GA POWER CAPSULE FOR BIOLOGY FOR DEFENCE EXAMS 2018-19

CELL

Cell: It is the basic structural unit of life.
Cells were first **discovered** by **Robert Hooke.**
Note: The smallest cell is 0.1 to 0.5 micrometre in bacteria. The largest cell measuring 170 mm ×130 mm, is the egg of an ostrich.
Amoeba acquires its food through **endocytosis.**

1. **Prokaryotes cells -** cells that have no defined nucleus
   Eg: Bacteria & Blue-green Algae
2. **Eukaryote -** cells which have definite nucleus
   Eg: Other than Bacteria & Blue-green Algae

Compounds called **proteins** and **phospholipids** make up most of the cell membrane.

Diffusion-It is a process of movements of substance from a region of high concentration to a region where its concentration is low. Water also obeys the law of diffusion.
Eg: Substances like Co_2 and O_2 can move across the cell membranes by a process called **diffusion**.

Osmosis: The movement of water molecules is called **osmosis**. Osmosis is a special case of diffusion through a selectively permeable membrane.

Types of Osmosis:

1. **Hypotonic:** more water will come into the cell than will leave. The cell is likely to swell up.
2. **Isotonic:** the amount going in is the same as the amount going out of the cell.The cell will stay the same size.
3. **Hypertonic:** more water leaves the cell than enters it. Therefore the cell will shrink.

When a living plant cell loses water through osmosis there is shrinkage or contraction of the contents of the cell away from the cell wall. This phenomenon is known as **plasmolysis.**

Cytoplasm: It is the fluid that fills a cell. Scientists used to call the fluid protoplasm.

Ribosomes: It synthesis protein, and Endoplasmic reticulum sent these protein in various part of the cell. Whereas Smooth Endoplasmic reticulum helps in the manufacture of fats. It a made up of ribonucleic acid.

Functions of these proteins and fats:

- Protein and fat (lipid) help in building the cell membranes. This process is known as **membranes biogenesis.**
- Smooth Endoplasmic reticulum plays a crucial role in detoxifying many poisons and drugs.

Golgi apparatus: It is another packaging organelle like the endoplasmic reticulum **functions:**

- It is the organelle that builds lysosomes (cells digestion machines).

Lysosomes (suicidal bag): It is a kind of waste disposal system of the cell.

Mitochondria(power house): The energy required for various chemical activities headed for life is released by mitochondria in the form of ATP (adenosine-tri-phosphate) molecules.

- **ATP is known as the energy currency of the cell.**
- Mitochondria are strange organelles in the sense that they have their own DNA and ribosomes, therefore mitochondria are able to make their own protein.
- Mitochondria is absent in bacteria and the red blood cells of mammals and higher animals.

Centrioles: centrioles are concerned with cell division. It initiates cell division.

Plastids: These are present only in plant cells.
Types of plastids:-

- **Chromoplast**(colour plastides) impart colour to flowers and fruits.
- **Leucoplasts**(white or colourless plastids) present in which starch, oils and protein are stored.
- **Plastids** are self-replicating. i.e. they have the power to divide, as they contain DNA, RNA and ribosomes.
- Plastides contains the pigment chlorophyll that is known as **chloroplast**. It is the site for photo synthesis.
  non –living parts with in the cell :-

Vacuoles: it is a fluid filled spaces enclosed by membranes. Its size in animal is small and in plant it is big.
Amino acids and sugars are stored in vacuoles.

Granules: It is not bounded by any membranes. It store fats, proteins and carbohydrates.

Cell nucleus: The cell nucleus acts like the brain of the cell. It helps control eating, movement
and reproduction. Not all cells have a nucleus.
The nucleus contain, the following components :
(a) Nuclear envelope (nuclear membrane)
(b) Chromatin : When the cell is in resting state there is something called **chromatin** in the nucleus. Chromatin is made up of DNA, RNA and nucleus protein. DNA and RNA are the nucleus acids inside the cell. When the cell is going to divide, the chromatin become very compact. It condenses when the chromatin comes together we can see the chromosomes.
(c) Chromosomes: Chromosomes make organisms what they are. They carry all the information used to help a cell grow, thrive and reproduce.

- Chromosomes are made up of DNA.
- Segments of DNA in specific patterns are called **genes**.
- In prokaryotes, DNA floats in the cytoplasm in an area called the **nucleoid**.

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- Chromosomes are not always visible. They usually sit around uncoiled and as loose shards called **chromation.**
- Chromosomes are usually found in pairs.
- Human Beings probably have 46 chromosomes (23 pairs).
- Peas only have 12, a dog has 78 chromosomes.
- The number of chromosomes is not related to the intelligence or complexity of the creature.

(d) Nucleolus: It is a dense spherical granule contained within the nucleus.It stores proteins.

Cell Division

Organisms grow and reduce through **cell division**.
There are two methods of replication **mitosis** and **meiosis**.
(a) Mitosis: It duplicates its DNA and the two new cells (daughter cells) have the same pieces and generic code. There are five steps in this process. You should remember the term PMATI. It breaks down to :
1. Prophase
2. Metaphase
3. Anaphase
4. Telophase
5. Interphase.

The main theme of **meiosis** is that there are two cell division. Mitosis has one division

Some important facts regarding cells :

- Nerve cells in animals are the longest cells.
- Smallest human cell is red blood cell.
- Largest human cell is female ovum.
- The single largest cell in the world is of an ostrich.
- The smallest cells are those of the mycoplasma.
- Every minute about 3 million cells in our body die.
- Sieve tube in plants and the mature mammalian red blood cells do not have a nucleus.
- The red blood cell carries respiratory gases.
- Sieve cells in plants transport nutrients in plants.
- The lysosomal enzymes of the sperm cells digest the limiting membranes of the ovum (egg). Thus the sperm is able to enter the ovum.
- During the transformation of tadpole into frog. The embryonic tissues like gills and tail are digested by the lysosome.
- Mitochondria contain DNA, hence capable of replication.
- Matrix is a transparent, homogenous semi-fluid substance. In its active state. It remains saturated with water.

TISSUE

Epithetical Tissue

(i) On the basis of cell layers
(a) When an epithelium has a single layer of cells it is called a simple epithelium.
(b) Where as a multiple tier of cells are known as stratified epithelium.
(ii) On the basis of simple shape of cells:

- **Cuboidal :** its occurrence is in kidney tubules, salivery glands, inner lining of the cheek. Its main function is to give mechanical strength.
- **Columnar :** its occurrence is in sweat gland, tear gland, salivary gland its main function is to gives mechanical strength concerned with secretions.
- **Squamous :** when it forms a living as that of blood vessels, it is called endothelium.
  Its main function is to protect the underlying parts from injury, entry of germs, etc.
- **Connective tissue :** Its main function is to bind and support other tissues.
  There are a few types of connective tissue.

Connective Tissue

Arelor
(i) Tendon
(ii) Ligament

Adipose Skeletal
(i) Bone
(ii) Cartilage

Fluid
(i) Blood
(ii) Lymph

A. Areolar tissue : It fills spaces inside organs found around muscles, blood vessels and nerves. Its main function is to joins skin to muscles, support internal organs, help in the repair of tissues. Whereas tendon's main function is to connect muscles to bones and ligament is connects bones to each other.

