peripheral resistance.
   c. Decreased cardiac output and decreased in peripheral resistance.
   d. Decreased cardiac output and decreased heart rate.

4. Degradation of norepinepherine action is achieved by all the following EXCEPT:

   a. Rapid reuptake in the presynaptic endings.
   b. Diffusion away to the blood
   c. Degradation by an oxidize.
   d. Degradation by hydrolysis.

5. Epinephrine infusion in an experimental animal causes:

   a. Increased strength and rate of cardiac contraction.
   b. Marked increase in the mean arterial blood pressure.
   c. Marked increase in the diastolic blood pressure.
   d. Severe bronchoconstriction.

EMQ on lecturer # 33

a. α receptors.
b. β receptor.
c. Adrenaline.
d. Noradrenaline.

1. Mostly inhibitory. (b)
2. Produced pupillodilatation. (a)
3. Produced bronchodilatation. (b)
4. Increased heart rate. (b)
5. Act more on alpha receptors. (d)
6. Released mainly in the adrenal medulla & inside the central nervous system. (c)

Lecture # 34 - 37: Excitable tissues (the nerve)

Student Notes:

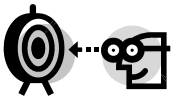
Department: PHYSIOLOGY

Lecturer: Prof. Mohammed Hanafi
Dr. Maha Hejazi

Teaching Location:

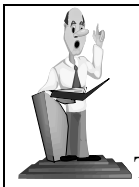
LECTURE # 34

Introduction to Excitable Tissues (nerve)



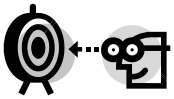
By the end of this lecture, the students should be able to:

1. State the ionic distribution across the cell membrane. (knowledge)
2. Describe the types of ions channels. (Evaluation)
3. Outline the structure of a nerve cell. (knowledge)
4. Distinguish the conduction differences between meylinated & unmeylinated nerve fibers. (Comprehension)
5. Definition of resting membrane potential (RMP) (knowledge)
6. list the causes of the RMP ((knowledge)
7. Identify how to record RMP ((knowledge)
8. Conclude the importance of NA-K pump. (Evaluation)

 The fluid which lies outside the cell membranes (ECF), differ in composition from that inside the cell (ICF).The cell membrane act as a barrier for the movement of most water molecules and water soluble substance between ECF and ICF. There are channels that allow passage of different molecules from & to the cells, these chanells may be leakage, voltage gated, or liganed gated The neuron is the basic building unit of the nervous system. It integrate and transmit the nerve impulse, and formed of Cell body or soma, dendrites, inputAxons, and output Neuroglia or glial cells: Support and protect neurons. Most of the neurons are mylinated others are unmylinated. The of mylinated nerves conduct faster than the unmylinated. The electrical potential difference between the outer surface and inner surface of the membrane of excitable tissues, during rest is defined as resting membrane potential. It is caused by selective permeability, and Na-K pump, and recorded by the cathode ray oscilloscope which always gives a negative potential in a nerve during rest

LECTURE # 35

Action Potential



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

1. Identify the types of stimuli (knowledge)
2. Distinguish the different types of potentials produced by threshold & sub-threshold stimuli. (Comprehension)

3. Explain and give examples to all or none law. (Comprehension)
4. Define the action potential. (Knowledge)
5. Illustrate the different components of action potential (Analyses)
6. Summarize the ionic bases of action potential phases (Comprehension, & Synthesis)
7. State how the action potential is recorded (knowledge)

   Explain compound action potential. (Comprehension

The stimulus may be electrical, chemical, or mechanical.

Two types of potentials may be produced; none propagated if the stimulus is subthreshold, or propagated which is produced by threshold stimulus.

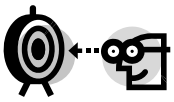
The non propagated one is characterized by being graded, summated, does not obey all or non law, and does not have absolute refractory period), while the propagated one have absolute refractory period, obeys all or non law, can not be summated, and does not produce higher response if the stimulus is more than threshold. The propagated action potential is started as a depolarization phase due to opening of a voltage gated Na+ channels (active channel both gates are opened), and ends with repolarization phase de to K+ out flux.

The Na channels open rapidly & closes. rapidly, while the K channels open slowly & closes slowly. At the end of repolarization the membrane potential does not return to the resting state (polarized) due to maintained outflux of K that is why before reaching resting state the cell membrane is hyperpolarized (more negative than resting; less excitable).

