

18.11.19

# ANNELIDA

Bilaterally symmetrical, True coelomate, Tribloblastic, Metamerically and segmented. Segmented worm like animals called Annelida.

## General characters of Annelida:

- \* Soft, elongated and then cylindrical body.
- \* The muscle layers are thick in body wall that is called Dermomuscular.
- \* The body is divided number of segmented called metameres segmentation known as metamerism.
- \* The locomotory organ is setae. The blood vascular system is closed type.
- \* The Excretory system form of segmentally arrange are called nephridia.
- \* It is a Hermaphrodite animal.

Regeneration is common.

\* Gonoduct formed from coelom.

classification: 8

1. Polychaeta → Eg: Nereis
2. oligochaeta → Tubifex
3. Hirudinea → Leech
4. Archannelida → Nerilla
5. Echiuroidea → Bonellia
6. Sipunculoidea → Sipunculus
7. Priapulida → Periapulus
8. Myxos tomaria → Myxostoma.

### EARTHWORM

\* phylum : Annelida

\* class : oligochaeta

\* order : Neoligochaeta

### General characters

\* Earthworm is a segmented worm like animal. setae is present in skin. Earthworm live in moist

soil. They are burrowing in habit.

It is Detritus feeders. Long cylindrical body with pointed End. It grows 15 cm above. The body divided 100 to 120

segmented. that is called metameres.

Externally metamers are marked by circular grooves, that is called Annuli.

Internally marked by septa. This

type of segmentation is called

metamerism. No head. The first

segment is called peristomium [MOUTH].

They anteriorly prostomium has fleshy

slope. The last segmented is a Anal segment is otherwise called pygidium.

The adult earthworm is four segmented

from 14 to 17 or swollen into ring

like structure is called clitellum. The

clitellum has many glandular cells, that

cells secreted eggs. The clitellum

divides pre, middle and post clitellum.

setae:

\* skin contains setae 'f' shaped.

Each setae has three regions are

neck, nodulus and base. It is

used for locomotion.

Earthworm following Apertures:

1. Mouth
2. Anus
3. Female genital Aperture
4. Male genital Aperture
5. Spermathecal openings
6. Nephridio pores
7. Dorsal openings.

**MOUTH**  $\Rightarrow$  It is located anterior end.  
presence of prostomium and peristomium.

**ANUS**  $\Rightarrow$  It is located posterior end.

**FEMALE**  $\Rightarrow$  It is a pair of female genital aperture is present. The ventral side of 14<sup>th</sup> segment.

MALE  $\Rightarrow$  It is a pair of  
aperture is present. ventral side of  
18<sup>th</sup> segment.

SPERMATHECAL OPENINGS  $\rightarrow$  Three pairs  
of segment is present. 6 & 7,  
7 & 8 and 8 & 9.

NEPHRIDIOPORES  $\Rightarrow$  Minute pore present  
all over the skin, it is opening  
for nephridia.

DORSALPORES  $\Rightarrow$  It is a minute  
opening present in mid-dorsal opening  
located the segment of 10 & 11. It is  
opening of coelom.

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Body wall - Dermomuscular:

\* The body wall of earthworm  
is present in thick layer of skin  
that is called dermomuscular. The

body wall is triploblastic.

they are:

\* cuticle - it is an outermost layer.

\* Epidermis - it contains numerous chitinous bristles that is called setae.

\* circular muscle

\* longitudinal muscle

\* coelomic epithelium - this is an inner layer of body wall.

coelom or body cavity:

\* coelom is present in between the body wall and gut. True coelom is

present. True coelom lined by coelomic epithelium. Coelom is filled with

fluid of coelomic fluid. The coelomic fluid contains amoeboid cells, that

is called coelomic corpuscles.

Locomotion:

\* It moves help of muscles and

setae. contraction and relaxation  
method. [Backward and forward].

### Digestive system:

\* It forms Alimentary canal  
and digestive glands.

straight tube → Mouth → Peristomium

↓  
Buccal cavity ← Pharynx ← Oesophagus  
↓  
Gizzard → Intestine → Anal

\* Intestine fold into the lumen  
of intestine that is called typhlosole.

### Digestive gland:

\* It has two types of digestive  
gland is present. They are:

1. Pharyngeal gland
2. Intestinal gland.

### Pharyngeal gland:

\* It is around the pharynx.

It secretes the proteolytic enzyme.