B. Adipose tissue : Its occurrence is below skin, between internal organs and in the yellow bone Marrow. Its main function is to storage of fat and to conserve heat.

C. Skeletal tissue : Bone & cartilage occurrences is in nose, epigotis and in intervertebral disc of mammals. Its main function is to provide support and flexibility to body part. Whereas bone protects internal delicate organs provides attachments for muscles, bone marrow makes blood cells.

D. Fluid tissue : Blood & Lymph blood transport O2 nutrients, hormones to tissues and organs. Whereas leucocytes fight diseases and platelets help in cloting of blood. Lymph transport nutrients into the heart and it also forms the defense system of the body.

Muscular Tissue

It is specialized for ability to contract muscle cells.
Types of Muscular tissue:
A. Skeletal muscle: It attached primarily to bones. Its main function is to provide the force for locomotion and all other voluntary movements of the body.
B. Cardiac muscle: It occurs only in the heart. The contraction and relaxation of the heart muscles help to pump the blood and distribute it to the various parts of the body.
C. Smooth muscle: It can be found in stomach, intestines, and blood vessels these muscles cause slow and prolonged contractions which are involuntary.

D. Nervous tissue: This tissue is specialized with a capability to conduct electrical impulses and convey information from one area of the body to another. Most of the nervous tissue (98%) is located in the central nervous system. The brain and spinal cord.

Types of Nervous Tissue

- neurons
- neuroglia

Important facts regarding animal tissue:-

- Muscles contain special protein called contractile protein. Which contract and relax to cause
- Fat storing adipose tissue is found below the skin and between internal organs.
- Two bones are connected to each other by a tissue called ligament. This tissue is very elastic.
- The skin, the living of the mouth, the living blood vessels, kidney tubules are all made up of epithelial tissue.
- Voluntary muscles and cardiac muscles are richly supplied with blood whereas involuntary muscles are poorly supplied with blood.

MUSCULAR AND SKELETAL SYSTEM

Skeletal Systems of Various Animals

Skeletons are either a fluid-filled body cavity, exoskeletons, or internal skeletons.

Note: Spiders use a combination of an exoskeleton for protection and fluid pressure for movement.

- Sharks, and rays have skeletons composed entirely of cartilage; other vertebrates have an embryonic cartilage skeleton progressively replaced by bone as they mature and develop.
- Some areas of the human body, however, retain cartilage in the adult: in joints and flexible structures such as the ribs, trachea, nose and ears.
- The upper bones of the limbs are single: humerus (arm) and femur (leg).
- Below a joint (elbow or knee), both limbs have a pair of bones (radius and ulna in the arms; tibia and fibula in legs) that connect to another joint (wrist or ankle).
- The carpals makeup the wrist joint; the tarsals are in the ankle joint.

Bone

- Bones have cells embedded in a mineralized (calcium) matrix and collagen fibers.
  The spongy bone of the femur, humerus, and sternum contains red marrow, in which stem cells reproduce and form the cellular components of the blood and immune system. Yellow marrow, at the center of these bones, is used to store fats. The outer layer of the bones is known as the periosteum.
- When fractures occur, the pain is carried to the brain by nerves running through the periosteum.

Skeletal Muscle Systems

When one muscle flexes (or contracts) the other relaxes, a process known as **antagonism**.

Muscles have both electrical and chemical activity.

Contraction of Non-muscular Cells

- Some fish have modified muscles that discharge electricity. These fish have electric organs consisting of modified muscles known as electroplates. The South American electric eel has more than 6000 plates arranged into 70 columns. Maximum discharge is 100 watts.

THE NERVOUS SYSTEM

- The Central Nervous System (CNS) includes the brain and spinal cord.
- The Peripheral Nervous System (PNS) connects the CNS to other parts of the body, and is composed of nerves(bundles of neurons)

The Neuron

Nervous tissue is composed of two main cell types: neurons and glial cells. Neurons transmit nerve messages. Glial cells are in direct contact with neurons and often surround them.

The neuron is the functional unit of the nervous system. Humans have about 100 billion neurons in their brain alone! While variable in size and shape,

Functions of the three parts of a neuron:

- **Axon:** It conducts messages away from the cell body.
- **Dendrite**: It receives information from axon of another cell and conducts the messages towards the cell body.
- **Cell body**: It contains nucleus, mitochondria, and other organelles. It is mainly concerned with the maintenance and growth.

SYNAPSES

The junction between a nerve cell and another cell is called a synapse.

The space between two cells is known as the synaptic cleft.

- The function between two neurons is called a 'ganglion'.

HUMAN EYE

The human eye is like a camera. Its lens system forms an image on a light-sensitive screen called the retina.

The eyeball is approximately spherical in shape with a diameter of about 2.3 cm.

The eye lens forms an inverted real image of the object on the retina.

RETINA -> The retina is a delicate membrane having enormous number of light-sensitive cells.

CORNEA -> Light enters the eye through a thin membrane called the cornea.It is the eye's outermost layer. It is the clear, dome-shaped surface that covers the front of the eye. It plays an important role in focusing your vision.

PUPIL -> The pupil is a hole located in the centre of the iris of the eye that allows light to strike the retina. It appears

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black because light rays entering the pupil are either absorbed by the tissues inside the eye directly, or absorbed after diffuse reflections within the eye. The pupil regulates and controls the amount of light entering the eye.
IRIS -> It is a dark muscular diaphragm that controls the size of the pupil and thus the amount of light reaching the retina.
CILIARY MUSCLE -> The ciliary muscle is a ring of smooth muscle in the eye's middle layer that controls accommodation for viewing objects at varying distances and regulates the flow of aqueous humour into Schlemm's canal. It changes the shape of the lens within the eye, not the size of the pupil.

The light-sensitive cells get activated upon illumination and generate electrical signals. These signals are sent to the brain via the optic nerves. The brain interprets these signals, and finally, processes the information so that we perceive objects as they are.

Note: When the light is very bright, the iris contracts the pupil to allow less light to enter the eye. However, in dim light the iris expands the pupil to allow more light to enter the eye. Thus, the pupil opens completely through the relaxation of the iris.

A human being has a horizontal field of view of about 150° with one eye and of about 180° with two eyes.

HUMAN BRAIN

The brain is the most complex part of the human body. This three-pound organ is the seat of intelligence, interpreter of the senses, initiator of body movement, and controller of behavior.

The brain can be divided into three basic units:
- The forebrain,
- The midbrain, and
- The hindbrain

The **forebrain** is the largest and main thinking part of the brain. It has regions which receive sensory impulses from various receptors. Separate areas of the fore-brain are specialised for hearing, smell, sight and so on.
The **Midbrain** connects the forebrain to the hindbrain.
The **hindbrain** controls the body's vital functions such as respiration and heart rate.