To reach the resting state Na+-K+ pump has to operate. The action potential can recorded from a single nerve fiber or a mixed nerve trunk in such case it is called compound action potential

LECTURE # 36:

Excitability Changes During the Different Phases of the Propagated Action Potential



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

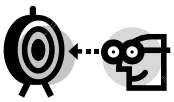
1. Describe the excitability changes during the phases of action potential. (Knowledge)
2. Define absolute refractory period, the relative refractory period, and the effective refractory period. (knowledge)
3. Explain the causes of excitability changes during polarized, depolarized, repolarized, after depolarized, and hyperpolarized. (Comprehension)
4. Conclude the threshold of stimulus that is suitable to stimulate the excitable nerve during each phase. (Evaluation).
5. Interprets the effect of extra-cellular ionic Concentration on cell excitability. (Evaluation)

During the resting membrane potential the cell is polarized, and threshold stimulus causes the cell to depolarize to the firing level (-55mV). The ascending limb of the action potential is started till the membrane is reversed as regard polarity (positive inside and negative outside). Then the Na+ channels are totally inactive (closed), and repolarization is started by increased K+ outflux. The absolute refractory period (ARP) is started with depolarization and continued to the first descending one third of repolarization. During it the membrane is totally refractory. The relative refractory
Period (RRP) is started. During which a supertyhreshould stimulus because K+ is still go

outside the cell, but it can activate some of the inactive sodium channels and causes anther action potential. The RRP started after depolarization and ends at the same level of the firing at the ascending limb. Then the after depolarization is started where the membrane is less negative than resting so it is more excitable and suthreshold stimulus can cause an action potential. The afterdepolarization is coincide with the lower part of the descending limb of the spike. After reaching this state the K+ outflux is maintained although the cell has reaching the resting level. This hyperpolarizes the cell because it became more negative than resting and less excitable. A superthreshould stimulus is needed to cause action potential. The Na-k pump returns the membrane potential back to its resting level. Changes in the extra cellular ion concentration (Ca++, or K+) alter the membrane excitability.

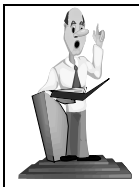
LECTURE # 37:

The Conduction of Propagated Action Potential



After completing this lecture, students should be able to

1. Summarize the direction and amplitude of action potentials conduction. (Comprehension).
2. Identify the mechanism and advantages of salutatory conduction of the mylinated nerves. (Analysis)
3. List the two Systems for Classifying Axons in Peripheral Nerve by Diameter. (knowledge)
4. List the susceptibility of Different Types of Fibers to conduction Block by Various Agents (hypoxia, pressure, & anesthesia (Knowledge)



The propagation of the action potential is faster in myelinated than non myelinated nerve fiber (saltatory conduction). It is one way direction in vivo, and propagated keeping its amplitude. An action potential elicited at any one point on an excitable membrane usually excites adjacent portions of the membrane, resulting in propagation of the action potential. a "local circuit" of current flow between the depolarized areas of the membrane and the adjacent resting membrane areas.

There are two different classification of nerve based on diameter and conduction velocity.
Susceptibility of the nerve fiber to conduction block by pressure, hypoxia and anesthesia differs by the nerve type

1. Gyuton, A.C. & Hall, J.E. (2000). Textbook of Medical Physiology. 10th edition (2000) W.B. Saunders comp.
2. Sherwood, L. (2001) Human Physiology from Cells to Systems 4th edition (2001) Brooks-Cole: USA.
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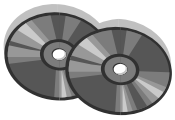

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Lecture 34:

Introduction to excitability and resting membrane potential:

1- Extended matching:

- The potential difference between the inside and outside of the neuronal cell membrane.
a- The excitability.

-The changes in membrane potential produced by threshold stimulus.
b- The membrane potential.

- A non-propagating change in membrane potential.
c - The stimulus.

- The ability to respond to a stimulus.

- A change in the internal or external environment.

1- The resting membrane potential of an excitable cell:

a- Is more permeable to organic anions than inorganic anions.
b- Is caused by the great permeability to K^+.
c- The negativity inside is due to chloride ions.
d- Its value is about – 40 mv.

Lecture 35:

Action Potential

Extended matching:

- Couples Na^+-K^+ transport in a ratio of 3:2.
a- Leak channels.

- Get activated by changes in membrane potential.
b- Na^+-K^+ pump.

- Allow ion flow passively according to chemical gradient.
c- Voltage-gated K^+ channels.

- Get activated by binding with a chemical substance.

- Have an outer and inner gates.

- The point at which all Na^+ channels get activated.
a- Latent period.

