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HIGHER SECONDARY FIRST YEAR

Last minute study questions

ZOOLOGY

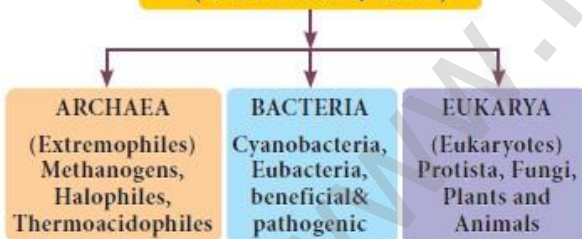


Carolus Linnaeus is the father of modern taxonomy, which is the system of classifying and naming organisms. One of his contributions was the development of hierarchical system of classification of nature.



Today, this system includes eight taxa: domain, kingdom, phylum, class, order, family, genus, and species.

THREE DOMAINS (Carl Woese, 1977)



Thermus aquaticus is a bacterium which can tolerate high temperatures. The first DNA polymerase enzyme was isolated from *T. aquaticus* it is used in PCR (Polymerase Chain Reaction) for DNA amplification.

THE THREE-DOMAIN SYSTEM

ARCHAEA BACTERIA EUKARYA

The traditional Five - Kingdom system

Monera Protista Fungi Plantae Animalia

The Six - Kingdom system

Bacteria Archaea Protista Fungi Plantae Animalia

THE SEVEN - KINGDOM SYSTEM

EUBACTERIA ARCHAEA BACTERIA PROTOZOA CHROMISTA FUNGI PLANTAE ANIMALIA

CURD IS ONE OF THE BEST SOURCES OF PROBIOTICS, WHICH ARE FRIENDLY BACTERIA THAT CAN IMPROVE OUR HEALTH. E.G. *LACTOBACILLUS* SP.

Table 1.1 Five Kingdom Classification

Salient features	KINDS OF KINGDOM				
	Monera	Protista	Fungi	Plantae	Animalia
Cell type	Prokaryotic	Eukaryotic	Eukaryotic	Eukaryotic	Eukaryotic
Cell wall	Non-cellulose structure	Present in some	Present	Present	Absent
Body organisation	Cellular	Cellular	Multicellular Tissue	Tissue Organ	Tissue Organ Organ system
Mode of nutrition	Autotrophic Heterotrophic	Autotrophic Heterotrophic	Heterotrophic	Autotrophic	Heterotrophic



In July, 2017, a 9 years old boy discovered a new Freshwater species of Jellyfish in the Kodaikanal lake, Tamilnadu.



A newly discovered Himalayan forest thrush bird was named after the birdman of India, Ornithologist Dr. Salim Ali. The name of the bird is "*Zoothera salimalii*". A fruit bat is also named after him "*Latidens salimalii*".

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Automated species identification tools

It consists of Cyber tools. For example: ALIS, DAISY, ABIS, SPIDA, Draw wing, etc.

ALIS → Automated Leafhopper Identification System.

DAISY → Digital Automated Identification System.

ABIS → Automatic Bee Identification System.

SPIDA → Species Identified Automatically (spiders, wasp and bee wing characters).

Draw wing → Honey bee wing identification.

Filariasis has been a major public health problem in India next only to malaria. The disease was recorded in India as early as 6th century B.C. by the famous Indian physician, Susruta in his book **Susruta Samhita**. In 7th century A.D., Madhavakara described signs and symptoms of the disease in his treatise 'Madhava Nidhana' which holds good even today. In 1709, Clarke identified elephantoid legs in Cochin. The **microfilariae** in the peripheral blood was first identified by Lewis in 1872 in Calcutta (Kolkata).

Table. 1 Comparison of chordates and non-chordates

Chordates	Non-chordates
Notochord is present	Notochord is absent
Dorsal, hollow and single nerve cord	Double ventral solid nerve cord
Pharynx perforated by gill slits	Gill slits absent
Heart is ventrally placed	Heart is dorsal or laterally placed or absent
A post anal tail is present	A post anal tail is absent
Alimentary canal is placed ventral to the nerve cord	Alimentary canal is placed dorsal to the nerve cord

