

## 9 WONDER OF THE BODY

Every living organism is made up of cells. Similarly human body is also made up of cells.

A group of cells forms a tissue and a group of tissues forms an organ. A group of organs which is specialized for a special function is called a system.

Every system performs an essential and specialized function in the body. The functions of various systems in the human body are closely connected and dependant on each other.

Mentioned below are some examples of the systems in our body.

- Digestive system
- Blood circulatory system
- Skeletal system
- Excretory system
- Respiratory system
- Nervous system
- Muscular system

### The Digestive system

The digestive system consists of an alimentary canal and several subsidiary glands and organs.

Alimentary canal consists of the mouth, oesophagus, stomach, duodenum, small intestine, large intestine, rectum and anus.

Salivary glands, liver, pancreas, gall bladder are main subsidiary organs that help in the digestion (fig 9.1).

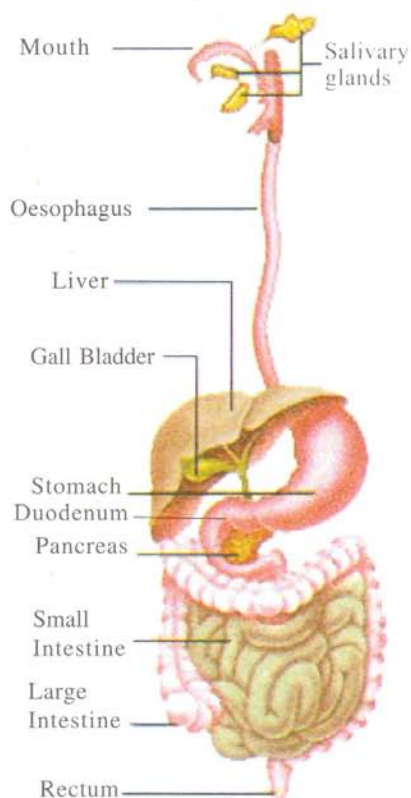


Fig 9.1. Human digestive system

In the mouth the food is broken, ground and crushed by the teeth and mixed with saliva. There are four kinds of teeth in the mouth which help in this process. They are incisors, canines, pre-molars and molars. The grid below depicts the functions and the number of teeth of an adult.

Grid 1.1

		Incisors	canines	premolars	molars
Number of teeth of an adult	upper jaw	4	2	4	6
	lower jaw	4	2	4	6
function		cutting	cutting and tearing	chopping and grinding	chopping and grinding

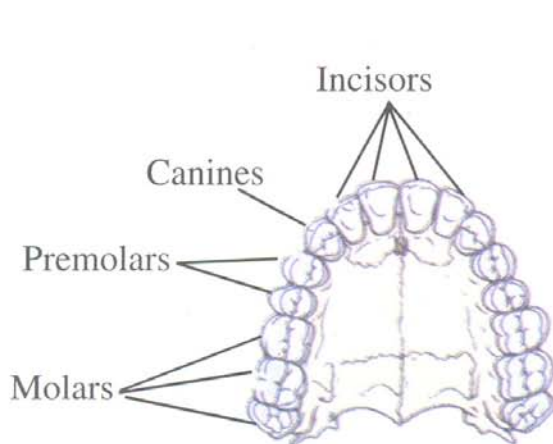


Fig 9.2. - position of teeth in the mouth

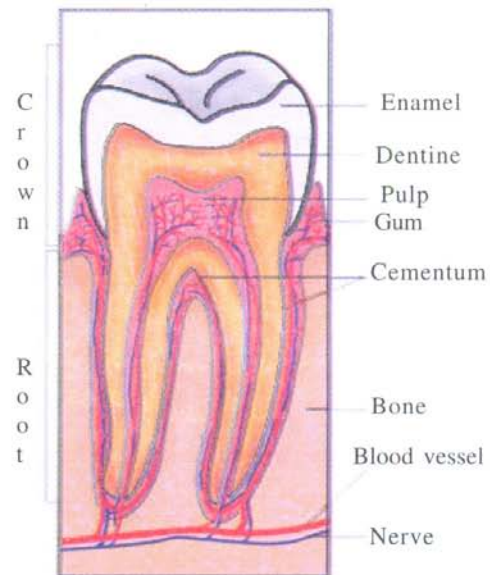


Fig 9.3. - structure of a tooth

The food passes from the mouth to the stomach through the oesophagus. Food moves along the oesophagus in a wave like motion called 'peristalsis'. Stomach is a sac like organ with thick muscular walls. Though the digestion starts from the mouth, it takes place mainly in the stomach. The food is retained in the stomach for about 3-4 hours. The peristalsis motion in the stomach muscles crushes and

mixes all the food and makes a semi – solid and thick fluid called chyme. Digestive juices help in the digestion of food.