- Can be used to determine nerve conduction velocity. b- Hyperpolarization.

- Produced by inward current of Cl^- ions.
c- Firing level.

- Caused by slow closure of K^+ ions.

- Produced by inflow of K^+ ions
==========

1- At the end of action potential, the negativity inside the membrane increases and takes some time to return back to resting state, this:

a- Is termed depolarization.
b- Shows increased excitability.
c- Results from high permeability to Na^+.
d- Is caused by slow closure of K^+ channels.

2- The action potential of a neuron:

a- Is initiated by the efflux of Na^+ ions.
b- Declines in amplitude as it moves along the nerve.
c- Is initiated by the influx of K^+ ions.
d- Is terminated by the efflux of K^+ ions.

3- An action potential in a nerve fiber:

a- Occurs when its membrane potential is hyperpolarized.

b- Is associated with a transient increase in membrane permeability to Na^+.

c- Its amplitude varies directly with the strength of the stimulus.

d- Initiates local response in the adjacent segment of the fibre.
==========

Lecture 36:

Excitability changes and propagation of action potential:

Extended matching:

- Obeys all or non law.
  a- Compound action potential.

- A local circuit of current flow
  b- Action potential in single fiber.

- Has multiple peaks.
  c- Local response.

- Is entirely accompanied by lost excitability.

- Can be produced by single subthreshold stimulus.

==========

- Extends from firing level till early repolarization.
  a- Relative refractory period.

- Is the ascending limb of the action potential spike.
  b- Absolute refractory period.

- During it, a stronger stimulus can excite the nerve.
  c- Depolariztion phase.

- Shows normal excitability.

- Caused by the action of Na - K pump.

==========

1- The velocity of conduction of action potentials:

a- Is higher in type C nerve fibers than type A fiber..
b- Decreases with increased diameter in myelinated fibers.
c- Is directly proportionate to the nerve diameter.
d- Is fast and called saltatory conduction in unmyelinated fibers.

2- Regarding local response and action potential:

a- Local response is a propagated potential.
b- Action potential can be produced by single subthreshold stimulus.
c- Excitability is increased during the whole local response.
d- Excitability is reduced during the whole action potential.

==========

Lecture 37:

Role of ion changes on excitability and types of nerve fibers:

Extended matching:

- Have no Schwann cells.
a- Type A nerve fibers.

- Have the highest conduction velocity.
b- Type B nerve fibers.

- Unable to transmit action potentials.
c- Type C nerve fibers

-Are the most sensitive to local anaesthesia.

- Are moderately sensitive to hypoxia.

==========

- Increases membrane excitability.
a- Hypocalcemia.

- Depresses Excitability.
b- Hypokalemia.

- decreases membrane permeability to Na ions.
c- Local anaesthetics.

- Block K channels.

- Increase magnitude of action potential.

==========

1- Which of the following nerve fibers has the slowest conduction velocity:

a- Aα fibers.
b- Aβ fibers.
c- B fibers.
d- C fibers.

2- Which of the following nerve fibers shows the highest sensitivity to pressure:

a- Aα fibers.
b- Aβ fibers.
c- B fibers.
d- C fibers.

Nerve excitability can be decreased by:

a- Hypocalcemia.
b- Hypercalcemia.
c- Hyperkalemia.
d- Hypernatremia.

Questions on the excitable tissues for the foundation course first year by Dr. Maha Hegazi, Associate Prof. of Physiology.

Questions on lecture # 34 Introduction

Objective: 1

List the causes of the RMP ((knowledge)

1. Which one of the following causes the resting membrane potential of an excitable nerve fiber?

a. K^+ efflux is more than that of Na^+ influx.
b. High permeability to the intracellular protein.
c. The pumped of two Na^+ ions out & three K^+ ions in the cell.
d. The activation of the voltage gated Na^+ channels.

Answer is a

Objective: 2

Conclude the importance of NA-K pump. (Evaluation)

2. The importance of the Na^+-K^+ pump in the resting membrane potential is to:

a. Depolarize the cell.
b. Consume energy during rest.
c. Maintains the selective permeability.
d. Move Na^+ down concentration gradient.

The answer is c.

Lecture # 35

THE ACTION POTENTIAL

Objectives: 1

Distinguish the different types of potentials produced by threshold & sub-threshold stimuli. (Comprehension)

1. The propagated action potential:

a. Is produced by subthreshold stimulus.
b. Obeys all or non-law.
c. Can be summated.
d. Has no refractory period.

The answer is b.

