Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Human anatomy and physiology

Definition and scope of anatomy,physiology & related topics. (01)

Introduction to topic

Definition

i)Anatomy: "*Anatome*" meaning to cut up. It is the study of structures that make up the body and how those structures relate with each other. The study of anatomy includes many sub specialties. These are Gross anatomy, Microscopic anatomy, Developmental anatomy and Embryology. With example & diagrams

ii) Physiology: the word physiology derived from a Greek word for study of nature. It is the study of how the body and its part work or function.

Gross anatomy

Microscopic anatomy (Histology)

Homeostasis

SCOPE and Explanation of human body System

REFERENCES -

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Basic terminologies used in anatomy and physiology (02)

Explanations with diagram.

- **Anatomical Terminologies Anatomical Position.**
- **Directional terms**

Superior (cranial) ,Inferior (caudal), Anterior (ventral) ,Posterior (dorsal) ,Lateral, Proximal, Distal ,Peripheral

- **Body parts Regions**

The body can generally be described to have areas of:

Axial body part,Appendicular body part:

- **Body planes and sections:**This helps for further identification of specific areas.

Sagittal plane,Frontal plane: - divides the body into asymmetrical antererior and posterior sections,**Transverse plane:** - divides the body into upper and lower body section,**Oblique plane:** - divides the body obliquely into upper and lower section.

- **Body Cavities** The cavities of the body house the internal organs, which commonly referred to as the viscera. The two main bodycavities are the larger ventral (anterior) and the smaller, dorsal (posterior) body cavity.

REFERENCES -

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Functional organization of human body and control of the "Internal Environment (03)

Homeostasis

When structure and function are coordinated the body achieves a relative stability of its internal environment called *homeostasis* / staying the same. Although the external environmental changes constantly, the internal environment of a healthy body remains the same with in normal limits.Under normal conditions, homeostasis is maintained by adaptive mechanisms ranging from control center in the brain to chemical substances called hormones that are secreted byvarious organs directly into the blood streams. Some of the functions controlled by homeostasis mechanisms are blood pressure, body temperature, breathing and heart rate.

Few examples

Negative and positive feedback system

Homeostatic imbalance- disorder, disease, sign and symptom.

REFERENCES -

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Cell and Tissues –

Structure of cell, its components and their functions (04)

- **Cell**

Cell is the basic living structural and functional unit of the body.
Cytology: - It is a branch of science concerned with a study of cells
Cell Theory explains about
a) All living organisms are composed of cell and cell products.
b) All cells come from the division of pre existing cell.
d) An organism as a whole can be understood through the collective activities & interactions of its cells.
Principal parts: -
Plasma (cell) membrane: it is the outer lining, limiting membrane separating the cell internal parts from extra cellular materials & external environment.*Cytoplasm:* cytoplasm is the substance that surrounds organelles and is located between the nucleus and plasma membrane.***Organelles:*** **these are permanent structures with characteristic morphology that are highly specialized in specific cellular activity.**
Inclusions: they are the secretions and storage products of cells.

- **Figure: structure of a cell**

- **Function of cell and its component**

REFERENCES -

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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Genetic control of protein synthesis (05)

TRANSCRIPTION – TRANSLATION –

GENETIC CODE AND OUTLINE OF PROTEIN SYNTHESIS

Step 1: DNA Transcription

a. Messenger RNA (mRNA)
b. Ribosomal RNA (rRNA)
c. A set of transfer RNA (tRNA)

RNA transcription

Formation and separation of RNA Chain

Step 2: RNA Translation

Characteristics of Genetic Code:

The genetic code is a triplet code:

REFERENCES -

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Cell function and cell reproduction (06)

Cell cycle – all reproduction begins at cellular level and Functions

Cell division-duplication of genetic material

Main stages – interphase,mitosis and cytokinesis.

Mitosis – prophase, metaphase,anaphase,telophase

Cytokinesis

Meiosis a reproductive division.