Next the food passes from the stomach to the duodenum. In the duodenum the food mixes with the secretions from the liver, gall-bladder and enzymes from the pancreas which help in further digestion. Digestion is completed in the small intestine. The nutrients in the food get absorbed in the small intestine. The small intestine is a thin, long tube. To increase the absorption, there are tiny finger like structures in the inner walls of the small intestine, called ‘villi’. At the small intestines all the nutrients in the food are completely absorbed. The absorbed nutrients are conveyed to all parts of the body through the blood stream.

The undigested rather solid materials enter the large intestine. The water is absorbed in the large intestine. What remains is called faeces. The faeces is sent out of the body through the anus.

### Diseases related to the Digestive system

- Diarrhoea
- Amoebiasis
- Gastritis

You should take care of your digestive system in order to lead a healthy life.

#### **Activity 9.1**

Write a list of things that you can do to keep your digestive system healthy.

### How to keep the digestive system healthy

- Brush your teeth at least twice a day.
- Include items of food with adequate amounts of calcium and vitamin D in your meal.
- Avoid consuming too much sweets and fats.
- Take nutritious and hygienically prepared food.



- Drink enough safe water daily. (Make it a habit to drink one or two glasses of water early in the morning)
- Take your meals on time.
- Do not neglect your breakfast.
- Take enough fresh fruits and vegetables including green leaves.
- Develop a regular habit of elimination of faeces.

## The Respiratory system

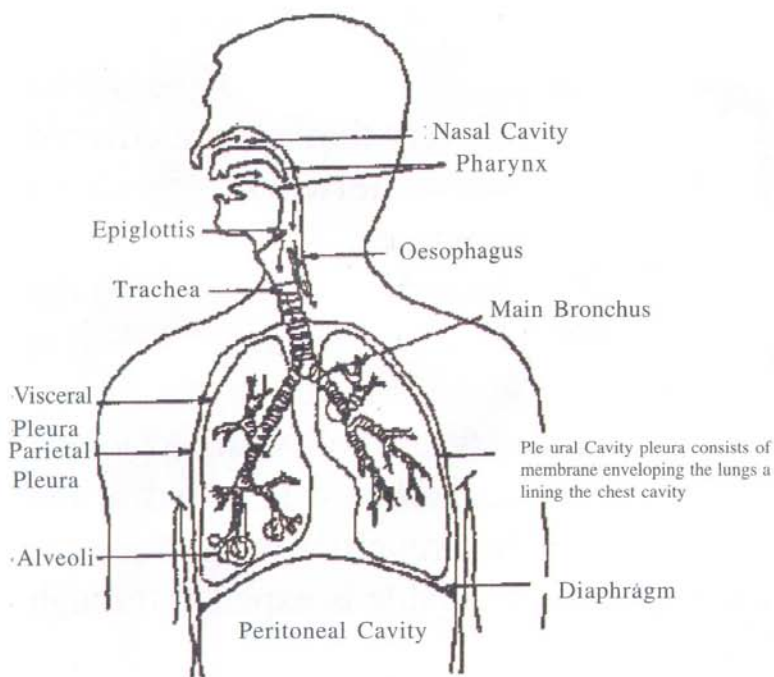


Fig 9.4 the respiratory system of man

Our body needs food and oxygen to produce energy for the functions of the body. Food is digested by the body and is absorbed in the small intestine.

The function of the respiratory system is taking oxygen inside the body and sending carbon dioxide out of the body. Carbon dioxide is the waste

material in the process of producing energy.

The respiratory system consists of nose, nasal cavity, larynx, trachea, bronchus, bronchioles and lungs.