Objectives: 2

Illustrate the different components of action potential (Analyses)

2. The depolarization phase of action potential is caused by activation of.

a. Na^+ leakage.
b. K^+ outflux.
c. Ligand gated Na^+ channels.
d. Voltage gated Na^+ channels.

The answer is d.

Objectives: 3

Explain compound action potential. (Comprehension)

3. The compound action potential is:

a. Produced by a single nerve fiber when depolarized.
b. Obeys all or non law.
c. The potential differences across the cell membrane of nerve fiber.
d. Caused by a mixed nerve with a variable speed in conduction velocity.

The answer is d.

LECTURE # 36

EXCITABILITY CHANGES DURING THE DIFFERENT PHASES OF THE PROPAGATED ACTION POTENTIAL

Objectives: 1

Define absolute refractory period, the relative refractory period, and the effective refractory period. (knowledge)

1. The phase of action potential during which the nerve can not respond to a stimulus what ever its strength is called:

a. Polarization.
b. Early 1/3 of repolarization.
c. Hyperpolarization.
d. Afterdepolarization.

The answer is b.

Objectives: 2

Explain the causes of excitability changes during polarized, depolarized, repolarized, after depolarized, and hyperpolarized. (Comprehension)

2. Repolarization is caused mainly by:

a. Increased K^+ outflux.
b. Reversed polarity.
c. Inactivation of Na^+ channels.
d. High intra-cellular Na^+ concentration.

The answer is a.

Objectives: 3

Conclude the threshold of stimulus that is suitable to stimulate the excitable nerve during each phase. (Evaluation)

2. In order to activate a hyperpolarized cell, a superthreshold stimulus is needed because its membrane is:

a. Highly excitable.
b. In absolute refractory period.
c. More negative than resting.
d. Highly permeable to Na^+.

The answer is c.

LECTURE # 37

THE CONDUCTION OF PROPAGATED ACTION POTENTIAL

Objectives:1

Summarize the direction and amplitude of action potentials conduction. (Comprehension).

1. The conduction of an action potential is characterized by which of the following:

a. It is a passive process.
b. Moves at constant amplitude.
c. Its amplitude decreases during propagation.
d. Is not self-propagated.

The answer is b.

Objectives:2

Identify the mechanism and advantages of salutatory conduction of the mylinated nerves. (Analysis)
Salutatory conduction:

a. Occurs in a thin nerve fiber.
b. Consumes more energy.
c. Conducts nerve impulse slowly.
d. Jumps from one node of Ranvier to the next.

The answer is d.

Objectives: 3

List the two Systems for Classifying Axons in Peripheral Nerve by Diameter. (knowledge)

2. Which of the following characterizes A α (alpha) type of a nerve fiber:

   a. Is not myelinated.
   b. Consumes more energy than other types.
   c. Is more Susceptible to local anesthesia.
   d. Is being fast as regard conduction velocity.

   The answer is d

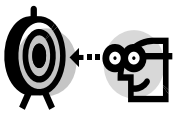
Lecture # (38): Human Cytogenetics

Student Notes:

Department: Medical Biology

Lecturer: Dr Qahtani
Dr. Wafa

Teaching Location: Building 7



On completion of the topic, the student should know:

1. Be familiar with symbols and abbreviations used in Cytogenetics.
2. Know the molecular basics for chromosomal abnormalities in number and structure.
3. Cytogenetic technology.

- Symbols and abbreviations used for description of chromosomes and their abnormalities.
- Karyotyping (chromosome classification, G-banding, C-banding, R-banding).
- Chromosomal non distinction (autosomal X sex-chromosome).
- Chromosomal numerical abnormalities
- Chromosomal structural abnormalities (deletion, translocation, imversion, duplication, unbalanced rearrangements, balanced rearrangements, isochromosome and ring chromosome.

READING:

1. Therman E (1988). Human Chromosomes: structure behavior, effects, 2nd ed. Springer verlage. New York
2. Rolf-Dieter Wegner (1999). Diagnostic Cytogenetics.
3. Margaret J.Barch, Turid Knutsen, Lack L. Spurbeck (1997), The AGT Cytogenetics Laboratory Manual, Third Edition

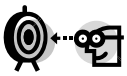
LECTURE #(39): Tools of Human Molecular Genetics

Student Notes:

Department: Medical Biology

Lecturer: Dr Qahtani
Dr. Wafa

Teaching Location: Building 7



On completion of the topic, the student should know:

1. Understand the principles of molecular analysis
2. learn the different methods used in molecular analysis
3. Be familiar with methods used in DNA & RNA analysis