➽CEREBRUM [Largest part of the human brain]
- It sits at the topmost part of the brain.
- It is the source of intellectual activities.
- It holds your memories, allows you to plan, enables you to imagine and think.
- It allows you to recognize friends, read books, and play games.
- It controls the voluntary motor actions.
- It is the seat of learning and memory.
- It is the site of sensory perceptions; like tactile and auditory perceptions.
- It is divided into two hemispheres; called cerebral hemispheres.

➽HYPOTHALAMUS
- It lies at the base of the cerebrum.
- It controls sleep and wake cycle (circadian rhythm) of the body.
- It also controls the urges for eating and drinking.
- It gets the adrenaline flowing during a test or job interview.

➽CEREBELLUM
- It lies below the cerebrum and at the back of the whole structure.
- It coordinates the motor functions.
- It is responsible for precision of voluntary actions and maintaining the posture and balance of the body.
- Example: When you are riding your bicycle; the perfect coordination between your pedaling and steering control is achieved by the cerebellum.

➽MEDULLA
- It forms the brain stem; along with the pons.
- It lies at the base of the brain and continues into the spinal cord.
- It controls various involuntary functions
- Example: heartbeat, respiration, size of the pupil, blood pressure, salivation and vomiting etc.

➽THALAMUS
- A major clearinghouse for information going to and from the spinal cord and the cerebrum.
- Cerebrospinal fluid (CSF) is a watery fluid that circulates through the brain's ventricles (cavities or hollow spaces) and around the surface of the brain and spinal cord.

THE ENDOCRINE SYSTEM

Hormones
The endocrine system is a collection of glands that secrete chemical messages we call hormones. These signals are passed through the blood to arrive at a target organ, which has cells possessing the appropriate receptor.
Exocrine glands (not part of the endocrine system) secrete products that are passed outside the body. Sweat glands, salivary glands, and digestive glands are examples of exocrine glands.
Hormones are grouped into three classes based on their structure:
1. steroids 2. Peptides 3. amines

The Nervous and Endocrine Systems
The pituitary gland (often called the master gland) is located in a small bony cavity at the base
of the brain. A stalk links the pituitary to the hypothalamus, which controls release of pituitary hormones. The pituitary gland has two lobes: the anterior and posterior lobes.
Too little or two much GH(Growth hormone) can cause **dwarfism or gigantism**, respectively.
Prolactin is secreted near the end of pregnancy and prepares the breasts for milk production.

II. THE POSTERIOR PITUITARY

ADH(Antidiuretic hormone) controls water balance in the body and blood pressure. Oxytocin is a small peptide hormone that stimulates uterine contractions during childbirth.

Thyroid secretion is usually higher in winter than in summer.

Endocrines: The Postal System of Communication and Co-Ordination

- Hormones are chemical substances manufactured by organs called endocrine glands or ductless glands. **Ductless glands** are also sometimes called 'exocrine glands'.

ENDOCRINE GLAND OF THE BODY

Adrenal gland

The adrenal glands (also known as suprarenal glands) are endocrine glands that produce a variety of hormones including adrenaline.

They are found above the kidneys.

Hypothalamus

The hypothalamus is a portion of the brain that contains a number of small nuclei with a variety of functions.

Function: link the nervous system to the endocrine system via the pituitary gland.

Pituitary gland

It is an endocrine gland about the size of a pea and weighing 0.5 grams in humans.

Hormones secreted from the pituitary gland help control:

- growth,
- blood pressure,
- certain functions of the sex organs,
- metabolism,
- pregnancy,
- childbirth,
- nursing,
- water/salt concentration,
- temperature regulation
- pain relief.

Thyroid

The thyroid gland, or simply the thyroid is one of the **largest endocrine glands** in the body.

It is found in the interior neck, below the Adam's apple.

- It secretes two hormones: triodothyro (T3) and tetraiodothysonine (T4), are called tyrosine. Both these hormones contain iodine.
- Hypothyroidism (hypo, 'under')–diminished thyroid activity. Hypothyroi-dism in childhood gives rise to a conditions called cretinism.

It controls

- **rate of use of energy sources, protein synthesis, controls the body's sensitivity to other hormones.**

Goiter– is called enlargement of the thyroid gland. It manifests itself as a swelling in the neck.

A goiter may be associated with increased, normal or descreased activity of the thyroid gland.

Government of India launched the Universal salt iodisation programme in 1986.

Pancreas

The pancreas is a glandular organ in the digestive system and endocrine system of vertebrates.

In humans, it is located in the abdominal cavity behind the stomach.

It produce several important hormones

- including insulin,
- glucagon,
- somatostatin, and
- pancreatic polypeptide which circulate in the blood.

The pancreas is also a **digestive organ**, secreting pancreatic juice containing digestive enzymes that assist digestion and absorption of nutrients in the small intestine. These enzymes help to further **break down** the **carbohydrates, proteins, and lipids in the chyme**.

Reduction on the quantity of effective insulin gives rise to diabetes mellitus (diabetes, siphon, mellitus of honey) commonly called simply diabetes.

Saliva: Tylene, Maltase
Gastric Juice: Pepsin, Renin
Pancreatic Juice: Trypsin, Amylase, Lipase
Intestinal Juice: Erepsin, Maltase, Lactase, Sucrase, Lipase

LYMPHATIC SYSTEM AND IMMUNITY

The Lymphatic System

- The spleen serves as a reservoir for blood, and filters or purifies the blood and lymph fluid that flows through it.
- If the spleen is damaged or removed, the individual is more susceptible to infections.

Immunity

- **Antibodies:** Antibodies are a type of protein molecule known as **immunoglobulins**.

BLOOD

- Blood is a fluid connective tissue.
- The quantity of blood in the human's body is 7% of the total weight.
- pH value of blood is 7.4.
- There is an average of 5-6 litres of blood in human body.
- Female contains half litre of blood less in comparison to male.
- It also fights infection and regulates temperature.

Blood cells are produced in BONE MARROW

The main functions of blood are to transport oxygen, carbon dioxide, water, nutrients, hormones and waste around the body. Blood also fights infection and regulates temperature.

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Blood has four components:
1. Plasma
2. Red blood cells
3. White blood cells
4. Platelets

PLASMA -> Liquid portion of Blood
- It constitutes for about 54% of our blood. 92% of it is water.
- maintaining a satisfactory blood pressure
- volume to supplying critical proteins for blood clotting and immunity.
- medium for exchange of vital minerals such as sodium and potassium
- helps to maintain a proper pH (acid-base) balance in the body, which is critical to cell function.

RED BLOOD CELLS -> Carry oxygen
- Red blood cells are disc-shaped cells containing haemoglobin,
- haemoglobin (haem=iron-containing)
- Haemoglobin enables the cells to pick up and deliver oxygen to all parts of the body, then pick up carbon dioxide and remove it from tissues.
- Its life span is from 20 days to 120 days and are then broken down into pigments called bilirubin and biliverdin in the liver.
- Its destruction takes place in liver & spleen. Therefore, liver is called grave of RBC.
- they are made in the bone marrow,
- they have no nucleus,
- N.B. oxyhaemoglobin =oxygen rich haemoglobin,
- deoxyhaemoglobin=low oxygen haemoglobin

WHITE BLOOD CELLS -> Defend Body (Fighter)
- White blood cells, also called leukocytes
- White cells are the body's primary defense against infection.
- They can move out of the blood stream and reach tissues to fight infection.
- They are essential for good health.
- Its life span is from 1 to 2 days.
- White blood cells have nuclei and are also made in the bone marrow.