Stages- prophase-I, metaphase-I,anaphase-I,telophase-I

Second meiotic division-

prophaseII, metaphaseII, anaphaseII, telophaseII

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Structure and functions of plasma membrane (07)

Plasma membrane is a thin outer membrane, which maintains the integrity of the cell. It keeps the cell and its contents separate and distinct from the surrounding. It is a double layered measuring about 4.5 nm and made of phospholipids, cholesterol, glyco-lipid, & carbohydrate (oligosaccharides).

Diagram – fluid mosaic model –

The bi-layer is self-sealing. If a needle is injected and pulled out, it automatically seals.

Functions: -

1. Separate the cytoplasm inside a cell from extra cellular fluid.
2. Separate cell from one another
3. Provide an abundant surface on which chemical reaction can occur.
4. Regulate the passage of materials in to and out of cells. It also let some things in and keeps others out. The quality selective permeability

Physicochemical properties of drug – in transportation- through plasma membrane

REFERENCES -

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Various transport mechanisms across membrane (08)

Movement across-cell membrane

Movements a cross membrane takes place in two ways. These are passive and active movements. Passive movement uses energy whereas active movement consumes energy in the form of ATP

Mechanism with examples

Passive movement: includes

a. *Simple diffusion*,

b. *Facilitated diffusion*

c. *Osmosis,*

d. *Filtration,*

Active movements across membranes it requires energy.

a) *Active Transport*:

Endocytosis, pocketing in by plasma membrane. It

includes: Pinocytoss – cell drinking

Receptor – mediated Endocytosis- Endocytosis with thehelp of receptor.

Phagocytosis- cell eating,*Exocytosis,*

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Structure, functions, characterization tissues: (09)

Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Epithelial, Connective,(09)

TISSUE

Cells are highly organized units. But in multicultural organisms, they do not function in isolation. They work together in-group of similar cells called *tissue.* Tissue is a group of similar cell and their intercellular substance that havea similar embryological origin and function together to perform a specialized activity. A science that deals with the study of a tissue is Histology.The various tissues of the body are classified in to fourprincipal parts according to their function & structure.

Theseare epithelial, connective, muscular, and Nervous tissue.

Epithelial tissue

Epithelial tissues covers body surface, lines body cavity & ducts and form glands. They are subdivided in to:

- Covering & lining epithelium,- Glandular epithelium

According to the arrangement of layers covering and lining epithelium is grouped in to –**types with figures**

Connective tissue

Connective tissues of the body are classified into *embryonic connective tissue* and *adult connective tissue*

Different Types Diagram Examples

REFERENCES -

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Muscle, Nervous tissues (10)

STRUCTURE AND FUNCTIONS:

1. Muscle tissue

Muscle tissue consists of highly specialized cells, which provides motion, maintenance of posture and heat production.

Classification of muscles is made by structure and function.

Muscle tissues are grouped in to **skeletal, cardiac and smooth muscle tissue.**

2. Nervous tissue

Nervous tissue contains two principal cell types. These are neurons and the neuroglia. Neurons are nerve cells,sensitive to various stimuli. It converts stimuli to nerve impulse. Neurons are the structural and functional unit of the nervous system

REFERENCES -

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Anatomy & physiology of skeletal& smooth muscle (11).

Muscle is a tissue characterized by **irritability** and **contractility**. It is composed of elongated cells called **myocytes** that contain contractile proteins organized as cytoplasmic filaments. Muscle cells are attached to bones and soft tissues, and thereby accomplish mechanical movements as a consequenceof their contraction (shortening).

Classification of muscles

Skeleton muscle

Organization – myofibers, myofibrils, myofilament

Myocytes – cellular component

Cardiac muscle characteristics

Structures

Neurotransmission and action potential through neuro-muscular junction

- Examples with Mechanism of action

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1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Neurotransmission, Excitation, Contraction of Smooth Muscle (12)

Neurotransmission process-Excitation of neuron – role of ions-sodium,potassium,calcium

Depolarization,reporisation and hyperpolarisation

Smooth muscle cells are typically elongated cells that are described as fusiform [L. *fusus* =a spindle + *forma* =form] or spindle-shaped, which are tapered at both ends.