1. Genomic DNA & RNA
2. Molecular cloning:
   - Restriction enzymes
   - Vectors:
     - 2.2.1 Plasmids
     - 2.2.2 Bactercophages
     - 2.2.3 Cosmids
3. Methods in molecular analysis:
   - DNA Extraction
   - In-situ hybridization
   - Probes
   - southern blotting
   - northern blotting
   - PCR

1. Sambrook J., Fritsch EF., Mainiatis, T.(1989). Molecular cloning, A laboratory manual, 2nd ed. Cold opring harbor laboratory, N.Y.
2. M.Krawczak and J.Schmidtke (1994), DNA Fingerprinting

Benjamin Lewin (2000) Genes VII

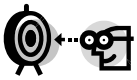
LECTURE # (40): Tools of Human Molecular Genetics II

Student Notes:

Department: Medical Biology

Lecturer: Dr Qahtani
Dr. Wafa

Teaching location:



On completion of the topic, the student should know:

1. Understand the individuality of DNA sequence of each person
2. Understand the practical importance of DNA finger printing in forensic analysis and profile individual identify
3. Understand the importance of microarray application

1. Use of minisatellites for DNA fingerprinting
2. single - locus probes
3. DNA profiling based on STRs (short tandem repeats)
4. Microarray
5. DNA sequencing

1. Tom Strachan & Andrew P.Read (1996) Human Molecular Genetics 2
2. M.Krawczak and J.Schmidtke (1994), DNA Fingerprinting
1. Bar, W., Brinkmann, B., Budlowe, B.etal. (1997) DNA recommendations: further report on the DNA commission of ISFH regarding the use of short tendem repeat systems. Int.J. of legal maricue 110: 175-176
2. http://www2.perkin-elmer.com.so/fo/773201/773201.html

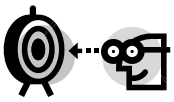
LECTURE #(41): Human Genome mapping

Student Notes:

Department:

Lecturer: Dr. Qahtani
Dr. Wafa

Teaching Location: Building 7



On completion of the topic, the student should know:

1. Understanding of gene mapping is necessary and prerequisite to understanding the function of the human genome.
2. Knowledge of genomic organization is necessary to develop optimal strategies for gene therapy.
3. The ethical and legal dilemmas raised by conflicts over sharing information.
4. The importance of DNA data banking and thinking about reasonable regulation of data banks.
5. Gene mapping provides information regarding linkage that is clinically useful.

1. Historical perspectives and goals of the human genome project

2. Strategies for caring the human genome project:
   2.1. Sequencing of the human genome:
   2.1.1. Strategies for obtaining sequence ready clones
   2.1.2. Sequencing technology
   FISH mapping

3. Current international Law

4. Possible new guidelines

1. Cuntor, C.R. (1992) Orchestrating the human genome project. Since 248: 49-51.

2. Ventor, J.C., smith, H.O. and Hood, L. (1996) A new strategy for genome sequencing. Nature, 381:364-366

3. Sutter, E.D. (1996) DNA chips: analysis sequence by hybridization on a large scale. Trends in Genetics. 12:110-115

Web site: http://www.ornl.gov/techresources Human_genome/research.html

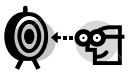
LECTURE # (42): Genetic Counselling

Student Notes:

Department: Medical Biology

Lecturer: Dr Qahtani
Dr. Wafa

Teaching Location: Building 7



1. Recognize indications for genetic counseling based on personal condition, family history, ethnicity, and past reproductive experiences
2. Be able to take and document a brief pedigree chart
3. Recognize different patterns of inheritance and specific disorders which display each pattern
4. Provide basic counseling about population based carrier rates and familial recurrence risks for common genetic disorders seen in routine obstetrics and gynecology practices
5. Provide basic counseling about prenatal testing

- Patterns of inheritance,
- Quantitative disorders,
- Risk calculations,
- A genetic perspective of pregnancy
- Ethics and medical genetics.
- The assessment, intervention and evaluation processes

R. J. McKinlay Gardner and Grant R. Sutherland (Aug 2003) Chromosome Abnormalities and Genetic Counseling

Lecture # (43): Introduction to pharmacology

Student Notes:

Department: Pharmacology

Lecturer: Mansour Ibrahim Sulaiman

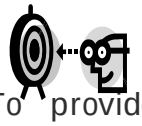
Msulaiman@kau.edu.sa *(ext: 20106*)

Mobile :0503680998

Dr. M. Hagras

TEACHING LOCATION:

M at BL 2 Level 2 .
MP at BL 2 Level G .
(D, Ph & AMS) at BL 4



To provide an introduce to foundation of pharmacotherapy:

1. Understand the problem of diseases, their consequences, and the use of chemicals to solve the problem.
2. define drugs, their sources, forms, and development
3. Understand the idea of active principles, and methods of nomination.
4. Define the science of pharmacology, its scope and importance.
5. Understand the idea of drugs response
6. Understand the general concepts of how drugs treat diseases.