PLATELETS-> Responsible for clotting
Platelets are the cells that circulate within our blood and bind together when they recognize damaged blood vessels.

Study of blood = HEMATOLOGY

THE CIRCULATORY SYSTEM

HUMAN HEART
The human heart is an organ that pumps blood throughout the body via the **circulatory system**, supplying oxygen and nutrients to the tissues and removing carbon dioxide and other wastes.

The human heart has four chambers:
- The right atrium and right ventricle together make up the "**right heart**,"
- the left atrium and left ventricle make up the "**left heart**."
- A wall of muscle called the **septum** separates the two sides of the heart.
- **Valves prevent backflow,** keeping the blood flowing in one direction through the heart.

A double-walled sac called the ***pericardium*** encases the heart, which serves to protect the heart and anchor it inside the chest.
Between the outer layer, the **parietal pericardium**, and the inner layer, the **serous pericardium**, runs pericardial fluid, which lubricates the heart during contractions and movements of the lungs and diaphragm.

The heart's outer wall consists of three layers:-
- The outermost wall layer, or **epicardium,** is the inner wall of the pericardium.
- The middle layer, or **myocardium,** contains the muscle that contracts.
- The inner layer, or **endocardium,** is the lining that contacts the blood.

The **sinoatrial node** produces the electrical pulses that drive heart contractions.

HUMAN HEART FUNCTION

The heart circulates blood through two pathways:
1. The pulmonary circuit
2. The systemic circuit

In the pulmonary circuit, deoxygenated blood leaves the right ventricle of the heart via the pulmonary artery and travels to the lungs, then returns as oxygenated blood to the left atrium of the heart via the **pulmonary vein.**

In the systemic circuit, oxygenated blood leaves the body via the left ventricle to the aorta, and from there enters the arteries and capillaries where it supplies the body's tissues with oxygen. Deoxygenated blood returns via veins to the **vena cava,** re-entering the heart's right atrium.

The ***cardiovascular system*** circulates blood from the heart to the lungs and around the body via blood vessels.

Blockage of any artery can cause a heart attack, or damage to the muscle of the heart. A heart attack is distinct from cardiac arrest, which is a sudden loss of heart function that usually occurs as a result of electrical disturbances of the heart rhythm.

The heart contains electrical "pacemaker" cells, which cause it to contract — producing a heartbeat.
The aorta is the main artery leaving the heart.
The pulmonary artery is the only artery that carries oxygen-poor blood.

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The pulmonary artery carries deoxygenated blood to the lungs.
The veins have valves that prevent backflow of blood **Blood pressure.**

Important Points:

Aorta
The largest artery in the body. It carries oxygen-rich blood away from the heart to vessels that reach the rest of the body.

Atria
The chambers of the heart, to which the blood returns from the circulation.

Capillaries
The smallest of the body's blood vessels. Oxygen and glucose pass through capillary walls and enter the cells. Waste products such as carbon dioxide pass back from the cells into the blood through capillaries.

Cardiac Valves (Heart Valves)
Any of the four heart valves that regulate the flow of blood through the chambers of the heart.

Oxygenated Blood -> Oxygen-rich blood.

Deoxygenated Blood -> Oxygen-poor blood.

Heart Ventricles
The lower right and left chambers of the heart.

Interventricular Septum
Interventricular septum is the stout wall separating the lower chambers (the ventricles) of the heart from one another.

Lungs
One of a pair of organs in the chest that supplies the body with oxygen, and removes carbon dioxide from the body.

Myocardium
The muscular substance of the heart; the middle of the three layers forming the outer wall of the human heart.

Pulmonary Artery
The pulmonary artery and its branches deliver blood rich in carbon dioxide (and lacking in oxygen) to the capillaries that surround the air sacs.

Pulmonary Circulation
The circulation of the blood through the lungs.

Pulmonary Veins
The veins that return the oxygenated blood from the lungs to the left atrium of the heart.

Superior Vena Cava
The large vein that carries blood from the head, neck, arms, and chest to the heart.

Vena Cava
A large vein which returns blood from the head, neck and extremities to the heart.

Endothelium is the innermost layer of blood vessels that consists of just a single layer of cells.

Veins are blood vessels that carry blood to the heart in an even flow. They have thin walls large lumens and valves.

A pulse is the alternate contraction and relaxation of an artery as blood passes through it.

Blood pressure is the force blood exerts on the walls of blood vessels.

A sphygmomanometer is used for measuring blood pressure(normally 120/80 mmHg)

Atherosclerosis is the hardening of artery walls due to a build-up of fatty deposits.

Smoking causes heart rate and blood pressure to increase. Diet high in saturated fats increase blood pressure and atherosclerosis. Exercise helps lower blood pressure.

Blood Groupings

- Father of Blood Grouping : Karl Landsteiner
- He discovered A, B and O blood groups
- Decastello and Sturle discovered AB blood groups

RH factor

- It is a blood antigen found in RBC
- A person can be Rh+ or Rh- depending upon the presence of Rh factor in RBC
- Rh+ can receive blood from both Rh+ and Rh- but Rh- can receive blood only from Rh- only

Blood transfusion techniques was developed by Dr. James Blundell.

THE REPRODUCTIVE SYSTEM

- Asexual reproduction allows an organism to rapidly produce many offspring without the time and resources committed to courtship, finding a mate, and mating.
- The hydra produces buds; starfish can regenerate an entire body from a fragment of the original body.

Sexual Reproduction

- In sexual reproduction new individuals are produced by the fusion of haploid gametes to form a diploid zygote.
- Sperm are male gametes, ova (ovum singular) are female gametes.
- Meiosis produces cells that are genetically distinct from each other.
- Fertilization is the fusion of two such distinctive cells.

Human Reproduction and Development

- Gonads are sex organs that produce gametes. Male gonads are the testes, which produce sperm and male sex hormones. Female gonads are the ovaries, which produce eggs (ova) and female sex hormones.

The Male Reproductive System

- Sperm production begins at puberty and continues throughout life, with several hundred million sperm being produced each day. Once sperm form they move into the epididymis, where they mature and are stored.

External Genitals

- The female external genitals are collectively known as the vulva.

Sexually Transmitted Diseases
STDs can affect the sex partners, fetus, and newborn infants. STDs are grouped into three categories.

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Category One
STDs that produce inflammation of the urethra, epididymis, cervix, or oviducts. Gonorrhea and chlamydia are the most common STDs in this category. Both diseases can be treated and cured with antibiotics, once diagnosed.
Category Two
STDs that produce sores on the external genitals. Genital herpes is the most common disease in this class. Symptoms of herpes can be treated by antiviral drugs, but the infection cannot be cured. Syphilis is a bacterially caused infection, and can, if left untreated, cause serious symptoms and death. However, the disease is curable with antibiotics.
Category Three
This class of STDs includes viral diseases that affect organ systems other than those of the reproductive system. AIDS and hepatitis B are in this category. Both can be spread by sexual contact or blood. Infectious individuals may appear symptom-free for years after infection.
The separation of intercourse from pregnancy uses methods blocking one of the three stages of reproduction
- release and transport of gametes
- fertilization
- implantation

PLANT REPRODUCTION

Flowers
Reproductive parts of the flower are the stamen (male, collectively termed the androecium) and carpel (often the carpel is referred to as the pistil, the female parts collectively termed the gynoecium).

