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**Subject : List and describe the 11 systems of the Human Body, their functions and Major Organs.**

### **Systems**

1. Skeletal System
2. Respiratory System
3. Circulatory System
4. Digestive System
5. Endocrine System
6. Reproductive System
7. Nervous System
8. Integumentary System
9. Lymphatic (& Immunity) System
10. Muscular System
11. Urinary (or Genito-Urinary) System

### **Functions and Major Organs**

#### **1. Skeletal**

This is the name attributed to the 350 bones that keeps the rest of our body up. Although the amount of bones we have at birth actually reduces between then and childhood to around 206, as some of our bones fuse together during growth. Our bones are most important to us as they do 3 essential tasks :

- a) *The skeleton is the protection for our vital organs, including the brain, heart and lungs.*
- b) *The skeleton makes us the shape that we are and supports our tissue otherwise we would just be a mass of blood and flesh on the ground.*
- c) *The skeleton enables us to move, because our muscles are adjoined to our bones so when our muscles move it moves our bones, therefore - we move.*

Bones have their own nerves and blood vessels which amongst other things store essential minerals. Most bones are made up of compact bone with an internal layer of spongy bone and some have bone marrow where new cells are produced on a constant cycle for our blood.

#### **2. Respiratory**

Our Respiratory system is designed to facilitate the most important function of the body, breathing, taking in oxygen that we need for survival and discarding the unwanted Carbon Dioxides. For this process

there are 2 specific groups of organs :

- a) *Nostrils, nasal passages, throat, trachea, bronchi, bronchioles and air sacs. This group dealing with the passage of oxygen (air) through the body into the bloodstream*
- b) *Ribs, rib muscles, diaphragm and abdominal muscles, which form the actual mechanics of breathing.*

Breathing is also defined as the movement of air in and out of the lungs by inspiration (inhalation) and expiration (exhalation), essentially controlled by the nervous system and done without any conscious effort. It involves External respiration, transportation, internal respiration and cellular respiration.

- a) *External - the exchange of oxygen from the air with carbon dioxide in the blood that takes place within the alveoli in the lungs.*
- b) *Transportation - method of carriage for oxygen and carbon dioxide that is performed by the pulmonary circulation.*
- c) *Internal - ensures that oxygenated blood gets to the cells so that exchange of oxygen and carbon dioxide can take by method of diffusion*
- d) *Cellular - the utilisation of oxygen in cells and production of Carbon Dioxide*

### 3 Circulatory

the circulatory system consists of the blood, the heart, and the blood vessels. The blood is the transport mechanism for oxygen and nutrients to reach the body's cells. It is also how waste is carried away. The blood also transports hormones that control other bodily processes along with germ fighting antibodies. All of this of course is controlled by the heart which is the organ that essentially keeps the system going

### 4. Digestive

Food is the fuel by which we live and gives us the energy required on a daily basis for working, playing etc... It also supplies us with the materials needed for the production and growth of new cells. However this would not be possible without the digestive system to break down the food and transport it throughout our body through the circulatory system

The main part of the Digestive System is the Digestive Tract which is a 9m tube like organ that travels through the centre of our bodies starting at the mouth and finishing at the anus. The organs encountered in the Digestive System are the Mouth, Oesophagus, stomach, pancreas, gall bladder, small intestine, Liver, large intestine and finally the rectum and anus.

### 5. Endocrine

This system is made up of Endocrine Glands that arise during the development of 3 embryological tissues (Endoderm, mesoderm and ectoderm) and the Endocrine glands release chemical messages (otherwise known as hormones) which are passed through the blood and sent to individual organs that contain the appropriate receptor cells. These hormones are grouped into Steroid, Peptide and Amines.

The Endocrine System regulates physiological function through cycle and negative feedback which aids the maintenance of physiological and homeostatic control.

The main organs (or glands) would include the Pituitary (or Master) Gland, Hypothalamus and also the Pineal, Thyroid, Parathyroids, Thymus, Adrenals, Islets of Langerhans located in the Pancreas, and in women the Ovary and in men the Testes.