Contraction of smooth muscle is slow and sustained.

1. Mechanism of contraction. A sliding filament mechanism of contraction occurs.

2. Initiation of contraction. Smooth muscle cell contraction may be triggered by various stimuli, including nervous and hormonal.

a. Nervous

i. Extrinsic.

ii. Intrinsic.

b. Hormonal. 3. Role of calcium. Smooth muscle cells are able to concentrate calcium in their cytoplasm.

Regeneration and repair

REFERENCES -

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Excitation and contraction skeletal muscle, energy metabolism and muscle tone (13)

Muscle Contraction

filament mechanism of muscle contraction Actin-myosin interaction Adenosine triphosphate (ATP) provides the energy for muscle contraction,Transverse (T) tubule system.

Muscle relaxation **- Calcium uptake - Actin - myosin inhibition.**

Muscle metabolism –production of atp in musle fibers,creatine phosphate,anaerobic cellular respiration,aerobic cellular respiration

Muscle tone- definition and explanation: by muscle's motor neuron.

REFERENCES -

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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The Blood Cell, Immunity and Blood Coagulation (14)

Composition and Functions of blood :

Blood

blood is classified as a connective tissue, since nearly half of it is made up of cells. however, it differ from other connective tissues in that its cells are not fixed in position, instead they move freely in the liquid portion of the blood,

Plasma.

blood is a viscous (thick) fluid that varies in colour from bright to dark red, depending on how much oxygen it is carrying. its quantity differs with the size of the person; the average adult male, weighing 70 kg has about 5-6 litres of blood.this volume accounts for about 8% of the total body weight. it is carried through a closed system of vessels pumped by the heart.

Functions with examples

1. **Transportation**
2. **Regulation**
3. **Protection**

Composition of Blood:

plasma; cells and fragments of cells are called formed elements or corpuscles

REFERENCES -

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Nature, types and function of plasma proteins. (15)

NATURE AND CHARECTERISTICS OF FOMED BLOOD ELEMENTS

- **Blood Plasma**

Over half of the total volume of blood is plasma. The plasma itself is 90% water. Many different substances dissolved or suspended in the water, make up the other 10%. However,the body tends to maintain a fairly constant level of these substances.

For example, the level of glucose, a simple sugar, is maintained at a remarkably constant level of about on tenth of a 1% solution.After water, the next largest percentage of material in the plasma is protein. Proteins are the principal constituents of cytoplasm and are essential to the growth and the rebuilding of body tissues. The plasma proteins include the following:

1. Albumin, the most abundant protein in plasma, is importantfor maintaining the osmotic pressure of the blood. This protein is manufactured in the liver.2. The antibodies combat infection.3. The blood clotting factors are also manufactured in the liver.4. A system of enzymes made of several proteins, collectively known as complement, helps antibodies in their fight against pathogens.

Nutrients are also found in the plasma.

REFERENCES -

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Red Blood Cell, Anemia (16)

Blood is a multifaceted body fluid and the medium through which essential nutrients are delivered to tissues throughout the body. On average, the adult human body contains more than 5 liters of blood. Blood flows freely through the veins and arteries because it is over half *liquid plasma*;

Red blood cells, or *erythrocytes*, contain ***hemoglobin***, an iron-containing protein responsible for transporting oxygen from the lungs to tissues. Erythrocytes are continuously produced in bone marrow and survive about 120 days. Having an abnormally low number of erythrocytes or low hemoglobin is known as **anemia**.

The three major blood disorders - anemia, leukopenia, and thrombocytopenia –

Anaemia - Causes - Symptoms - Types

Treatment

REFERENCES -

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Polycythemia (17)

Definition:

The word polycythemia simply means "many cells in the blood." There are two forms of this disease: *polycythemia vera* and *secondary polycythemia.*Polycythemia vera usually produces a high concentration of red blood cells or hemoglobin in the circulating blood, but it's important to note that white blood cell and platelet counts may also be increased.