The atmospheric air enters the body during inspiration. In the lungs, there are sac like structures called alveoli. There are a lot of blood capillaries around the alveoli. Here the exchange of gases takes place. The blood capillaries absorb oxygen and give out carbon dioxide. During expiration the air rich in carbon dioxide is exhaled.

Respiratory system takes air into the body through the nose. The air goes through the nasal cavity. While the air moves through the

nasal cavity, the dust particles, germs and other substances are removed by the cilia and the other secretions in the nose. So the air is purified before entering the lungs.

There is a little flap called epiglottis in the throat to stop food from entering the trachea. If something enters the trachea, coughing will bring it out instantly. Trachea is a tube which is surrounded by cartilage rings.

Air enters the lungs through the trachea, bronchus and bronchioles. There are about 300 millions of alveolar sacs in the lungs.

### Exchange of gases

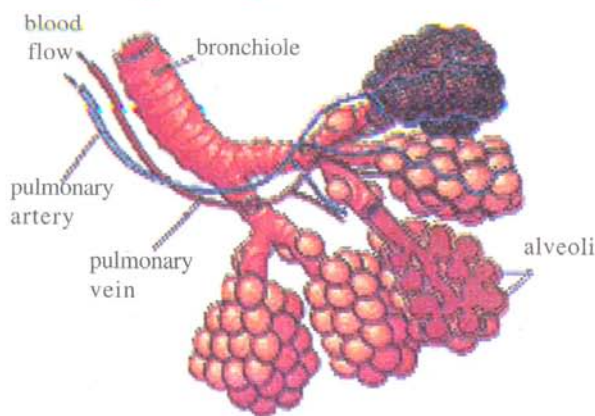


Fig 9.5 structure of an alveoli

The walls of the alveoli are very thin and are covered by a network of blood capillaries.

The air enters into the alveoli, oxygen is absorbed in to the blood through the walls of the alveoli. Carbon dioxide in the blood is added to the air through the walls of alveoli.

When you exhale, the air rich in carbon dioxide is expelled through the nose.

Lungs are situated in the thoracic cavity and are protected by the ribs. The process of respiration is also facilitated by the ribs and diaphragm.

The rate of respiration increases when you do exercises or heavy work and when frightened. A person needs more energy for doing these things. To produce more energy the rate of respiration increases. Then panting also takes place.

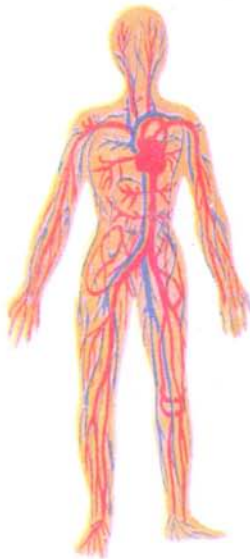
### Diseases related to the Respiratory system

- Tuberculosis
- Bronchitis
- Asthma and wheeze
- Coughs and colds
- Pneumonia
- Cancer

### How to keep the respiratory system healthy

- Keeping the nasal passage constantly clean
- Living in a well ventilated house
- Keeping away from dust and polluted air
- Wearing a mask while working with Asbestos and in an environment with smoke and dust
- Avoid smoking
- Doing exercises regularly
- Playing outdoor games

### **The blood circulatory system**



The circulatory system consists of heart, arteries, capillaries and veins through which blood is circulated. Circulatory system transports oxygen and digested food into cells and carbon dioxide and other excretory products away from cells for disposal. It helps to transport hormones, enzymes and medicines also.

fig 9.6 - The blood circulatory system of man

### The Heart

The main organ of the circulatory system is the heart. It is made of heart muscles which never get tired. Heart acts as a pump and sends blood to all living cells in the body. The heart is situated between the lungs slightly to the left side of the thoracic cavity. It is a four chambered hollow muscular organ. The upper chambers are called auricles and the lower chambers are called ventricles.

There is a muscular wall to separate the heart into left and right parts.