Intestinal gland:  
\* It is found in the wall of intestine.  
It secretes the proteolytic, lipolytic and Amylolytic enzymes.

Feeding:  
\* The earthworm swallows a large amount of soil.

Digestion:  
\* Intercellular digestion is taken place in Intestine.

\* Intracellular digestion is taken place in epithelial cells of Intestine.

Absorption:  
\* It takes place in Intestine.  
Typhlosole increase the absorption.

Egestion:  
\* The undigested material



collected the intestine pass out to anus, that is called worm castings.

## circulatory system

\* It is a closed type. It is formed blood, blood vessels, hearts.

### Blood:

\* Reddish in colour formed plasma and corpuscles.

\* corpuscles are amoeboid colourless and nucleated.

\* plasma contain red pigment is called haemoglobin.

### Blood vessels:

\* Two main blood vessels present:

1. Dorsal - Above the alimentary canal pair of valves.

2. ventral - Below the intestine

is present. valves absent.

### Heart:

\* Heart are muscular Pumping organ.

\* It is eight pair of heart present. it is located at the segment of 6 to 13. They connect dorsal vessels to ventral vessels. They pump blood dorsal vessels to ventral vessels.

### Respiration system:

\* Respiratory organ are absent.

Respiration takes place the skin.

It is called cutaneous respiration.

Exchange of gas through diffusion.

### Excretion system:

\* Excretion is carried out

by coiled duct called Nephridia.

Each nephridium is coiled duct.

one end of duct open into

coelom. by funnel like structure

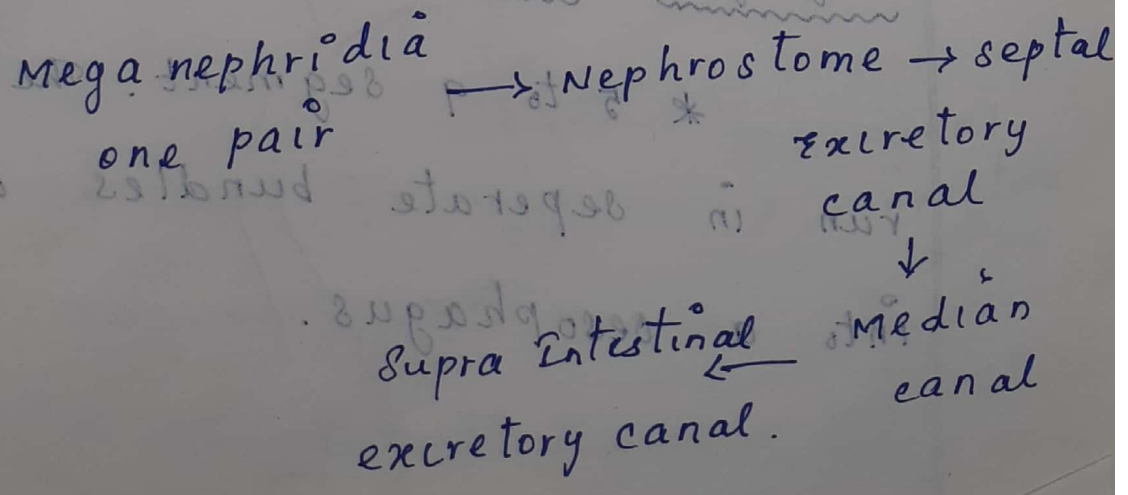
called Nephrostome. so other end of opens to a outside by nephridiophore.

This type of nephridium is called meta nephridium. Three types of Nephridia is present.

1. Mega nephridium
2. Micro nephridium
3. pharyngeal nephridium.

Mega Nephridia:

\* 19<sup>th</sup> segment, one pair is present. Nephrostome arises a narrow duct is called septal excretory canal. It opens into a mid-dian canal called supra intestinal excretory canal.



Micro Nephridia:

micro nephridia <sup>open</sup> → Nephridiopore

↓  
Integumentary  
(or)

Exonephric  
nephridia

\* Fingure shape tubels of

micro nephridia present of 14<sup>th</sup>

nephridia. The tube open to a  
outside seperate is called nephridio-  
phore.

\* They have to nephrostome

this are called Integumentary (or)

exonephric nephridia.

pharyngeal nephridia:

\* 5 to 9 segment. The duct

run in seperate bundles open

into a oesophagus.

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Nervous system:

\* It has a brain. Brain form 2 ganglia called cerebral ganglia.