Pollen
Pollen grains contain the male gametophyte (microgametophyte) phase of the plant. They are produced by meiosis of microspore mother cells that are located along the inner edge of the anther sacs (microsporangia).

Pollination
The transfer of pollen from the anther to the female stigma is termed pollination. This is accomplished by a variety of methods:
Entomophyly is the transfer of pollen by an insect.
Anemophyly is the transfer of pollen by wind.
Other pollinators include birds, bats, water, and Humans.

Double Fertilization
The process of pollination being accomplished, the pollen tube grows through the stigma and style toward the ovules in the ovary.
Fruit
The ovary wall, after fertilization has occurred, develops into a fruit. Fruits may be fleshy, hard, multiple or single.
Note:- Seeds germinate, and the embryo grows into the next generation sporophyte.

THE DIGESTIVE SYSTEM
Stages in the Digestive Process
1. MOVEMENT : propels food through the digestive system
2. SECRETION : release of digestive juices in response to a specific stimulus
3. DIGESTION : breakdown of food into molecular components small enough to cross the plasma membrane
4. ABSORPTION: passage of the molecules into the body's interior and their passage throughout the body
5. ELIMINATION: removal of undigested food and wastes

The human digestive system, is a coiled, muscular tube (6-9 meters long when fully extended) stretching from the mouth to the anus.

The Mouth and Pharynx
Chemical breakdown of starch by production of salivary amylase from the salivary glands into glucose. This mixture of food and saliva is then pushed into the pharynx and esophagus.

The STOMACH

Gastric juice in stomach contains:
- **hydrochloric acid(HCl),**
- **pepsinogen, and**
- **mucus**

Functions of Hydrochloric Acid (HCl) :
- It kills microorganisms.
- It lowers the stomach pH to between 1.5 and 2.5.
- It lowers pH of the stomach so pepsin is activated.

Pepsinogen is an enzyme that starts protein digestion and controls the hydrolysis of proteins into peptides.

Chyme, the mix of acid and food in the stomach, leaves the stomach and enters the small intestine.

Alcohol and aspirin are absorbed through the stomach lining into the blood.

Epithelial cells secrete mucus that forms a protective barrier between the cells and the stomach acids.

ULCERS
Peptic ulcers result when these protective mechanisms fail.
Bleeding ulcers result when tissue damage is so severe that bleeding occurs into the stomach.
Perforated ulcers are life-threatening situations where a hole has formed in the stomach wall.
At least 90% of all peptic ulcers are caused by Helicobacter pylori.
Other factors, including stress and aspirin, can also produce ulcers.

THE SMALL INTESTINE

- The small intestine is the major site for digestion and absorption of nutrients.
- it is about 22 feet (6.7 meters) long.

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Parts of small intestine:

1. **Duodenum**
2. **Jejunum**
3. **Ileum**

- Sugars and amino acids go into the bloodstream via capillaries in each villus.
- Glycerol and fatty acids go into the lymphatic system.
- Starch and glycogen are broken down into maltose by small intestine enzymes.
- **Maltose, sucrose, and lactose** are the main carbohydrates present in the small intestine; they are absorbed by the microvilli.
- Enzymes in the cells convert these disaccharides into monosaccharides that then leave the cell and enter the capillary.
- **Gluten enteropathy** is the inability to absorb gluten, a protein found in wheat.
- Fat digestion is usually completed by the time the food reaches the ileum (lower third) of the small intestine. Bile salts are in turn absorbed in the ileum and are recycled by the liver and gall bladder.

LIVER

The liver produces and sends bile to the small intestine via the hepatic duct.

Bile contains cholesterol, phospholipids, bilirubin, and a mix of salts.

In addition to digestive functions, the liver plays several other roles:
(1) detoxification of blood;
(2) synthesis of blood proteins;
(3) destruction of old erythrocytes and conversion of haemoglobin into a component of bile;
(4) production of bile;
(5) storage of glucose as glycogen, and its release when blood sugar levels drop; and
(6) production of urea from amino groups and ammonia.

GALL BLADDER

It **stores excess bile** for release at a later time.
We can live without our gall bladders, in fact many people have had theirs removed. The drawback, however, is a need to be aware of the amount of fats in the food they eat since the stored bile of the gall bladder is no longer available.
Glycogen is a polysaccharide made of chains of glucose molecules.
In plants starch stored in the form of glucose, while animals use glycogen for the same purpose.

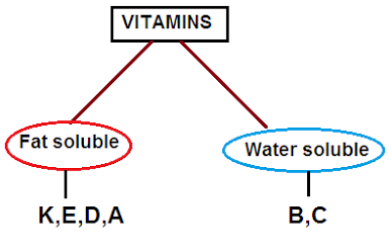
Low glucose levels in the blood cause the release of hormones, such as glucagon, that travel to the liver and stimulate the breakdown of glycogen into glucose, which is then released into the blood(raising blood glucose levels).
When no glucose or glycogen is available, amino acids are converted into glucose in the liver.The process of deamination removes the amino groups from amino acids. Urea is formed and passed through the blood to the kidney for export from the body. Conversely, the hormone insulin promotes the take-up of glucose into liver cells and its formation into glycogen.
Liver Diseases Jaundice occurs when the characteristic yellow tint to the skin is caused by excess hemoglobin breakdown products in the blood, a sign that the liver is not properly functioning.
Hepatitis A, B, and C are all viral diseases that can cause liver damage.
Cirrhosis: Cirrhosis of the liver commonly occurs in alcoholics, who place the liver in a stress situation due to the amount of alcohol to be broken down. Cirrhosis can cause the liver to become unable to perform its biochemical functions. **Chemicals responsible for blood clotting are synthesized in the liver, as is albumin, the major protein in blood.**

(D) The Large Intestine

The large intestine is made up by the colon, cecum, appendix, and rectum.

VITAMINS

Vitamins: Vitamins are organic molecules required for metabolic reactions. They usually cannot be made by the body and are needed in trace amounts. Vitamins may act as enzyme cofactors or coenzymes.