## 6. Reproductive

Survival of the species is the main function of the Reproductive System. Other systems cover the survival of the individual however for a species to survive as a whole requires the production of offspring which in turn involves 4 particular functions.

- a) *Production of egg/sperm cells*
- b) *Transportation and sustenance of these cells*
- c) *Nurturing and development of offspring*
- d) *production of hormones*

These in turn can be split into primary and secondary or reproductive and accessory organs.

Primary/Gonads consist of ovary/testes responsible for sperm/egg cell production, hormone production which also functions in the maturing of the reproductive system

Secondary/Accessory which include ducts, glands which transport and sustain gametes and nurture developing offspring.

## 7. Nervous

The nervous system can be broken into 3 systems, the Central Nervous System, The Peripheral Nervous System and the Autonomic Nervous System. The Central System incorporates the brain and spinal cord. The Peripheral System which contains cranial and spinal nerves takes nerves which link the various parts of the body with the Central System, and the Peripheral System is further broken down into Sensory and Afferent Nerves, which transfer message from the sensory organs to the Central System and then the motor and efferent nerves relay messages from the Central System to muscles and organs in order to create a response. Finally the Autonomic System which is made up of sympathetic and parasympathetic systems which work in opposition so that the sympathetic side prepares the body for action and the parasympathetic system prepares the body for rest.

All these systems as a whole form a network which is responsible for aiding the maintenance of homeostasis which gives a steady state of balance..

The nervous system itself is made up of nerve tissue which consist of cells known as Neurons, which are unique to the nervous system

## 8. Integumentary

This system is what provides the body with its waterproof outer covering that is both resilient and flexible contributing to our unique and individual personal appearance. This system also supports the "Excretory System" in the removal of waste. Skin, fingernails, toenails and hair make up the system from which surface level waste is discarded. The skin acts

as the person's protection and provides removal of sweat and dead cells which contain waste products. It should also be noted that hair and fingernails etc. are actually the build up of dead epidermal cells and as more cells die and are removed the more hair and nails will grow. The skin also has other functions which include body temperature regulation, sensation, immunity, synthesis of Vitamin D

## **9. Lymphatic (Immunity)**

This system is the body's defence against invasion by disease causing factors such as viruses, bacteria and fungal infection and this system consists of Bone Marrow, spleen, thymus gland, lymph nodes, tonsils, appendix. The system contains a network of vessels that aid the circulation of body fluids and they transport excess fluid away from interstitial areas in the body tissue to return it to the bloodstream. Also Lymphatic vessels prevent reverse flow of the lymph fluid and has lymph nodes which act as a filter for destroyed micro-organisms.

## **10. Muscular**

The Muscular System is made up of different types of tissue, all responsible for some form of movement. Muscles are like engines and produce force to enable movement of internal and external parts of the body. This is aided by nutrients carried to them via the blood from the Digestive System. The muscles fall into the following categories, Cardiac, Visceral, Skeletal. There are 2 types of movement in the Muscular System, voluntary and involuntary, which of course is voluntary by choice and involuntary without thinking

## **11. Urinary (Genito-Urinary)**

The Urinary tract is the system involved in the formation and expulsion of Urine. Produced by the kidneys during the filtration of waste products from the blood. The waste products when combined with water are urine, which is then passed out of the kidneys through two narrow tubes called ureters. This is then emptied into the bladder and finally excreted from the body through the urethra

The principal function of this system is to maintain the body fluids within normal limits which involves ridding the body of waste products that have gathered through cellular metabolism which is why it is sometimes referred to as the Excretory System. Its function also includes regulation of electrolytes in bodily fluid and the maintenance of a normal pH level in the blood also in addition to maintaining homeostasis, the Urinary System aids the control of red blood cell production by way of secreting Erythropoietin hormone and finally helps to maintain normal blood pressure by the secretion of the Renin Enzyme