Causes of Polycythemia

Polycythemia vera stems from problems with the bone marrow. Bone marrow is found in the centre of most

Causes of Polycythemia- Symptoms and Complications of Polycythemia

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Resistance of the body to infections…WBCs and Inflammation (18)
Leukocytes

The leukocytes, or white blood cells, They contain nuclei of varying shapes and sizes; the cells themselves are round. Leukocytes are outnumbered by red cells by 700 to 1, numbering 5,000 to 10,000 per cubic millimetre of blood. **The different types of white blood cells are identified by their size, the shape of the nucleus, and the appearance of granules in the cytoplasm when the cells are stained, usually with Wright's blood stain**.

Granulocytes include neutrophils, which show lavender granules; eosinophils, which have beadlike, bright pink granules; and basophils, which have large, dark blue granules that often obscure the nucleus. The neutrophils are the most numerous of the white cells,constituting up to 60% of all leukocytes.Because the nuclei of the nuclei of the neutrophils are of various shapes, they are also called polymorphs (meaning "many forms") or simply polys.

The **agranulocytes**, so named because they lack easily visible granules, are the **lymphocytes** and **monocytes**. The ratio of the different types of leukocytes is often a valuable clue in arriving at a diagnosis

Diagrams -

Disorders

Inflammation

Definition -Types – Acute and Chronic -Process of inflammation

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Immunity and Allergy- Innate immunity (19)

Immunity:

Definition: consists of a complex network of specialized cells and organs designed to protect and defend the body against attacks by "foreign" invaders such as bacteria and viruses

Humans have three types of immunity — innate, adaptive, and passive:

Innate Immunity

Adaptive Immunity: The second kind of protection is adaptive (or active) immunity, which develops throughout our lives. Adaptive immunity involves the lymphocytes and develops as people are exposed to diseases or immunized against diseases through vaccination.

Passive Immunity

Hypersensitivity types- diagram – characteristics

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Blood types: Transfusion, Tissue and organ transplantation :(20)

Blood Typing and Transfusions:

For some reason the amount of blood in the body is severely reduced, through **haemorrhage** or disease, the body cells suffer from lack of oxygen and food. The obvious measure to take in such an emergency is to inject blood from another person into the veins of the patient, a procedure called **transfusion**.The patient's plasma may contain substances called antibodies that can cause the red cells of the donor's blood to become clumped, a process called **agglutination**. **Haemolysed** and the resulting condition can be very dangerous. These reactions are determined largely by certain proteins, called antigens, on the surface membrane of the red blood cells.There are many types of these proteins but only two groups are particularly likely to cause a transfusion reaction, the so-called A and B antigens and the Rh factor.

and role of organ transplantation.

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Blood group (21)

Four blood types involving the -A and B antigens have been recognized: A, B, AB, and O. **universal donors-universal recipients**, **The Rh factor** Rh factor is another red cell antigen that determines the blood group. Those individuals who possess this antigen in their red cell surface are said to be **Rh positive**. Those who lack this antigen are said to be **Rh negative**

Types with detail characteristics

The ABO Blood Group System

Blood Type RBC-AntigenPlasma-Antibodies Can takefrom-Can donate to.

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Hemostasis (22)

The Clotting Process (Hemostasis)

The process by which the body prevents blood loss is referred to as coagulation.Coagulation involves the formation of a blood clot (thrombus) that prevents further bloodloss from damaged tissues, blood vessels or organs. This is a complicated process with acellular system comprised of cells called platelets that circulate in the blood and serve toform a platelet plug over damaged vessels and a second system based upon the actions ofmultiple proteins (called clotting factors) that act in concert to produce a fibrin clot.These two systems work in concert to form a clot; disorders in either system can yielddisorders that cause either too much or too little clotting.
Platelets serve three primary functions: 1) sticking to the injured blood vessel (calledplatelet adherence), 2) attaching to other platelets to enlarge the forming plug (calledplatelet aggregation), and 3) providing support (molecules on the surface of platelets arerequired for many of the reactions) for the processes of the coagulation cascade.