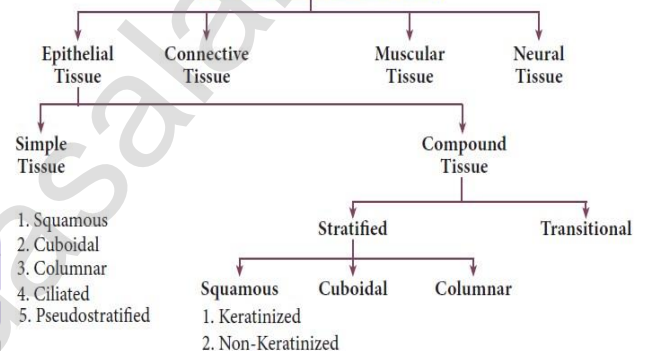
Hooded Pitohui

(*Pitohui dichrous*)

The Hooded Pitohui is a songbird found in the rain forests of New Guinea. The first poisonous bird to be documented. A neurotoxin called Homobatrachotoxin is found in its skin and feathers, causes numbness and tingling in those touching the bird.



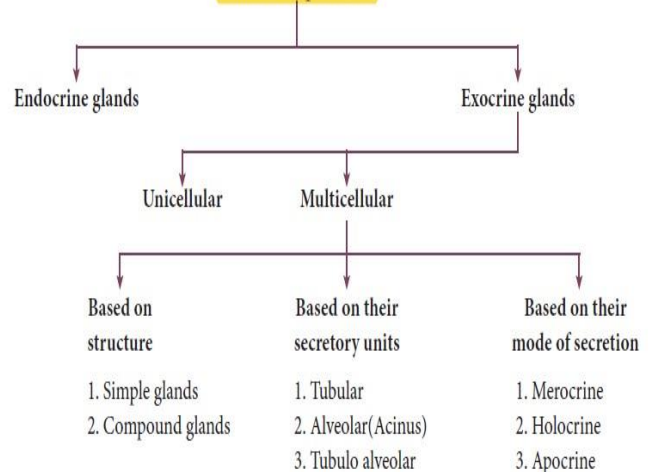
Classification of Animal Tissues



Important epithelial tissue disorders:

Eczema, Psoriasis, Epithelial carcinoma and severe asthma

Glandular Epithelium



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Important connective tissue disorders: (Heritable types)

1. Ehler's -Danlos syndrome - Defect in the synthesis of collagen in the joints, heart valves, organ walls and arterial walls.
2. Stickler syndrome - Affects collagen and results in facial abnormalities.
3. Rhabdomyosarcoma - Life threatening soft tissue tumour of head, neck and urinogenital tract.

Autoimmune connective tissue disorders

1. Rheumatoid arthritis: The immune cells attack and inflame the membranes around the joints. It can also affect heart, lungs and eyes.
2. Sjogren's syndrome: Progressive inability to secrete saliva and tears.

Diseases of Nervous System:

1. Parkinson's disease: A degenerative disorder of the nervous system that affects movement, often including tremors.
2. Alzheimer's disease: It is a chronic neurodegenerative disease which includes the symptoms of difficulty in remembering recent events, problems with language, disorientation and mood swings.

Excretory System

Excretion is the process of elimination of metabolic waste products from the body. In earthworm, excretion is effected by segmentally arranged, minute coiled, paired tubules called nephridia. There are three types of nephridia; (i) pharyngeal or

Regeneration



Earthworms have most of their important organ in the first 20 segments.

If earthworm gets cut after the 20th segment, the anterior half can regenerate, while the posterior half shall disintegrate after some time.



One of the fastest moving land insects is the cockroach. They can move as fast as

5.4 Km per hour.

Table 4.2: Differences between male and female cockroach

S.No.	Character	Male cockroach	Female cockroach
1.	Abdomen	Long and narrow	Short and broad
2.	Segments	In the abdomen, all nine segments are visible	In the abdomen, all seven segments are visible
3.	Anal styles	Present	Absent
4.	Terga	7 th tergum covers 8 th tergum	7 th tergum covers 8 th and 9 th terga
5.	Brood pouch	Absent	Present
6.	Wings	Extends beyond the tip of abdomen	Extends up to the end of abdomen

Nervous system

The nervous system of cockroach consists of a nerve ring and a ganglionated double ventral nerve cord, sub-oesophageal ganglion, circum-oesophageal connectives and double ventral nerve cord (Figure 4.13). The nerve ring is present around the oesophagus in the head capsule and is formed by the supra-oesophageal ganglion called the 'brain'. The brain is mainly a

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Table 4.3: Differences between a Frog and Toad

Characters	Frog	Toad
Family	Ranidae	Bufonidae
Body shape	Slender	More Bulky
Legs	Longer	Shorter
Webbed feet	present	Absent
Skin	Smooth and moist skin	Dry skin covered with wart like glands.
Teeth	Maxillary and vomerine teeth.	Teeth absent.
Egg formation	Lays eggs in clusters.	Lays eggs in strings.