What is disease?.

The consequences of untreated diseases.

The use of chemicals (drugs) to solve the problem of diseases

The WHO, and the pharmacological definition of drugs.

Sources of drugs, and their development pathways.

The common forms of drugs.

The active principles, their chemicals, generic and trade names.

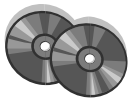
What is pharmacology?

The division of pharmacology and subjects requisites

1. Disease refers to an abnormal condition of an organism that impairs function. In human beings, "disease" is often used more broadly to refer to any condition that causes discomfort, dysfunction, distress
2. Methods of modulation of diseases process using chemicals
3. WHO definition of drugs
4. the pharmacological definition of the drugs
5. The idea of active principles
6. Sources of drugs
7. The development of new drugs
8. definition of pharmacology (in Greek: *pharmakos (φάρμακον)* meaning drug, and *logos (λόγος)* meaning science) is the study of how

substances interact with living organisms to produce a change in function. If substances have medicinal properties, they are considered pharmaceuticals. The field encompasses drug composition and properties, interactions, toxicology, therapy, and medical applications and antipathogenic capabilities

1. Lippincott Pharmacology 3rd Edition, R.D. Howland and M.J. Mycek .
2. Basic and Clinical Pharmacology 10th Edition, B. Katzung



CD- Rom

Assignment

1. List the chemical, generic, and trade names of 20 drugs of your choice.
2. Describe how pharmacology increases the safety and competency of drugs prescribing.

I- MCQ

- Which of the following is true concerning drugs definition

A. Any substance used to relief pain and anxiety.
B. Any substance in tablets, capsules, or injection forms.

C. Any substances used treat diseases and cause no side effects.
D. Any substance used to cure, or prevent diseases
E. Any low molecular weight substance with high fats solubility.

2 Which of the following best describe the science of pharmacology?

A. Science of the study of drugs in all aspects
B. Science of how drugs treat diseases
C. Study of biochemical and physiological effects of drugs and their mechanisms of action
D. Study of how drugs should be administrated
E. Science of how to prescribe drugs

3- Which of the following is true concerning the role of physician and dentists in the traditional health care

A. Dispensing drugs
B. Prescribing drugs
C. Monitoring therapeutic response
D. B and C
E. A , B, and C

4- Which of the following is true concerning the role of clinical pharmacist in traditional health care

A. Monitor drugs concentrations in the plasma.
B. Monitor drugs adverse reaction and side effects
C. Metabolism of the drug always abolish their pharmacological activity
D. Dispensing drugs and teach the patients who to use them
E. All of the above.

5- Which of the following best describe the concept of active principle.

A. A substance responsible for drugs side effects
B. A substance responsible for drugs therapeutic response and causes little side effects or no.
C. A substance responsible for toxic effects in herbal products.
D. A and C
E. A, B, ad, C

6- Which of the following is true Concerning active principles in a drug

A. The drug may contain one active principle
B. The drugs may contain two active principles.
C. The drug may contain more than four active principles
D. The drug may contain no active principles
E. All of the above
F.

II- Short answer questions

1. What is Pharmacology?
2. What is the importance of pharmacology to drugs prescribers (physician, dentists, and pharmacists)?
3. In general term describe how drugs may treat diseases?

Lecture # (44): Pharmacodynamics

Student Notes:

Department: Medical Pharmacology

Lecturer: Mansour Ibrahim Sulaiman

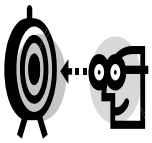
Lecturer:

Msulaiman@kau.edu.sa *(ext: 20106*)

Mobile :0503680998

Dr.M.Hagras

TEACHING LOCATION
M at BL 2 Level 2
MP at BL 2 Level G .
(D, Ph & AMS) at BL 4 .