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Continue ……

Blood Coagulation (23)

Blood clotting, or coagulation, is a protective device that prevents blood loss when a blood vessel is ruptured by an injury. The many substances necessary for clotting are normally inactive in the blood stream. A balance is maintained between compounds that promote clotting, known asprocoagulants, and those that prevent clotting known as anticoagulants. In addition, there are also chemicals in the circulation that act to dissolve clots. Under normal conditions the substances that prevent clotting prevail. However, when an injury occurs, the procoagulants are activated and a clot is formed. Basically, the clotting process consists of thefollowing essential steps:

1. The injured tissues release thromboplastin, a substance that triggers the clotting mechanism.
2. Thromboplastin reacts with certain protein factors and calcium ions to form prothrombin activator, which in turn reacts with calcium ions to convert the prothrombin to thrombin.
3. Thrombin, in turn, converts soluble fibrinogen into insoluble fibrin. Fibrin forms a network of threads that entraps red blood cells and platelets to form clot.

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Lymph and lymphatic system (24)

Composition, formation, circulation and functions of lymph

The Lymphatic System

The lymphatic system communicates with the blood circulatory system and is closely associated with it. It consists of:

1. **Lymphatic capillaries** made of endothelium (simple squamous epithelium)2. **Lymphatic vessels** made of three layers like veins; also they have valves.3. **Lymphatic ducts** are ducts that drain different parts of the body and include: **a. Right lymphatic duct** drains upper right part of the bodyand empties in to right subclavian vein **b. Thoracic duct** drains remainder part of the body and Empties into left subclavian vein.These components help achieve the functions of the lymphatic system which are the draining of interstitial fluid, transportation of lipids and fighting infection (immune response)- lymphatic capillaries- a unique one-way structure that allows interstitial fluids Attached to the capillaries are anchoring filaments

Figure: lymphatic capillary -The capillaries then form lymphatic vessels. The lymphatic's are larger than the capillaries and open out into lymphatic nodes. The fluid, lymph (a usually clear fluid containing electrolytes, proteins and lymphocytes).- figures with examples.

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Structure of lymph node. (25)

Explanation

Diagram

Functions

There are approximately 600 lymph nodes [1] in the body and are bean-shaped.They are between 1 -25mm long [1] and are found usually in groups.They are named according to where they are, what they surround or the organ they receive lymph from There are main groups of nodes such as axillary nodes.inguinal nodes and cervical nodes.The nodes are surrounded by an external capsule made of collagen Projecting in from the external capsule are trabecula also called septa.The trabeculae divide the node, provide support and also allow blood vessels a route into the interior node On one side is a depression called hilus this is also where blood vessels leave and enter and also where efferent lymphatic vessels emergeThe lymph node is like a filtration system.

Lymph enters the node by the afferent lymphatic'sinto the cortical sinuses and then into the medullary sinusesThe sinuses are lined with macrophages which destroy substances like damaged cells, unwanted protein and bacteria by ingesting.This process is called phagocytosis

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1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
3. Anatomy, physiology and health education by Ross and Wilson eleventh edition.churchill living stone, Elseveir -201o.

Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Anatomy, physiology and functions of spleen, Disorders of lymphatic system (27)

The spleen combines the innate and adaptive immune system in a uniquely organized way. The structure of the spleen enables it to remove older erythrocytes from the circulation and leads to the efficient removal of blood-borne microorganisms and cellular debris. This function, in combination with a highly organized lymphoid compartment, makes the spleen the most important organ for antibacterial and antifungal immune reactivity.

Disorders of lymphatic system- Lymphedema- LYMPHATIC TUMORS AND MALFORMATIONS.

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Anatomy of heart (27)

Diagram

The heart is a muscular pump that drives the blood through the blood vessels.