Two ganglia fused together form bilobed mass. So they are situated

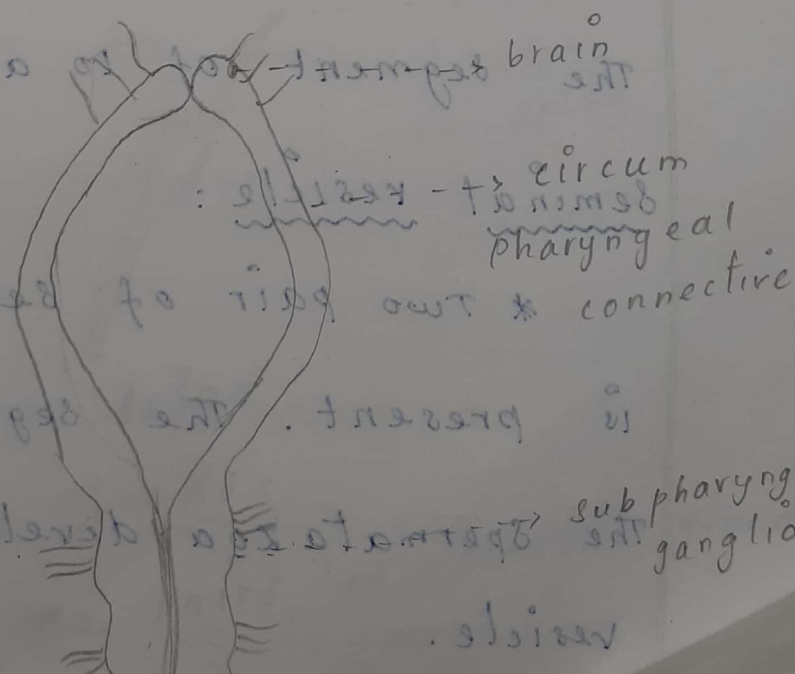
above the pharynx. So, they are called supra pharyngeal ganglia.

Below the pharynx is another pair of ganglia is present that is

called sub pharyngeal ganglia. The brain and sub pharyngeal ganglia

connected that is called circum

pharyngeal connectives.



## Reproductive system:

\* It is a Hermaphrodite.

Bath sexes are present in same animal.

## Male reproductive system:

\* It is formed testes.

1. testes

2. seminal vesicle

3. seminal funnel

4. vas deferens

5. penial setae

6. prostate glands.

## Testes:

\* Two pair of testis is present.

The segment of 10 and 11.

## Seminal vesicle:

\* Two pair of seminal vesicle

is present. The segment of 9 and 10

The spermatazoa develop in seminal vesicle.

Seminal funnel:

\* Two pair of seminal funnel

is present. The segment of 10 and 11

vas deferens:

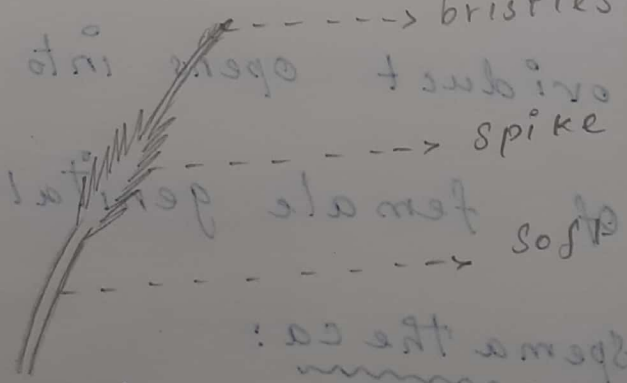
\* Two vas deferens is present.

It starts from 10<sup>th</sup> segment. The vas deferens opens to a 18<sup>th</sup> segment of pair of male genital aperture.

penial setae:

\* A pair of setae is present.

Each male genital aperture. They are used copulation. The setae consists of soft, spike and numerous bristles.



setae

prostate glands:

\* The pairs of prostate gland

is present. The segment of 18.

Each gland much coiled. The

spermatazoa cement the bundles

that is called spermatospores.

Female reproductive system:

\* ovaries, oviduct and

spermatheca is present

ovaries:

\* The pair of ovaries present.

The segment of 13.

oviduct

\* The pair of oviduct is

present. The segment of 14. The

oviduct opens into a 14<sup>th</sup> segment

of female genital aperture.