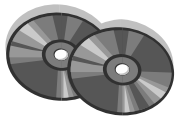
At the end of the lecture you should be able to:

By the end of this lecture you will be able to:

1) Define targets for drug actions, receptor binding sites, drug specificity
2) Describe drug-receptor interactions, identify agonist, partial agonist and antagonist, potency and efficacy
3) Identify spare receptors
4) Outline the different types of drug antagonism (chemical, pharmacokinetic, pharmacodynamic, and physiologic antagonism)
5) Describe graded dose-response curve, quantal dose-response curve, and the therapeutic index

Targets for drug action
Drug specificity
Drug receptor interactions
Agonists, partial agonists, and antagonists
Spare receptors
Drug antagonism
Graded dose-response curve, quantal dose-response curve
Therapeutic index

Required texts and resourses: Lippincott Pharmacology 3rd Edition, R.D. Howland and M.J. Mycek
Basic and Clinical Pharmacology 10th Edition, B. Katzung



You have the opportunity to watch the CD-ROM about the Cardiac contractility. You can access the CD-ROM during your spare time.

WEB
Web CAI General principles Pharmacodynamic Review
www. Kumc.edu/research/medicine/pharmacology
Dept of Pharmacodynamics
www.cop.ufl.edu/departments/pd
www.med.howard.edu/pharmacology

MCQ'S

1- The maximum effect (E_{max}) achieved by a drug is a measure of

A- Potency

B- Efficacy

C- The quantal response

D- Antagonist maginitude

E- The therapeutic index

2- Which of the following statements best describes a drug receptor?

A- Gamma globulin can bind to a drug and serve as a drug receptor
B- A drug cannot act unless it is first bound to a receptor
C- A drug cannot act unless it is first released from a receptor
D- Drug receptors play a role in the bioavailability of a drug
E- A drug can act as an antagonist even if it is bound to a drug receptor

3- All of the following statements about efficacy and potency are true Except:

A- Efficacy is usually a more important clinical consideration than potency

B- Efficacy is indicated by the height of the log dose-response curve

C- The ED_{50} is a measure of a drug's efficacy

D- Drugs that produce a similar pharmacological effect can have a very different levels of efficacy

E- On a log dose-response curve, two drugs with the same action but with different potencies usually have parallel curves

4- Which of the following terms best describes a drug that blocks the action of epinephrine at its receptor by occupying those receptors without activating them?

A- Pharmacologic antagonist

B- Partial agonist

C- Physiologic antagonist Chemical antagonist

D- Noncompetitive antagonist

5- Which of the following provides information about the variation in sensitivity to a drug within the population studied?

A- Maximal efficacy

B- Therapeutic index

C- Drug potency

D- Graded dose-response curve

E- Quantal dose-response curve

6- A 55 year-old woman with heart failure is to be treated with a diuretic drug. Drugs X and Y have the same diuretic action. Drug X in a dose of 5 mg produces the same magnitude of dieresis as 500 mg of drug Y. This suggests that:

A- Drug Y is less efficacious than drug X

B- Drug X is about 100 times more potent than drug Y

C- Toxicity of drug X is less than that of drug Y

D- Drug X is safer drug than drug Y

E- Drug X will have a shorter duration of action than drug Y because less of drug X is present for a given effect

7- Which of the following statements most accurately describes a system having spare receptors?

A- The number of spare receptors determines the maximum effect

B- Spare receptors are sequestered in the cytosol

C- A single drug-receptor interaction results in many cellular response elements being activated

D- Spare receptors are active even in the absence of agonists

E- Agonist affinity for spare receptors is less than their affinity for non-spare receptors

Lecture # (45) : Introduction to pharmacokinetic

Student Notes:

Department: Pharmacology

Lecturer: Mansour Ibrahim Sulaiman

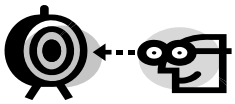
Msulaiman@kau.edu.sa *(ext: 20106*)

Mobile :0503680998

Dr. M. Hagras

Teaching Location:

M at BL 2 Level 2
MP at BL 2 Level G .
(D, Ph & AMS) at BL 4 .