Location –

STRUCTURE OF THE HEART

The heart is a hollow organ the walls of which are formed of three different layers. The heart wall has three tissue layers

1. The **endocardium** is a very thin smooth layer of cells that resembles squamous epithelium. This membrane lines the interior of the heart. The valves of the heart are formed by reinforced folds of this material.
2. The **myocardium**, the muscle of the heart, is the thickest layer.
3. The **epicardium** forms the thin outermost layer of the heart wall and is continuous with the serous lining of the fibrous sac that encloses the heart. These membranes together make up the pericardium. The serous lining of the pericardial sac is separated from the epicardium on the heart surface by a thin **fluid- filled space.**

four chambers-valves- blood supply

Functions -

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Anatomy of blood vessels (28)

Blood Vessels

Functional classification

The blood vessels, together with the four chambers of the heart, from a closed system for the flow of blood
Groups:
Arteries -arterioles.-Veins-venules-Capillaries

Structure of blood vessels
Arteries, veins and capillaries differ in structure. Three coats or layers are found in both arteries and veins.Theouter most layer is called the tunica externa.
Tunica media of arteries-tunica interna

Location of common arteries and veins

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Cardiac muscle, the heart as pump (29)

Cardiac muscle tissue has several unique properties. One of these is the interconnection of the muscle fibers. The fibers are interwoven so the stimulation that causes the contraction of one fiber results in the contraction of the whole group. This plays an important role in the process of conduction and the working of the heart muscle.

PROPERTIES OF HEART MUSCLE –IMPORTANCE

The volume of blood pumped by each ventricle in 1 minute is termed the **cardiac output**. It is determined by the volume of blood ejected from the ventricle with each beat–the **stroke volume**–and the number of beats of the heart per minute–the **heart rate**. The cardiac output averages 5 litres/minute for an adult at rest.

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Function of heart valves (30)

Four Valves- diagram and Explaination

Since the ventricles are the pumping chambers, the valves, which are all one way, are located at the entrance and the exit of each ventricle. The entrances valves are the **atrioventricular valves**, while the exit valves are the **semilunar valves**. Semilunar means "resembling a half moon." Each valve has a specific name, as follows:

- The **right atrioventricular valve** also is known as the **tricuspid valve**,
- The **left atrioventricular valve** is the bicuspid valve, referred to as the **mirtal valve** ------**chordae tendineae**
- The **pulmonic** (semilunar) **valve** -
- The **aortic** (semilunar) **valve**
- The appearance of the heart valves

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Cardiac cycle (31)

The Work of the Heart

The blood is squeezed through the chambers by a contraction of heart muscle beginning in the thin-walled upper chambers, the atria, followed by a contraction of the thick muscle of the lower chambers, the ventricles. This active phase is called **systole**, and in each case it is followed by a resting period known as **diastole**. The contraction of the walls of the atria is completed at the time the contraction of the ventricles begins. Thus, the resting phase (diastole) begins in the atria at the same time as the contraction (systole) begins in the ventricles. After the ventricles have emptied, both chambers are relaxed for a short period of time as they fill with blood. Then another beat begins with contraction of the ventricles. This sequence of heart relaxation and contraction is called the **cardiac cycle**. Each cycle takes an average of 0.8 seconds.

Functions and steps of cardiac cycle

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Conduction system and ECG :(32)

Parts:

The order in which the impulses travel is as follows:

The sinoatrial node generates the electric impulse that begins the heart beat.2.The excitation wave travels throughout the atrio ventricular node is stimulated. The relatively slower conduction through this node allows time for the atria to contract and complete the filling of the ventricles.3. The excitation wave travels rapidly through the bundle of His and then throughout the ventricular walls by means of the bundle branches and Purkinje fibers. The entire musculature of the ventricles contracts practically at once. As a safety measure, a region of the conduction system other than the sinoatrial node fails, but it does so at a slower rate.

Electrocardiogram (ECG) – information - P,QRS-T-wave functions – diagnosis role.