Thus the four chambers are

1. left atrium/auricle
2. left ventricle
3. right atrium/auricle
4. right ventricle

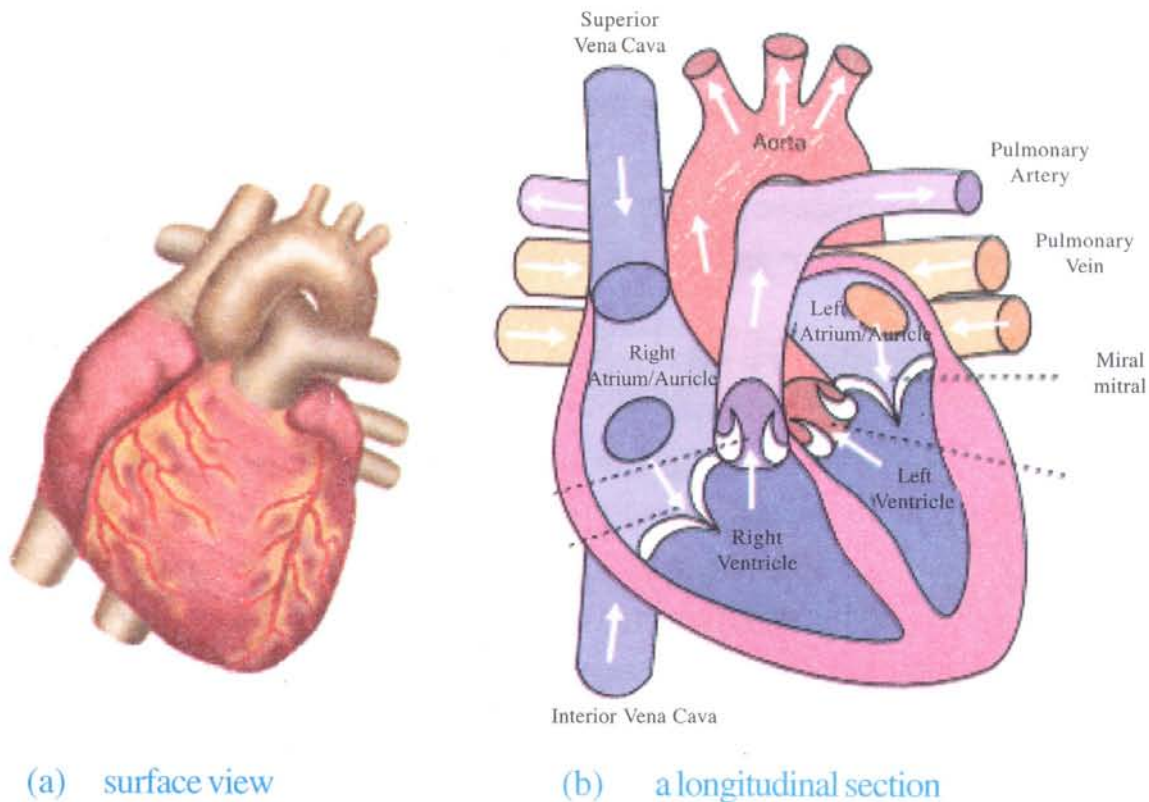


Fig. 9.7 - The human heart

The left side of the heart contains oxygenated blood which is bright red in colour.

The right side of the heart contains de-oxygenated blood which is dull red in colour.

The de-oxygenated blood in the right side of the heart is sent to the lungs for oxygenating. Then the oxygenated blood comes to the left auricle. Through the left ventricle this oxygenated blood is sent all over the body.

The heart muscles contract and relax rhythmically. By this contraction and relaxation the blood is sent out of the heart.

The heart will start functioning while a baby is inside the mother's womb. It beats according to a particular rhythm until the time of death. Heart beat is equal to the pulse rate.

## The blood

The blood is circulated in the body through blood vessels. There are two types of blood vessels. The blood vessels that send blood out of the heart are called **arteries**. The vessels that bring blood into the heart are called **veins**.

There are tiny branches of the arteries called **blood capillaries**. These capillaries enter and leave an organ.

### Blood can be divided into two componets

1. blood cells
2. blood plasma

### There are 3 types of blood cells.

1. red blood corpuscles
2. white blood corpuscles
3. blood platelets

Red blood cells contain a pigment called haemoglobin which gives the red colour to the blood. It is the red blood cells that help the transportation of oxygen.

White blood corpuscles protect the body from germs.

Platelets help the clotting of blood. The ability of clotting prevents the continuous bleeding in an injury.