Nobel Prize for the year 2005 was awarded to Robin Warren and Barry Marshall for the discovery of *Helicobacter pylori* which causes peptic ulcer.

DO YOU KNOW?

Bicarbonates in the saliva make the pH 5.4 to 7.4. If the bicarbonates level in saliva is reduced the saliva becomes acidic and the tooth enamel may get dissolved.

DO YOU KNOW?

Allergy is caused by allergens. When we enter a polluted area, immediately we start sneezing and coughing. The allergens in that place affect our respiratory tracts and the responses to the allergens start within minutes. Allergens provoke an inflammatory response. A common manifestation of allergy is Asthma.

DO YOU KNOW?

N.I. Lunin discovered vitamins but the name vitamin was given by Dr. Funk (1912). The first vitamin isolated was B1 by Dr. Funk. The first vitamin produced by fermentation process using, *Acetobacter* bacteria is Vitamin C.

White Blood Cells

White blood cells (leucocytes) are colourless, amoeboid, nucleated cells devoid of haemoglobin and other pigments. Approximately 6000 to 8000 per cubic mm of WBCs are seen in the blood of an average healthy individual. The different types of WBCs are shown in Figure 7.2. Depending on the presence or absence of granules, WBCs are divided into two types, granulocytes and agranulocytes.

Rh factor is a protein (D antigen) present on the surface of the red blood cells in majority (80%) of humans. This protein is similar to the protein present in Rhesus monkey, hence the term Rh. Individuals who carry the antigen D on the surface of the red blood cells are Rh⁺ (Rh positive) and the individuals who do not carry antigen D, are Rh⁻ (Rh negative). Rh factor compatibility is also checked before blood transfusion.

Table 5.2 Water soluble vitamins

Vitamins	Functions	Symptoms of Deficiency
B ₁ (Thiamine)	Involved in carbohydrate metabolism. Act as a coenzyme	Beriberi: affects muscular, nervous and cardiovascular system
B ₂ (Riboflavin)	Acts as coenzyme in oxidation and reduction reactions	Inflammation, soreness and fissures in the corners of the mouth, lips and tongue. Loss of appetite. Skin and eye disorder.
B ₃ (Pantothenic acid)	Acts as coenzyme A and is essential for the metabolism of fats and carbohydrates	Gastrointestinal disorders, anaemia, Burning feet syndrome, etc.
B ₄ (Choline)	Precursor for acetylcholine	Fatty liver.
B ₅ (Niacin / Nicotinic acid)	Derivatives of coenzymes	Pellagra (4D Syndrome) characterised by dermatitis, diarrhoea and dementia (mental deterioration) and death.
B ₆ (Pyridoxine)	Haemoglobin formation, brain, heart and liver activities	Dermatitis, convulsions, muscular twitching and anaemia.

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HEART BEAT- Rhythmic contraction and expansion of heart is called heart beat. The contraction of the heart is called systole and the relaxation of the heart is called diastole. The heart normally beats 70-72 times per min in a human adult. During each cardiac cycle two sounds are produced that can be heard through a stethoscope.

7. 4. 4 Electrocardiogram (ECG)

An electrocardiogram (ECG) is a simple test that records the electrical activity of the heart over a period of time using electrodes placed on the skin, arms, legs and chest. It records the changes in electrical potential across the heart during one cardiac cycle. The special flap of muscle which initiates the heart beat is called as sinu-auricular node or SA node in the right atrium. It spreads as a wave of contraction in the heart. The waves

Blood Pressure

Blood pressure is the pressure exerted on the surface of blood vessels by the blood. This pressure circulates the blood through arteries, veins and capillaries. There are two types of pressure, the systolic pressure and the diastolic pressure. Systolic pressure is the pressure in the arteries as the chambers of the heart contracts. Diastolic pressure is the pressure in the arteries when the heart chambers relax. Blood pressure is measured using a sphygmomanometer (BP apparatus). It is expressed as systolic pressure / diastolic pressure. Normal blood pressure in man is about 120/80mm Hg.