VITAMIN K (Phylloquinone)

SOURCE
Green leafy vegetables, soya beans. The human body can also produce Vitamin K through germs in the colon(part of small intestine).
FUNCTION

- Helps blood clotting, prevent over bleeding
- Maintains health of the liver

SYMPTOMS OF DEFICIENCY
Uncontrol bleeding from wounds due to clotting difficulty
SYMPTOMS OF EXCESS
Can lead to liver damage

VITAMIN E (Tocopherol)=Beauty Vitamin

It is also known as Antisterility Vitamin.
SOURCE
Green leafy vegetables, whole-wheat cereals, nuts, sprouts, egg yolk

FUNCTION

- Maintains normal conditions of cells, and healthy skin and tissues
- Protects red blood cells
- Antioxidation
- Enhance immunity

SYMPTOMS OF DEFICIENCY

New born infants: haemolytic anaemia
Adults: weakness

SYMPTOMS OF EXCESS
- Low thyroxine level
- Fertility Desease
- Headache, dizziness, fatigue
- Stomach discomfort, poor appetite

VITAMIN D (Calciferol)=(Sunhine Vitamin)
SOURCE
Egg yolk, liver, cod liver oil, fish. Our skin also produces Vitamin D when exposed to sunlight.

FUNCTION
- Helps body absorb and utilize calcium and phosphorus, so as to maintain bones, teeth and brain healthy
- Maintains normal calcium level in blood

SYMPTOMS OF DEFICIENCY
Children: rickets
Adults: Osteomalacia, Osteoporosis

SYMPTOMS OF EXCESS
- Calcified cartilage
- High calcium level in the blood causes abnormal heart beat and damage to organs such as kidneys
- Vomiting, diarrhea
- Sore eyes
- Itchy skin

VITAMIN A (Retinol)
SOURCE
Dairy products, cod liver oil,liver, dark green and yellow vegetables and fruits
FUNCTION
- Maintains eye health
- Promotes growth and development, maintains healthy bones and teeth
- Enhances the protection and regeneration of cells and mucous membrane
- Maintains healthy respiratory and intestinal tracts
- Maintain healthy hair, nails and skin

SYMPTOMS OF DEFICIENCY
- Night blindness, dry eyes
- Dry skin
- Stomach discomfort
- Poor growth
- Weak bones and teeth

SYMPTOMS OF EXCESS
- Dry, scaly, peeling, and itchy skin, rash
- Hair loss
- Poor appetite, fatigue
- Vomiting, stomach discomfort
- Liver injury
- Headache, bone pain
- Nervousness, irritability

VITAMIN B

VITAMIN B1 (Thymine)
SOURCE
sprouts, yeast
Desease
Beri-beri

VITAMIN B2 (Ryboflabin)
SOURCE
sprout, present in cow's milk(yellowish)
Desease
Cheilosis, ulceration

VITAMIN B6 (Pyridoxine)
FUNCTION
It is responsible for rememeber dreams.
SYMPTOMS OF DEFICIENCY
Anaemia
Nervousness, insomnia, depression
Muscle cramps

VITAMIN C (Ascorbic acid)
SOURCE
Citrus fruits (orange, grapefruit, lemon), strawberry, black current, kiwi fruit, tomato, green leafy vegetables, green pepper

FUNCTION
- Helps synthesize collagen; promotes the growth and repair of cells, gum, teeth, blood vessels and bones
- Helps healing after operation and injury
- Helps calcium and iron absorption
- Enhances immunity

SYMPTOMS OF DEFICIENCY
- Scurvy
- Gum
- inflammation and bleeding, fall of teeth
- Susceptibility to skin bleeding, burst of capillary vessels
- Weakness, fatigue
- Bone pain, swollen and aching joints

SYMPTOMS OF EXCESS
- Abdominal pain
- Diarrhea
- Kidney stone

In smokers and drinkers vitamin C is absent.

TYPES OF VITAMINS:

Vitamin	Chemical Name	Food Sources	Deficiency Diseases
A	Retinol	Milk, eggs, fish, butter, cheese and	Night blindness, Skin dryness.

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		liver.	
B1	Thiamine	Legumes, whole grain, nuts.	Beri-beri.
B2	Riboflavin	Egg, milk, cheese, nuts, bread products.	Inflammation of tongue, sores in the corners of the mouth.
B3	Niacin or Nicotinic acid	Meat, fish, pea nuts, whole grain.	Skin disease, diarrhoea, depression, dementia.
B5	Pantothenic acid	Eggs, liver, dairy products.	Fatigue, muscle cramp. Pellagra
B6	Pyridoxine	Organ meats, cereals, corn.	Anaemia, kidney stones, nausea, depression.
B12	Cyanocobalamin	Meat, fish.	pale skin, constipation, fatigue.
C	Ascorbic acid	Oranges, tomatoes, sweet and white potatoes.	Scurvy, anaemia, ability to fight infections decreases.
D	Calciferol	Direct sunlight, fish oils, eggs.	Rickets, osteomalacia.
E	Tocopherol	Vegetable oils, olives, tomatoes, almonds, meat, eggs.	Neurological problems, problems of reproductive system.
K	Phylloquinone or Naphthoquinone	Soyabeans, green leafy vegetables, dairy products, meat.	Failure to clot blood.

Minerals: Iron(for hemoglobin), iodine (for thyroxin), calcium (for bones), and sodium (nerve message transmission) are examples of minerals.

Digestion in Animals Facts from NCERT

- Starfish feeds on animals covered by half shells of calcium carbonate.
- The saliva breakdown the starch into sugar.
- Liver situated in the upper part of the abdomen on the right side. It is the largest gland in the body.
- In the process of digestion carbohydrates get broken down into simple sugars such as glucose. Fats into fatty acid and glycerol. Proteins into amino acid.
- The grass is rich in cellulose a type of carbohydrates human cannot digest cellulose.
- Amoeba is a microscopic single celled organism found in pond water. When it sense food, it pushes out one or more finger like projection (pseudopodia) around the food particles and engulf it and then the food becomes trapped in a food vacuole.

THE EXCRETORY SYSTEM

Excretory Systems in Various Animals

Components of this system in vertebrates include the kidneys, liver, lungs, and skin.

Water and Salt Balance

The excretory system is responsible for regulating water balance in various body fluids.

Osmoregulation refers to the state aquatic animals are in: they are surrounded by freshwater
and must constantly deal with the influx of water.

Excretory System Functions

1. Collect water and filter body fluids.
2. Remove and concentrate waste products from body fluids and return other substances to body fluids as necessary for homeostasis.
3. Eliminate excretory products from the body.

The Human Excretory System

The urinary system is made-up of the kidneys, ureters, bladder, and urethra. The nephron, an evolutionary modification of the nephridium, is the kidney's functional unit.

The nephron has three functions:

1. Glomerular filtration of water and solutes from the blood.
2. Tubular reabsorption of water and conserved molecules back into the blood.
3. Tubular secretion of ions and other waste products from surrounding capillaries into the distal tubule.

Kidney Stones

In some cases, excess wastes crystallize as kidney stones. They grow and can become a painful irritant that may require surgery or ultrasound treatments.

Kidney Functions

1. Maintain volume of extracellular fluid
2. Maintain ionic balance in extracellular fluid
3. Maintain pH and osmotic concentration of the extracellular fluid.
4. Excrete toxic metabolic by-products such as urea, ammonia, and uric acid.

Kidneys, The Fascinating Filters

Nephron is the filteration unit of kidney.