The nutrients and waste materials such as carbon dioxide, urea are carried in the blood plasma.

## Blood groups

There are four groups of blood in the human body. They are A, B, AB and O. Blood is also divided into two groups called Rhesus Positive(Rh+) and Rhesus negative(Rh-).

## The Functions of the Blood

- provides oxygen and nutrients to all cells in the body.
- removes all the waste materials that are produced by the organs. (eg:- Carbon dioxide, urea)



- destroys disease causing germs that enter the body. (eg:- bacteria and virus)
- maintains a constant temperature in our body.

### Diseases Related to the Blood Circulatory System

Anaemia  
 Leukemia  
 High Blood Pressure  
 Coronary heart diseases

### How to Keep the Circulatory System Healthy

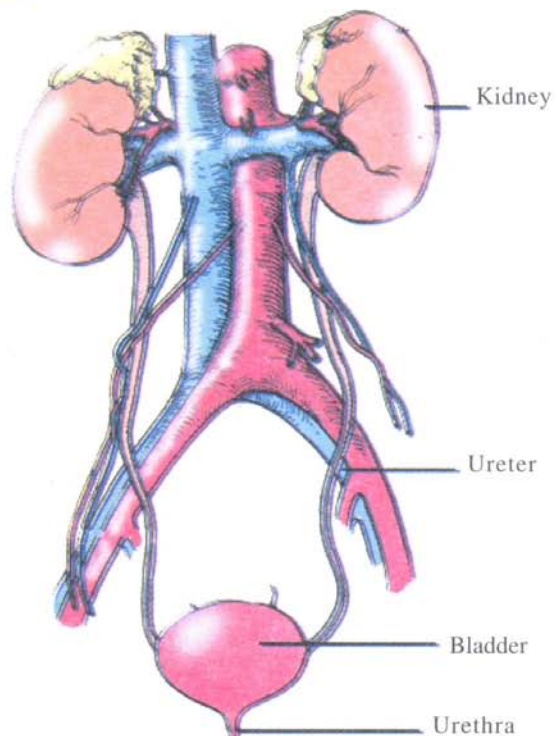
- Practise healthy food habits
- Regular exercises
- Avoid of food rich in fat and oil
- Avoid of smoking and consuming alcohol
- Take adequate rest and sleep
- Avoid of mental stress
- Avoid excess salt intake

### **The Excretory System**

Waste substances are produced during various processes taking place inside our body. These waste products are removed in many ways.

The organs that eliminate waste products are skin, lungs and kidneys. Kidneys are the main organs responsible for the removal of waste materials from the body.

**Fig. 9.8 - Human urinary System**



The kidneys lie in the upper part of the abdomen, on either side of the back bone. They are made up of special tiny tubes called **nephrones**. There are about one million of nephrones in one kidney.

These tubes take the waste products such as urea and other salts and a large amount of water from the blood. This is called urine. Urine passes from the kidneys through the two tubes called ureters to the urinary bladder. Urine is stored in the urinary bladder until it is removed from the body. When the bladder is full urine is released from the body through the urethra.

In the process of filtering urine, the nutrients are re-absorbed.

The amount of urine depends on the amount of water in the body.

By analys of urin can detect different diseases

### Skin as an excretory organ

One of the functions of the skin is to remove waste products in the form of perspiration.

### Lungs as an excretory organ

The Carbon dioxide produced inside the cells is removed through the lungs with the exhaled air.

### Diseases Relatet to the Urinary System

- acute glomerulonephritis
- diabetic kidney
- renal calculi
- infections of the urinary tract
- chronic glomerulonephritis
- acute renal failure
- tumours of the kidney

### How to keep the Urinary System Healthy

- Drink plenty of pure water daily
- Avoid consuming alcohol
- Avoid taking food and drinks that are harmful to the body (eg:- food containing artificial dyes and acids)

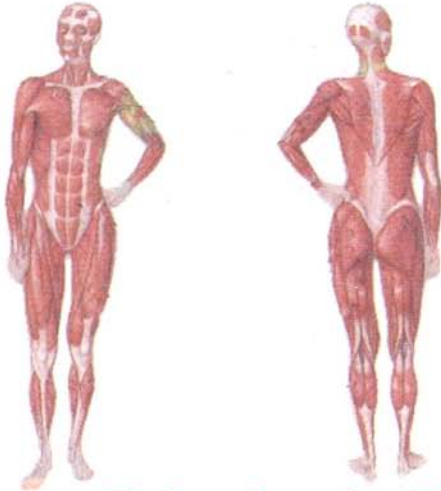
## The Muscular System

The muscles give the body the power of movement.

