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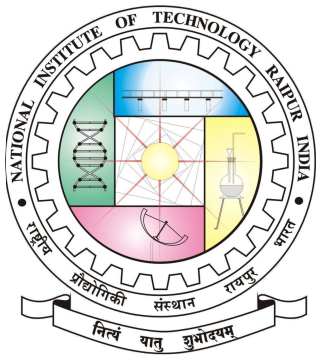

Assignment-1

Summary Of Introduction Of Human Body

Submitted by:
Name: Sonali Kesharwani
Roll no: 21111062
Branch : Biomedical
Semester : 3^{rd}
NIT Raipur,Chhattisgarh

Under the Supervision of:
Mr.Saurabh Gupta
Department of Biomedical Engineering NIT Raipur, Chhattisgarh

Contents

1 The Human Body And Homestosis

1.1 Anatomy and Physiology Defined

Anatomy and Physiolgyare two branch of science which deals with study of body structure and its function.Anatomy basically refer to study of body structure and its relationshipwith other body part. Physiology as by word is related to physics that means it refer to function of body , how it work.As a biomedical engineer it is important because its gives us idea how our body work ,what types of materials present in our body,as a biomedical engineer how we help doctors and patients resolve problem.

1.2 Levels Of Structural organization And Body System

Body has six levels of organization and 11 systems .First, we will discuss six level of organization- **1. Chemical level** These level is basically composed of atoms,molecules,ions,catalyst,vitamin,protein,DNA,RNA,etc. **2.Cellular level** Molecules combine to form the cell. It is basicssic structural and functional unit of life. Mainly four types of cells are present in the human body they are **epithelial cell, muscular cell,nerve cell** . **3.Tissue level** Tissue are a groups of cells and material that surround together to perform a particular function. There are four types of tissues are **Epithelial tissue** its function is to cover the body surface, cavities and form glands.**Connective tissue** function is to connect, protect and support body organs during the distribution of bvesselsessel to other tissue.**Muscular tissue** function is to contract body and generate heat.**Nervous Tissue** function is to carry the message through nerve impulse. **4.Organ level** collectiondifferenttypes type of tissue and having a specific function also having recognizable shape.**5. System** consists of related organs with a common function. An example of the system level also called the organ-system level, is the digestive system, which breaks down and absorbs food. Its organs include the mouth, salivary glands, pharynx (throat), esophagus (food tube), stomach, small intestine, large intestine, liver, gallbladder, and pancreas. Sometimes an organ is part of more than one system.6.**Organismal level** All the body parts functioning together is said to be organizational level.

2 Charecteristics Of Living Human Organism

2.1 Basic life process

1.Metabolism all chemical reaction occur in body .It has two phase first one is catabolism -breakdown of a chemical complex compound into simpler ane and other phase is anabolism building of chemicacomplexex from smaller ne .For example digestive processes catabolize (split) proteins in food into amino acids. These amino acids are then used to anabolic (build) new proteins that makeup body structures such as muscles and bones. 2.**Responsiveness** ability to detect and respond to changes. muscle cells response by contracting, nerve impulses by generatingan electrical signal. 3.**Movement**includes motion of the whole body, individual organs, single cells, and even tiny structures inside cells. 4.**Growth** increase in body size, cell ,tissue, number of cells, for example, mineral deposits accumulate between bone cells, causing the bone to grow in length and width. **5.Differentiation** development of unspecialized cell to specialized state. 6.**Reproduction** formation of a new cell for tissue growth,r epair,reproduction or production of a new one.

2.2 Homeostasis

Homeo +sameness; stasis=standing still: is the maintenance of relatively stable conditions in the body's internal environment. Maintaining the volume and composition of body fluids. Extracellular fluid intracellular fluid, interstitial fluid. Positive and negative feedback system.

2.2.1 Homeostasis and body fluid

Fluid within the cell is known as **intracellular fille d**,fluid outside the cell is called **extracellular fluid**, fluids which filled the space between tissue known as **interstitial fluid**.e ECF differs depending on where it occurs in the body: ECF within blood vessels is termed blood plasma, within lymphatic vessels, it is called lymph, in and around the brain and spinal cord it is known as cerebrospinal fluid, in joints it is referred to as synovial fluid, and the ECF of the eyes is called aqueous humour and vitreous body.

2.2.2 Control of homeostasis

Unbalancing of homeostasis is occur because of two reasons - first one by changing the physical environment example pressure ,temperature,glucose level, etc or by psychological stress in our social environment.The has many regul systems imponesant the one are endocrine the system and nervous systemch maintain the homeostasis by secreting hormones or signal sending signal respectively.

2.3 Feedback system

systemback systemor, feedback loop, is a cycle of events in which the status of a body condition is monitored, evaluated, changed, re-monitored, re-evaluated, and so on.

2.3.1 Receptor

. A receptor is a body structure that monitors changes in a controlled.It can be in the form of chemical signal and nerve impulse.

2.3.2 Control center

in human body controlled system is brain. It take output and evaluate the input and it send output when it required.Output can be in formed of negative feedback or positive feedback.

2.3.3 Negative and Positive Feedback System

negative feedback system is reverse of change in controlled condition .Example systolis and distolic case of blood pressure. Positive feedback system is in favour of controlled condition. Example -blood clotting.