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- Excessive eating (polyphagia), excessive drinking (polydipsia) and too much of urine (polyusia) are three cardinal symptoms of diabetes. The 'hypothesis' produces a chemical substance called 'antidivretic hormone (ADH).
- The Adrenal gland maintains the regulating salt in the body and is located in an organ lying just over the kidney. As soon as the salt (sodium) concentration become just a little less than normal, it release into the blood stream a substance called 'aldosterone'.
- Renal transplantation or dialysis (artificial kidney) are the supportive measure when the damage to kidney reaches a certain point.

Hormone Control of Water and Salt

Water reabsorption is controlled by the antidiuretic hormone (ADH) in negative feedback.

ADH is released from the pituitary gland in the brain. Dropping levels of fluid in the blood signal the hypothalamus to cause the pituitary to release ADH into the blood. ADH acts to increase water absorption in the kidneys.

Aldosterone, a hormone secreted by the kidneys, regulates the transfer of sodium from the nephron to the blood. When sodium levels in the blood fall, aldosterone is released into the blood, causing more sodium to pass from the nephron to the blood. This causes water to flow into the blood by osmosis. Renin is released into the blood to control aldosterone.

PHOTOSYNTHESIS

- The raw materials of photosynthesis, water and carbon dioxide, enter the
- cells of the leaf, and the products of photosynthesis, sugar and oxygen leave the leaf.
- Water enters the root and is transported up to the leaves through specialized plant cells known as xylem.
- Carbon dioxide cannot pass through the protective waxy layer covering the leaf (cuticle), but it can enter the leaf through an opening flanked by two guard cells.
- Likewise, oxygen produced during photosynthesis can only pass out of the leaf through the opened stomata.

Chlorophyll and Accessory Pigments

- Chlorophyll, the green pigment common to all photosynthetic cells absorbs all wavelengths of visible light except green, which it reflects to bedetected by our eyes.
- Black pigments absorb all of the wavelengths that strike them.

DIVERSITY IN LIVING ORGANISMS

Differentiation in Plants

Thallophyta

- The plants in this group are commonly called algae. These plants are predominantly aquatic.
  E.g. : Spirogyra, cladophora and chara.

Bryophyte

- These are called the amphibians of the plant kingdom. There is no specialized tissue for the conduction of water and other substances from one past of the plant body to another.
  E.g. : moss (fumaria) and marchantia

Pteridophyta

- In this group plant body is differentiated into roots, stem and leaves and has specialized tissue for the conduction of water and other substances from one plant of the plant body to another. Eg- marsilea, ferns, and horse tails.

Gymnosperms

- The plant of this group bear naked seeds and one usually perennial and evergreen and woody. Eg- pines such as deodar.

Angiosperms

- The seeds develop inside an organ which is modified to become a fruit. These are also called flowering plants.
- Plant embryos in seeds have structures called cotyledons. Cotyledons are called seed leaves because in many instances they emerge and become green the seed germinates.
- Plants with seeds having a single cotyledon are called monocotyledons or monocots. Eg- paphiopedilum.
- Plants with seeds having two cotyledons are called dicots. E.g-Egipomoce.

Pisces

- These are fish. They are cold blooded and their hearts have only two chambers unlike the four that human have.
- Some with skeletons made entirely of cartilage, such as shark.
- Some with skeleton made of both bones and cartilages such as tuna or rohu.

Amphibian

- They have mucus glands in the skin and a three chambered heart. Respiration is through either gills or lungs. **Eg:** frogs, toades, and salamanders.

Reptilia

- These animals are cold blooded have scales and breathe through lungs. While most of them have a three chamber heart while crocodile have four heart chambers. Eg- snakes, turtles, lizards and crocodiles.

Aves

- These are warm blooded animals and have a four chambered heart. They lay eggs. They breathe through lungs. All birds fall in this category.

Mammalia

- They are warm blooded animals with four chambered hearts.

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- They have mammary glands for the production of milk to nourish their young. They produce live young ones.
- However a few of them like platypus and the echidna(Spiny Anteater) lay eggs.

MICRO ORGANISMS

Micro organisms are classified into four major groups. These groups are bacteria, fungi, protozoa and algae.

- **Viruses:** They reproduce only inside the cells of the host organisms which may be bacterium, plants or animal.
- Common cold, influnenza and most coughs are caused by viruses.
- Serious diseases like polio and chickenpox are also caused by viruses.
- Micro organisms may be single celled like bacteria, Some algae and protozoa. Multicellular such as algae and fungi.
- Micro organisms like amoeba can live alone, while fungi and bacteria may live in colonies.

Advantages of Micro Organisms

- Making of curd and breed:-milk is turned into curd by bacteria. The bacterium "lactobacillus" promotes the formation of curd.
- Yeast reproduces rapidly and produces CO2 during respiration. Bubbles of the gas fill the dough and increase its volume.
- Yeast is used for commercial production of alcohol and wine. For this purpose yeast is grown as natural sugars present in grains like barley, wheat, rice, crushed fruit juice etc.
- This process of conversion of sugar into alcohol is known as fermentation. Lewis Pasteur discovered fermentation.

Medicinal Use of Micro Organisms

- The medicine which kills or stops the growth of diseases causing microorganism is called antibiotics.
- Streptomycin, tetracycline and erythromycin are some of the commonly known antibiotics. Which are made from fungi and bacteria.
- Alexander Fleming discovered penicillin.
- Antibiotics are not effective against cold and flu as these are caused by virus.

Vaccine

- Edward Jenner discovered the vaccine for small pox.

Harmful Microorganisms

- Disease-causing microorganisms are called pathogens.
- Microbial diseases that can spread from an infected person to a healthy person through air water, food, or physical contact are called communicable diseases. i.e.-cholera, common cold, chicken pox and TB.
- Female anopheles mosquito which carries the parasite of malaria.
- Female aedes mosquito acts as carrier of dengu virus.
- Robert Koch discovered the bacteria (bacillus anthracis) which causes anthrax disease.

Common Methods of Preserving Food in our Homes

- **Chemical method:** salt and edible oils are the common chemical generally used.
- Sodium benzoate and sodium metabisulphite are common preservatives. These are also used in the Jams and squashes to check their spoilage.

Preservation by sugar :

- Sugar reduces the moisture context which inhibits the growth of bacteria which spoil food.
- Use of oil and vinegar prevents spoilage of pickles become bacteria cannot live in such an environment.
- Pasteurized milk : the milk is heated to about 70°C for 15 to 30 seconds and then suddenly chilled and stored.
- This process was discovered by Louis Pasteur. It is called **pasteurisation.**

SOME IMPORTANT TABLES

Important Facts about Human Body:

Largest and strongest Bone in the body:	Femur (thigh bone)
Smallest Bone in the body:	Stapes in ear
Volume of Blood in the body:	6 litres (in 70 kg body)
Number of Red Blood Cells(R.B.C.):	1. In male: 5 to 6 million/cubic mm
	2. In female: 4 to 5 million/cubic mm
Life span of Red Blood Cells(R.B.C.):	100 to 120 days
Life span of White Blood Cell(W.B.C.):	3-4 days
Time taken by R.B.C. to complete one cycle of circulation:	20 seconds
Other name of Red Blood Cell (R.B.C.):	Erythrocytes
Largest White Blood Cells:	Monocytes
Smallest White Blood Cells:	Lymphocyte
Who discovered Blood Group:	Karl Landsteiner
Blood Platelets count:	150,000 - 400,000 platelets per micro litre
Haemoglobin (Hb):	1. In male: 14-15 gm/100 c.c. of blood
	2. In female: 11-14 gm/100 c.c. of blood
Hb content in body:	500-700 gm