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Rhythmical excitation of heart and Circulation (pulmonary, coronary, systemic and portal) (33)

Excitation /contraction of heart cells

Circulatory Routes or Circuits

All the vessels together may be subdivided into two groups or circuits: pulmonary and systemic.

1. Pulmonary circulation: carry blood to and from the lungs.

2. Systemic circulation: it is the largest circulatory route. It takes oxygenated blood from the left ventricle through the aorta to all parts of the body

Hepatic Portal System

a portal system is akind of detour in the pathway of venous return that can transport materials directly from one organ to another. The largest portal system in the body is the hepatic portal system, which carries blood from the abdominal organs to the liver. The hepatic portal system includes the veins drains blood from capillaries in the spleen, stomach, pancreas, and intestine.

Types- functions –circulatory system

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Blood pressure (cardic output, venous return and their regulation). Renin- angiotensin- aldosternon system. (34)

Definitions- regulations and rennin-angiotensin-aldosterone system

Pulse and Blood Pressure

Pulse

The ventricles pump blood into the arteries regularly about 70 to 80 times a minute.

Blood Pressure

The instrument used is called a sphygmomanometer, and two variables are measured:

1. Systolic pressure, which occurs during heart muscle contraction, averages around 120 and is expressed in millimetres of mercury (mm Hg).
2. Diastolic pressure, which occurs during relaxation of the heart muscle, averages around 80 mm Hg.

Mean blood pressure – role of renin,angiotensin (vasoconstrictor) - aldosterone –functions and maintenances of blood pressure

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1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Disorders of cardiovascular system - (35)

Definitions - mechanism

Hypertension, hypotension, arteriosclerosis,

Angina, myocardial infarction, congestive heart failure,

Circulatory shock and cardiac arrhythmias

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Digestive system (36)

Anatomy and Physiology of different parts of digestive system (salivary glands,stomach) (36)

General Function

Everybody cell needs a constant supply of nutrients to proviide energy and building blocks for the manufacture of body substances. Food as we take it in, however, is too large to enter the cells. It must first be broken down into particles small enough to pass through the cell membrane. This process is known as ***digestion***. After digestion, food must be carried to the cells in every part of the body by the circulation.The transfer of food into the circulation is called ***absorption***.

Digestion and absorption are the two chief functions of the digestive system.

Structure and Function of Organs of Digestion and Accessory Organs

For our purpose the digestive system may be divided into two groups of organs:1. The ***digestive tract***, a continuous passageway beginning at the mouth, where food is taken in, and terminating at the anus, where the solid waste products of digestion are expelled from the body

2. The accessory organ, which are necessary for the digestive process but are not a direct part of the digestive tract. They release substances into the digestive tract through ducts.

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Liver-anatomy, physiology (37)

The Liver

The liver, often referred to by the word root *hepat*, is the largest glandular organ of the body

Diagram

Functions

1. The storage 2. The formation of blood plasma proteins, 3. The synthesis of urea4. The modification of fats5. The manufacture of bile 6. The destruction of old red blood cells. 7. The detoxification (removal of the poisonous properties) of harmful substances such as alcohol and certain drugs.8. The storage of some vitamins and iron

The main digestive function of the liver is the production of bile.

The Gallbladder

The gallbladder is a muscular sac on the inferior surface of the liver that serves as a storage pouch for bile.

Structure -Functions

The Pancreas

The pancreas is a long gland that extends from the duodenum to the spleen. The pancreas produces enzymes that digest fats, proteins, carbohydrates, and nucleic acids.

Structure and functions

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Small intestine anatomy,physiology (38)

The Small Intestine

The small intestine is the longest part of the digestive tract. It is known as the small intestine because, although it is longer than the large intestine, it is smaller in diameter, with an average width of about 2.5 cm (1 inch).