First heart transplantation was performed in the year 1959. Human heart transplant was performed by Prof. Christian Bernard in South Africa in the year 1967, December 3 at Groote Schuur Hospital, Cape Town. Dr Anangipalli Venugopal was the first to perform heart transplant at AIIMS, India on August 3, 1994.



The world's first successful human kidney transplantation was performed from one twins to another by Joseph E. Murray and his colleagues at Peter Bent Brigham Hospital, Boston in 1954. The first ever human kidney transplant performed in India was done at the King Edward Memorial Hospital at Mumbai in May 1965, using a cadaver donor in a non-renal failure patient who had had hypernephroma. The first successful live donor kidney transplant in India was done at Christian Medical College Hospital, Vellore in January 1971 by Dr. Johnny and Dr. Mohan Rao.

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9.1 Types of movement

The different types of movements that occur in the cells of our body are amoeboid, ciliary, flagellar and muscular movement.

Amoeboid movement - Cells such as macrophages exhibit amoeboid movement for engulfing pathogens by pseudopodia formed by the streaming movement of the cytoplasm.

Ciliary movement - This type of movement occurs in the respiratory passages and genital tracts which are lined by ciliated epithelial cells.

Flagellar movement - This type of movement occurs in the cells which are having flagella or whip-like motile organelle. The sperm cells show flagellar movement.

Muscular movement - The movement of hands, legs, jaws, tongue are caused by the contraction and relaxation of the muscle which is termed as the muscular movement.

CTS-(Carpal Tunnel Syndrome) -

The narrow passage (tunnel) bounded by bones and ligaments in the wrist gets narrowed and pinches the median nerve. This syndrome is mostly seen among the clerks, software professionals and pregnant women and people who constantly play or text in mobile phones.

Muscle pull

Muscle pull is actually a muscle tear. A traumatic pulling of the fibres produces a tear known as sprain. This can occur due to sudden stretching of muscle beyond the point of elasticity. Back pain is a common problem caused by muscle pull due to improper posture with static sitting for long hours.

10.1 Neural System

The neural system comprises of highly specialized cells called **neurons**, which can detect, receive, process and transmit different kinds of stimuli. Simple form of neural system as nerve net is seen in lower invertebrates. The neural system of higher animals are well developed and performs the following basic functions:

- **Sensory functions**- It receives sensory input from internal and external environment.
- **Motor functions**- It transmits motor commands from the brain to the skeletal and muscular system.
- **Autonomic functions**- Reflex actions.

Table 10.4 Differences between rod and cone cells

Rod cells	Cone cells
Rods are responsible for vision in dim light	The cones are responsible for colour vision and works best in the bright light.
The pigment present in the rods is rhodopsin, formed of a protein scotopsin and retinal (an aldehyde of vitamin A)	The pigment present in the cones is photopsin, formed of opsin protein and retinal.
There are about 120 millions rod cells	There may be 6-7 millions cone cells
Rods are predominant in the extra fovea region	Cones are concentrated in the fovea region

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DO
YOU
KNOW?

Insulin: The half life period of insulin (in plasma) is 6 minutes. It is cleared from the circulation within 10-15 minutes.

DO
YOU
KNOW?

"WHITE COAT EFFECT"

White coat hypertension, more commonly known as white coat syndrome, is a phenomenon in which the patients exhibit a blood pressure level above the normal range, in a clinical setting, though they do not exhibit in other settings.

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Preparation of Blood Smear

The examination of peripheral dry blood smear is a very important laboratory test as it is possible to

- Estimate approximately the number of cellular components
- Study the morphology of these components
- Observe the presence of blood parasites
- Study the response of the body to various diseases

Erythro
Neutro
Basc

Types of cultivable fish

Cultivable fish are of 3 types (Figure 13. 8).

- Indigenous or native fresh water fishes (Major carps, *Catla*, *Labeo*, *Clarias*)
- Salt water fishes acclimatized for fresh water (*Chanos*, Mullet).
- Exotic fishes or imported from other countries (Common carps)

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