At the end of the lecture you should be able to:

1. Understand the four pharmacokinetics process ADME?
2. Identify Variables affecting oral absorption & Bioavailability
3. Understand the importance of drug distribution & Protein binding
4. Define the basic terms related to drug Metabolism
5. Describe renal Elimination of drugs

- Routes of Drug Delivery
- Example of Factors Affecting Drug Absorption
- Def'n of bioavailability
- Some factors affecting oral absorption or Bioavailability

- Some Factors influencing distribution :
- Clinical significance of Protein Binding
- Apparent Volume of distribution (Vd)
- Factors affecting drug metabolism
- Enzyme Inhibiting Drugs
- An Example of Phase I and II Biotransformation:
- Factors affecting biotransformation
- EXCRETION (Overview) -
- Processes involved in renal excretion:
- Creatinine clearance

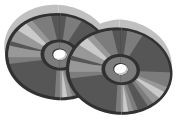
1. Bioavailability is Fraction of a drug that reaches systemic circulation after a particular route of admin'n. there are many variables affect drug bioavalibility.
2. Only free drug can act at receptor site
3. Apparent Volume of distribution : (Vd) it is not a real volume It is a proportionality constant between dose & peak level . Large vololumer of distribution means good access to the tissues or extra cellular fluids
4. Enzyme inhibition: usually lead to increase the level of the drugs which are substrate for the inhibited enzyme , the reverse is true for enzyme induction
5. There are two major phases for drug metabolism

Phase I: (oxidation , reduction etc) and leads conversion to lipophilic compounds ; Phase II: conjugation with glucronic acid or sulfate

6. The clearances of many renal excreted drugs are closely linked to GFR. e.g.. The clearance

of gentamicin approximately equals GFR and therefore also approximates to creatinine clearance.

1. Lippincott Pharmacology 3rd Edition, R.D. Howland and M.J. Mycek pp 1-21
2. Basic and Clinical Pharmacology 10th Edition, B. Katzung pp 20--31



CD- Rom

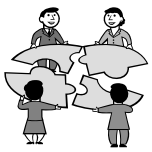
You have the opportunity to watch the CD-ROM about the *Introduction to Pharmacokinetics* . You can access the CD-ROM during your spare time.

www.rx.kinetics .com
boomer.org/pkin/

Assignment

1- Describe with the most important variables affecting drug bioavability

2- Give an example of genetically related difference in drug metabolism.



(Tutorial)

1- Simplified Clinical Case 1

A child with chronic epilepsy, he administer phenytoin in conventional doses. Recently his seizure is not well controlled. His clinician added valproic acid to his regimen. The patients complained from drowsiness although the blood levels of both drugs are within the therapeutic

range.

Notes both drugs are strongly bound to plasma protein. The method of analysis measures the total drug level.

Explain the PK basis of the observed adverse effects

2-Simplified Clinical Case 2

An elderly patient with congestive heart failure. He administer digoxin 0.25 mg once daily. The patient has high serum creatinin level 95 umol/L (normal 55-115 umol/L). The patients suffers vomiting and anorexia (Adverse effects due to digoxin) . Serum digoxin level was found (3.1 ng/m l) higher than

normal range (0.9-2.0 ng/ml).

Could you explain the PK bases of elevated digoxin level.

I- MCQ

1- The following factors which influence drug bioavailability are true EXCEPT

A- The formulation and dosage form.
B- interaction with food or other drugs
C- .Drug stability in the GIT
D- The drug lipid solubility and molecular weight
E- The degree of protein binding

2 Factors which can increase the fraction of unbound drug include the following Except :

A- Renal impairment (uraemia)
B- Low plasma albumin levels
C- Late pregnancy
D- Displacement from binding site by other drugs,
E- Drugs with high molecular weight

3- Distribution of drugs to specific tissues

A- Is Independent of the blood flow to the organ
B- Is independent of the solubility of the drug in that tissue
C- Depends on the unbound drug concentration gradient between blood and the tissue
D- Is increased for drugs that are strongly bound to plasma proteins
E- Has no effect on the half-life of the drug

4-Regarding termination of drug action

A- Drug must be excreted from the body to terminate their action
B- Metabolism of the drug always increase their water solubility
C- Metabolism of the drug always abolish their pharmacological activity
D- Hepatic metabolism and renal execration are the two most important mechanisms involved
E- Distribution of the drug out of the blood stream terminates the drug effects.

5- The addition of glucronic acid to a drug

A- Decrease its water solubility
B- Usually leads to inactivation of the drug
C- Is an example of phase 1 reactions
D- Occurs in the same rate in adults and newborns
E- Involve cytochrome p450

6- Which of the following is true for drugs which have large volume of distribution

A- Usually have low blood level relative to the dose

B- Usually have low access to the extra cellular fluids .

C- Usually strongly bound to plasma proteins

D- Usually have short duration of action

E- Usually subjected to extensive metabolism

II- Short answer questions

1- What is the PK term that reflects the total amount of the drug reaching the systemic circulation after administration?

2- What is the pharmacokinetic parameter that could be used to estimate the time required to attain the steady state serum concentration Css. ?

3- What is the relationship between peak drug level and its volume of distribution?

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