There are three types of muscular tissues in the body.

They are,

1. Voluntary muscles  
(muscles attached to the skeleton - skeletal muscles)
2. involuntary muscles  
(found in various internal organs eg:- walls of alimentary canal and blood vessels)
3. Cardiac muscles (found only in the heart)



These muscles are adapted to perform various tasks in different places of the body. Muscles have the ability to contract and relax.

Fig :- 9.9 - Human muscular System

### Diseases Related to the Muscular System

- muscle sprains.
- muscle tear
- muscle spasm

### How to keep the muscular system Healthy

1. Doing exercises regularly
2. Maintaining correct postures
3. Taking a healthy diet
4. Taking rest when necessary



## The Skeletal System

The skeletal system of a man consists of 206 bones.

The skeleton serves as a frame work and support for the muscles. The bones protect - internal organs.

eg:- skull protects the brain, ribs protect the lungs and the heart.

The skeleton helps the organism with movements. Both calcium and phosphate are stored in the bone. The marrow inside some of the bones produces red blood cells. Fractures of bones make you a disabled person.

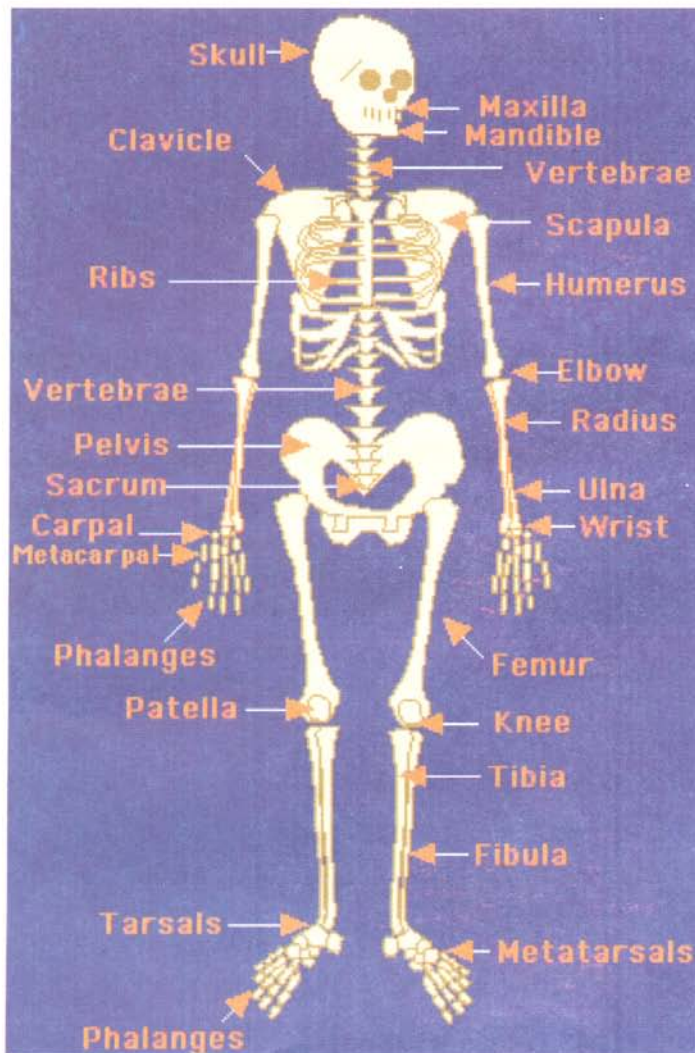


Fig.9.10 Human skeleton

### Diseases Related to the Skeletal System

- Osteoporosis
- Rickets
- Osteomyelitis
- Bone fractures

### How to keep the Skeletal System Healthy

- Doing exercises regularly
- Taking food rich in calcium
- Maintaining correct posture.
- Avoiding accidents.