STRUCTURAL ORGANIZATION IN ANIMALS

Rana tigrana
Cold-blooded

Male Reproductive System
- **Testes** : Pair of yellowish ovoid structures, adheres to upper part of kidneys by mesorchium.

Female Reproductive System
- A pair of ovaries situated near kidneys.
- No functional connection with kidneys by mesorchium.

Fertilization
- External in water.
- Development involves a larval stage, tadpole.
- Tadpole → Adult.

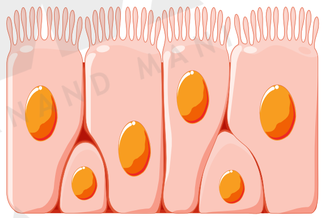
Circulatory System
-Heart: 3-Chambered, 2 Artia + 1 Ventricle.
-Ventricle opens into conus arteriosus on ventral side of heart.
-Blood from heart is carried to all body parts by arterial system.

Blood Vascular System
-Heart + Blood vessels + Blood.
-RBCs are nucleated and red in color

Lymphatic System
-Lymph + Lymph channel + Lymph nodes.
-Lymph has No RBC's

Digestive System
-Short alimentary canal + digestive glands.
-Mouth → Buccal cavity → Stomach → Intestine → rectum → cloaca.
-Digested food is absorbed within intestine and undigested solid waste is removed via cloaca.

Respiratory System
Land- Buccal cavity skin and lungs as pulmonary respiratory organs.
Water- Skin acts as cutaneous respiratory organ.

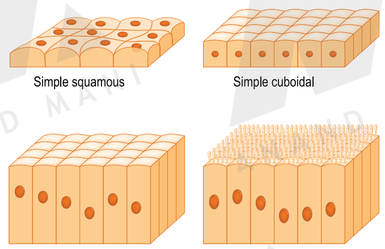


Animal tissue

Cell Junction
- **Tight-** check the flow between cells.
- **Gap-** helps in between cells' communication.
- **Adhering-** cements the cells together.

1) Epithelial Tissue

EPITHELIAL CELLS



i) Glandular: Columnar and cuboidal are specialized and for Secretion.
- **Unicellular** – goblet cells of alimentary canal
- **Multicellular** – Salivary glands
- **Endocrine** – Pituitary, thymus
- **Exocrine** – Sweat & Sebaceous glands

ii) Simple: made of single layer of cells.

Squamous
- function is exchange of material, filtration & little absorption.
- lining cavity organs like heart, lungs etc.

Cuboidal
- Absorption & Secretion.
- tubules and ducts of glands & surface of ovary.

Columnar
- Secretion & absorption.
- Gastrointestinal tract.

Ciliated
- Movement of mucous & egg.
- Respiration tract & fallopian tube.

iii) Compound

Squamous
- Protection against abrasion.
- Epidermis of skin, hair & oral cavity.

Columnar
- Protection & Secretion.
- Epiglottis & mammary glands.

Cuboidal
- help in mechanical & chemical stress.
- Sweat glands, and Conj & female urethra.

Pseudo – Stratified
- Protection & movevment
- Salivary glands, trachea, and male urethra.

2) CONNECTIVE TISSUE

LOOSE	DENSE	SPECIALIZED
- Areolar - Adipose	- Regular - Irregular	- Lymph - Blood - Bones - Cartilage

3) NEURAL TISSUE

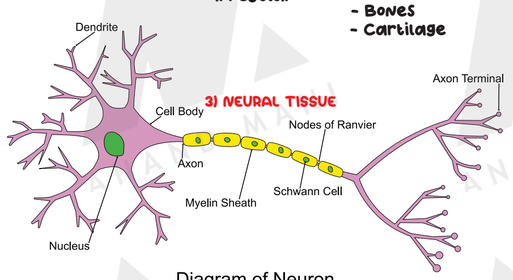
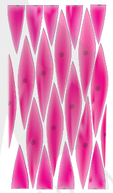


Diagram of Neuron

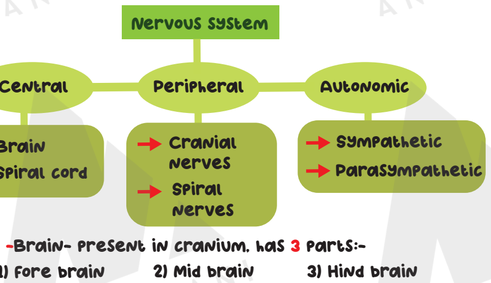
4) MUSCULAR TISSUE
- **Skeletal/ Striated** – Long & cylindrical present in-limbs, tongue & pharynx
- **Smooth / Unstriated** – walls of visceral organ – Spindle shaped with pointed end
- **Carciac** – Long & cylindrical – Uninucleate – Present in Heart


Skeletal Muscle Tissue


Smooth Muscle Tissue

LOREM IPSUM


Cardiac muscle tissue



-Brain- present in cranium, has **3** parts:-
1) Fore brain 2) Mid brain 3) Hind brain

Common Indian varieties
Peretima and Lumbricus

Reproductive System (Hermaphrodite)
Male- 2pairs of testes (10th and 11th).
-Vas differentia upto 18th segment.
-One pair of accessory gland in 17th and 19th segments.
-4 pairs of Spermathecae in 6th - 9th Segments.