3 Body Position

Descriptions of any region of body assume the body is in the anatomical position,in which the subject stands erect facing the observer,with the head level and the eyes facing directly forward ,and the upper limbs are at the sides,with the palms turned forward. A body lying face-down is prone, body lying face-up is supine.

2.Regional names are term given to a specific regions of body.Within the region,the specific body part have anatomical name and corresponding names. 3.Directional terms indicate relationship of one part of body another. 4.Planes are imaginary flat surfaces that are used to divide the body or organs to visualize interior structures.A midsagittal plane divides the body organ or an organ into eight unequal left and right side.A frontal plane divides the body or an organ into anterior and posterior portions.A transverse plane divide body or an organ into superior and inferior portions.An oblique planes passes through body or organ at an oblique angle. 5.Sections are cut of body or its organ made along a plane. They are named according to plane along with the made and include transversed,frontal and sagittal sections. 6.Body cavities are space in body that help protect,separate and support internal organs. The cranial cavity contains the brain , and the vertebral canal contains the spinal cord.The diaphragm separates the throacic cavity from the abdominal cavity. Viscera are organs witihin the throacic cavity and abdominal cavity.A serous membrane line the wall of cavity and adhere to the viscera.

3.1 Aging and Homeostasis

Aging is a process in which body capability of restore homeostasis is decrease.Some common example are wrinkled skin, digestive system,other.

3.2 Medical Imaging

Medical imaging refers to techniques and procedures used to create images of the human body. Various types of medical imaging allow visualization of structures inside our bodies and are increasingly helpful for precise diagnosis of a wide range of anatomical and physiological disorder.

3.2.1 MAGNETIC RESONANCE IMAGING (MRI)

This based on the principle of magnetic field. : The body is exposed to a high-energy magnetic field, which causes protons (small positive particles within atoms, such as hydrogen) in body fluids and tissues to arrange themselves in relation to the field.s: Relatively safe but cannot be used on patients with metal in their bodies. Shows fine details for soft tissues but not for bones. Most useful for differentiating between normal and abnormal tissues. Used to

detect tumors and artery-clogging fatty plaques; reveal brain abnormalities; measure blood flow; and detect a variety of musculoskeletal, liver, and kidney disorders.

3.2.2 COMPUTED TOMOGRAPHY (CT)

: In this form of computer-assisted radiography, an x-ray beam traces an arc at multiple angles around a section of the body. The resulting transverse section of the body, called a CT scan, is shown on avideo monitor.Comments: Visualizes soft tissues and organs with much more detail than conventional radio-graphs. Differing tissue densities show up as various shades of gray. Multiple scans can be assembled to build three dimensional views of structures (described next). Whole-body CT scanning typically targets the torso and appears to provide the most benefit in screening for lung cancers, coronary artery disease, and kidney cancers.

3.2.3 ULTRASOUND SCANNING

: High-frequency sound waves produced by a hand held wand reflect off body tissues and are detected by the same instrument. The image, which may be still or moving, is called a sonogram and is shown on a video monitor.Safe, non invasive, painless, and uses no dyes.Most commonly used to visualize the fetus during pregnancy. Also used to observe the size, location, and actions of organs and blood flow through blood vessels.

3.2.4 CORONARY (CARDIAC) COMPUTED TOMOGRAPHY ANGIOGRAPHY (CCTA) SCAN

In this form of computer-assisted radiography, an iodine containing contrast medium is injected into a vein and a beta blocker is given to decrease heart rate. Then, numerous x-ray beams trace an arc around the heart and a scanner detects the x-ray beams and transmits them to a computer, which transforms the information into a three dimensional image of the coronary blood vessels on a monitor. The image produced is called a CCTA scan and can be generated in less than 20 seconds. Used primarily to determine if there are any coronary artery blockages (for example, atherosclerotic plaque or calcium) that may require an intervention such as angioplasty or stent. The CCTA scan can be rotated, enlarged, and moved at any angle. The procedure can take thousands of images of the heart within the time of a

single heartbeat, so it provides a great amount of detail about the heart's structure and function.

3.2.5 POSITRON EMISSION TOMOGRAPHY (PET)

A substance that emits positrons (positively charged particles) is injected into the body, where it is taken up by tissues. The collision of positrons with negatively charged electrons in body tissues produces gamma rays (similar to x-rays) that are detected by gamma cameras positioned around the subject. A computer receives signals from the gamma cameras and constructs a PET scan image, displayed in color on a video monitor. The PET scan shows where the injected substance is being used in the body. In the PET scan image shown here, the black and blue colors indicate minimal activity; the red, orange, yellow, and white colors indicate areas of increasingly greater activity.Used to study the physiology of body structures, such as metabolism in the brain or heart.

3.2.6 ENDOSCOPY

Endoscopy involves the visual examination of the inside of body organs or cavities using a lighted instrument with lenses called an endoscope. The image is viewed through an eyepiece on the endoscope or projected onto a monitor.Examples include colonoscopy (used to examine the interior of the colon, which is part of the large intestine), laparoscopy (used to examine the organs within the abdominopelvic cavity), and arthroscopy (used to examine the interior of a joint, usually the knee).