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pH of Urine:	6.5-8
pH of Blood:	7.36-7.41
Volume of Semen:	2-5 ml/ejaculation
Normal Sperm Count:	250-400 million/ejaculation
Menstrual cycle:	28 days
Menopause age:	45-50 years
Blood clotting time:	3-5 minutes
Weight of Brain:	1300-1400 gm in human adult
Normal Blood Pressure (B.P.):	120/80 mm Hg
Universal blood donor:	O
Universal blood recipient:	AB
Average body weight:	70 kg
Normal body temperature:	37 degree Celsius
Breathing Rate at rest:	12-16/minute
Number of Spinal Nerves:	31 pairs
Largest Endocrine Gland:	Thyroid gland
Normal Heart Beat at rest:	72 beats per minute
Largest Gland:	Liver
Largest Muscle in the body:	Gluteus Maximus or Buttock Muscle
Smallest Muscle in the body:	Stapedius
Largest Artery:	Aorta
Largest Vein:	Inferior Vena Cava
Largest and longest Nerve:	Sciatic Nerve
Longest Cell:	Neurons (nerve cells)
Minimum distance for proper vision:	25 cm
Pulse rate:	72 per minute
Thinnest Skin:	Eyelids
Weight of Heart:	200-300 gm

Common Drugs and Their Usage

Drugs/Medicine	Use
Anaesthetics	It is a drug that induces insensitivity to pain.
Antiflatulent	It is a drug that reduces intestinal gas
Antipyretics	It is a drug used to lower body temperature.
Analgesics	It is a drug that is used to prevent or relieve pain. Eg. Aspirin.
Antibiotics	It is a drug that inhibits the growth of or destroys micro-organisms. Eg. Penicillin.
Antihistamines	It is a drug used to relieve symptoms of cold and allergies.
Antispasmodic	It is a drug used to relieve spasm of involuntary muscle usually in stomach.
Antacid	It is a drug used for preventing or correcting acidity, especially in the stomach.
Diuretics	It is a drug that promotes the production of urine.
Laxative	It is a drug used to provide relief in constitpation.

TYPES OF DISEASES

List of Diseases caused by Virus, Bacteria, Protozoa and Worm:

Disease caused by Viruses:

1. Chicken pox - It is caused by Varicella-zoster virus.
2. Small Pox - It is caused by Variola virus.
3. Common Cold -It is caused by Rhinovirus.
4. AIDS (Acquired Immunono Deficiency Syndrome) - It is caused by Human Immunodeficiency Virus (HIV).
5. Measles -It is caused by Measles virus.
6. Mumps -It is caused by Mumps virus.
7. Rabies - It is caused by Rabies virus (Rhabdoviridae family).
8. Dengue fever -It is caused by Dengue virus.
9. Viral encephalitis - It is an inflammation of the brain. It is caused by rabies virus, Herpessimplex, polio virus, measles virus, and JC virus.

Disease caused by Bacteria

1. Whooping Cough - It is caused by a bacterium called Bordetella pertussis.
2. Diphtheria - It is caused by Corynebacteriumdiphtheriae.
3. Cholera - It is caused by Vibrio cholerae.
4. Leprosy - It is caused by Mycobacterium leprae.
5. Pneumonia-It is caused by Streptococcus pneumoniae.
6. Tetanus -It is caused by Clostridium tetani.
7. Typhoid - It is caused by Salmonella typhi.
8. Tuberculosis -It is caused by Mycobacterium tuberculosis.
9. Plague - It is caused by Yersinia pestis.

DISEASE CAUSED BY PROTOZOANS:

1. Malaria	It is spread by Anopheles mosquitoes. The Plasmodium parasite that causes	it is a single	celled parasite that multiplies

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	malaria is neither a virus nor a bacteria		in red blood cells of humans.
2.Amoebic dysentery	It is caused by Entamoebahistolytica.		
3.Sleeping sickness	It is caused by Trypanosomabrucei.		
4. Kala azar	It is caused by Leishmaniadonovani.		

DISEASE CAUSED BY WORMS

1. Tapeworm	They are intestinal parasites. It cannot live on its own. It survives within the intestine of an animal including human.	
2. Filariasis	It is caused by thread	like filarial nematode worms. Most cases of filaria are caused by the parasite known as Wuchereriabancrofti.
3. Pinworm	It is caused by small, thin, white roundworm called Enterobiusvermicularis.	

VITAMINS AND MINERAL DEFICIENCY DISEASES

1. Anaemia	It is caused due to deficiency of mineral Iron.
2. Ariboflavinosis	It is caused due to deficiency of Vitamin B2.
3. BeriBeri	It is caused due to deficiency of Vitamin B.
4. Goitre	It is caused due to deficiency of Iodine.
5. Impaired clotting of the blood	It is caused due to deficiency of Vitamin K.
6. Kwashiorkor	It is caused due to deficiency of Protein.
7. Night Blindness	It is caused due to deficiency of Vitamin A.
8. Osteoporosis	It is caused due to deficiency of mineral Calcium.
9. Rickets	It is caused due to deficiency of Vitamin D.
10. Scurvy	It is caused due to deficiency of Vitamin C.

COMMON HUMAN DISEASES AND AFFECTED BODY PART

Disease	Affected Body Part
AIDS	Immune system of the body
Arthritis	Joints
Asthma	Bronchial muscles
Bronchitis	Lungs
Carditis	Heart
Cataract	Eye
Cystitis	Bladder
Colitis	Intestine
Conjunctivitis	Eye
Dermatitis	Skin
Diabetes	Pancreas and blood
Diphtheria	Throat
Eczema	Skin
Goitre	Thyroid gland
Glossitis	Tongue
Glaucoma	Eye
Gastritis	Stomach
Hepatitis	Liver
Jaundice	Liver
Malaria	Spleen
Meningitis	Brain and spinal cord
Myelitis	Spinal cord
Neuritis	Nerves
Otitis	Ear
Osteomyelitis	Bones
Paralysis	Nerves and limb
Pyorrhoea	Teeth
Peritonitis	Abdomen
Pneumonia	Lungs
Rhinitis	Nose
Rheumatism	Joints
Tuberculosis	Lungs
Tonsillitis	Tonsils
Trachoma	Eye

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BLOOD GROUP AND ITS CLASSIFICATION

K. Landsteiner: Classified human beings (1900) in four groups on the basis of the reaction of their blood: A, B, AB and O.

Blood group	*Carries antigen*	*Carries antibody*	*Can donate blood to*	*Can receive blood from*
A	**A**	**B**	**A,AB**	**A,O**
B	**B**	**A**	**B,AB**	**B,O**
AB	**A,B**	**None**	**Only AB**	**Universal Accepter**
O	**None**	**A,B**	**Universal donor**	**Only O**