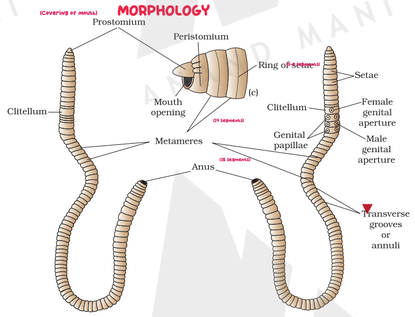
Female- 1 Pair of ovaries at 12th intersegmental septa of and 13th.
-Ovarian funnels beneath ovaries.
-Oviduct opens on 14th segment as female genital pore.

EXCRETORY SYSTEM
Excretory organ - Nephridia
-Integumentary - attached to the living of body wall from 3rd to end.
-Septal - present on both sides of intersegmental septa of 15th to end.
-Pharyngeal as- 3 Paired tufts in 4th – 6th segments.
-Nephridia regulate volume and composition of body fluids.
-They start as a funnel to connects excess fluid from coelomic chamber.
-Deliver body waste to body to body wall surface through pore.

Sensory System
- No eyes but sensitive to light & touch.
- Chemoreceptors 7 for response to chemical stimuli.
- Sense organs located on anterior part of body

Digestive System
1- 3 Segment → Terminal mouth opens in buccal cavity.
Muscular Pharynx → 5-7 Segment.
Oesophagus → 8-9 Segment.
Gizzard → helps in grinding soil and decaying leaves.
Stomach → 9-14 Segment - calciferous gland neutralizes humic acid in humus
Intestine → 15- last Segment - Open into Anus.
Typhlosole → Characterised by presence of internal medial fold of dorsal wall.

MORPHOLOGY
(Covering of setae)

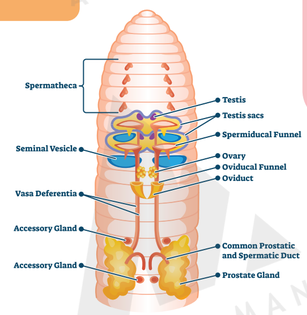


Nervous System
- Represent by Ganglia.
- Ganglia arranged on ventral paired nerve cord.
- The bifurcated nerve cord joins the cerebral ganglia dorsally to from nerve ring.
- cerebral ganglia commands muscular responses.

Respiratory System
- No Specialized breathing organ system.
- Exchange occurs via moist body surface into blood stream.

CLOSED CIRCULATORY SYSTEM
- has blood vessels, capillaries and heart.
- Contraction helps blood circulation in one direction.
- Smaller blood vessels supply the gut, nerve cord & body wall.
- Blood glands in 4th 5th & 6th segment produce blood cells & hems globin.

REPRODUCTIVE SYSTEM OF EARTHWORM



Periplaneta Americana
Nocturnal omnivores

Male Reproductive System
-Pair of testes at 4th-6th abdominal segment.
-Genital pouch has -1) Anus
2) Male genital pore
3) Phallomere
-Anal style present

Female Reproductive System
-Pair of ovaries at 2th-6th abdominal segment.
-Genital pouch has -1)Female gonopore
2)Spermathecal pores
3)Collateral glands
-Anal style absent.

Respiratory System
-Trachea, divided into tracheoles
-Tracheoles carry oxygen to all body parts.
-Trachea opens via Spiracles.

Vascular System
-Open type
-Blood,called Haemolymph has colorless plasma and haemocytes.
-Alary muscles help in circulation.
-Heart is dorsal and 13 chambered.

Alimentary canal
-Divided into - Foregut, midgut and hindgut.
-Mouth opens into → Pharynx → Oesophagus → Crop (food storing region) → Gizzard, where grinding of food occurs → Hepatic Caeca → Midgut → Malpighian tubules → Hindgut.
-Hindgut is divided into ileum, Colon and rectum.
-Rectum opens out through anus.

General Features
Body – Head – Prothorax
Thorax – Mesothorax
Abdomen – Metathorax
(covered by hard chitinous exoskeleton made of NAG)
-Head has compound eye, Ocellus and antennae.
-Has mosaic vision for Nocturnal vision