Parts – digram- enzymes- functions – blood vessles – nerves involvment

Thefirst 25 cm (10 inches) or so of the small intestine make up the ***duodenum***. Beyond the duodenum are two more divisions: the ***jejunum***, which forms the next two fifths of the small intestine, and the ***ileum***, which constitutes the remaining portion. The wall of the duodenum contains glands that secrete large amounts or mucus to protect the small intestine from the strongly acid chyme entering from the stomach. Cells of the small intestine also secrete enzymes that digest proteins and carbohydrates.

Digestive juice

Structures- roles

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Large intestine –anatomy and physiology (39)

The Large Intestine

Structure

Location

The large intestine is about 6.5 cm (2.5 inches) in diameter and about 1.5 m (5 feet) long. The outer longitudinal muscle fibers form three separate bands on the surface. These bands draw up the wall of the organ to give it its distinctive puckered appearance.The large intestine begins in the lower right region of the abdomen. The first part is a small pouch called the ***cecum***.Between the ileum of the small intestine and the cecum is a sphincter, the ***ileocecal valve*** that prevents food from traveling backward into the small intestine. Attached to the cecum is a small, blind tube containing lymphoid tissue; it is called the vernriform appendix (vermiform means "wotmlike").

Inflammation of this tissue as a result of infection or obstruction is ***appendicitis***.

The second portion, the ***ascending colon***, extends upward along the right side of the abdomen toward the liver. The large intestine then bends across the abdomen, forming the ***transverse colon***. At this point it bends sharply and extends downward on the left side of the abdomen into the pelvis, forming the ***descending colon***. The lower part of the colon bends posterior in an S shape and continues downward as the ***sigmoid colon***. The sigmoid colon empties into the ***rectum***, which serves as a temporary storage area for indigestible or un absorbable food residue

Functions with detail mechanism

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Secretary functions of alimentary tract. (40)

Functions–digestion,ingestion,peristalsis,absorption,defecation-enzymes- secretion role- actions

1) Oral cavity

2) Pharynx

3) Esophagus

4) Stomach and others

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Neuro humoral control of digestive tract.(41)

Action potential – involved in absorption, secretions etc.

Role of enteric nervous system

Parasympathetic activation importance and control

Sympathetic functions associated with digestion and other functions

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Disorders of digestive system (definitions only) (42)

Hepatitis – inflammation of liver

Cirrhosis: Degenerative disease of liver

Gallstones

Appendicitis –an inflammation of vermiform appendix.

Crohn's disease

Mechanism with treatment

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Disorders of digestive system (43)

Hemorrhoids /piles aused by inflammation and enlargement of rectal veins

Colorectal cancer

Diverticulosis

Diarrhoes

Dysentery

Definitions- mechanism – treatment.

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Health Education (44)

WHO Definition of health and health promotion. Family planning: different devices for family planning

- plays a primary role in providing education about contraceptive choices and teaching about the use of different methods.
- The Ideal Method Should Be –Safe-100% effective-Free of SE,Easily obtainable,Affordable,Acceptable to the user & sexual partner,Free of effects on future pregnancies-Natural Family planning methods
- They include:

Calendar (Rhythm) method-Basal body temperature -Cervical mucous method -Symptothermal method -Ovulation awareness method -Lactational amenorrhea method-Withdrawal (Coitus interruption)

Advantages and Disadvantages

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
2. Principles of anatomy and physiology by Tortora and Grabowski,Tenth edition.John wiley and sons inc.2003.
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Class- *First Year B.Pharm* ***Subject- HAP-I***

Subject In charge- Mr.Chanshetti R.R. ***LECTURE SYNOPSIS -***

Classification of food requirements: Balanced diet,.
nutritional deficiency disorders, their treatment and prevention (45)

Classification - sources

Eseential nutrients –carbohydrate,lipids,proteins,vitamins,minerals and also water.

Guidelines -

Variety of food- balanced diet

Healthy diet

Malnutritional cases

Treatment and management with healthy diet

REFERENCES –

1. Fundamental of Anatomy and Physiology by Dr.Donald C.Rizzo, Second edition,Thomson publishing house. 2006.
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