Spermatheca:

\* Three pair of sac like

structure that is called spermatheca

The segment of 7, 8 and 9. The



spermatheca serve to store of  
spermatazoa.

copulation:

\* It takes place between  
the two earthworm.

Development

\* Fertilization is external.

cacoon containing many egg. one  
or two eggs develop into a earthworm.

Remaining eggs fused as a food  
developing embryo. The young earthworm  
release out by rupture of cacoon.

Hirudinaria granulosa

phylum : Annelida

class : Hirudinea

order : Gnathobdellida

General characters:

\* Hirudinaria is commonly sucker, called cattle leech. It is multicellular,

bilaterally symmetrical, coelomate and triploblastic and then metamERICALLY segmented worm like animal. It

lives in pond, river and lake. It is

a Ectoparasite feeding on blood. It

is called Sanguivorous animal. It

is ribbon shaped. Dorsal surface

convex in shape and then ventral is

flattened. Leech grow in 35 cm. Body

is metamERICALLY. The anterior end



of loop like structure that is called prostomium. Each segment a number ring like structure called annuli. Leech has two suckers: Anterior and posterior. The anterior sucker is otherwise called oral sucker. The posterior sucker is otherwise called anal sucker. Leech has 5 pair of eyes present. one pair present in each segment. Each segment.

There are two receptors is present:

\* Segmented receptor

\* Annular receptor.

36 pairs of Annular receptor

is present in each annuli [18

pair dorsal and 18 pair of ventral].

MOUTH:

\* Mouth is situated in Anterior

sucker.

### ANUS:

\* It is present in posterior sucker.

### NEPHRIDIOPHORE:

\* 17 pairs of nephridiophores is present in last annuli. The segmented of 6 to 22.

### MALE GENITAL PORE:

\* It is present in ventral side of 10<sup>th</sup> segment.

### FEMALE:

\* It is present in 11<sup>th</sup> segment.

### Body wall:

- \* cuticle - outermost layer.
- \* Epidermis
- \* Dermis
- \* Muscular layer
- \* Botryoidal tissue.

cuticle → It is outermost layer.

thin and secreted by epidermis.

Epidermis → Below the cuticle. It

is formed of columnar cells.

Dermis → Below the epidermis found

connective tissue.

Muscular layer → Below the dermis.

Botryoidal tissue → Longitudinal

muscles, leech is a coelomate

animal, original cavity between

the body wall and gut. Filled

with special kind of tissue is

called Botryoidal tissue.

\* Leech contain special longitudinal

canals is present. that is called

Haemocoelic canals. It is filled

with blood like fluid that is

called Haemocoelic fluid. This type

of coelom is called Haemocoel.

## Locomotion:

\* Locomotary animal in two ways

- They are:
1. Looping or crawling
  2. Swimming movement.

## Looping:

\* This type of movement contraction and relaxation of muscle. Fixed anterior sucker and released the posterior sucker. The posterior sucker is fixed and anterior sucker is released. The movement is repeated.

## Swimming:

\* Swimming in water.

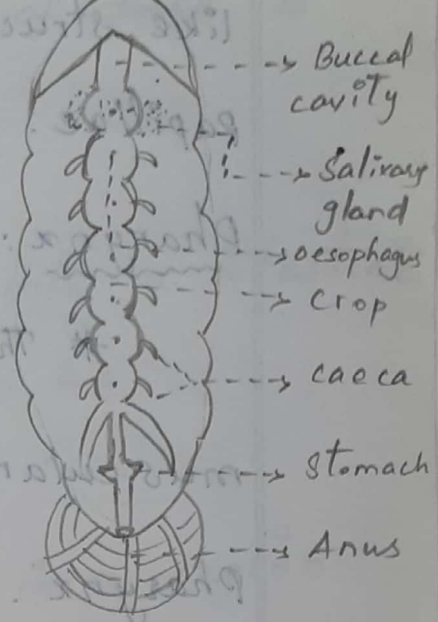
## Digestive System:

\* The Alimentary canal of leech is straight tube with mouth

to Anus. The Digestive System consists of following

parts:

1. Pre oral chamber & mouth
2. Buccal cavity
3. pharynx
4. oesophagus
5. crop
6. stomach
7. Intestine
8. Rectum & Anus.



Pre oral chamber & mouth:

\* cup like structure on the

ventral side of anterior sucker.

Buccal cavity:

\* Mouth leads to buccal

cavity. The buccal cavity contains

3 jaws.

1. Mid dorsal

2. Lateral

3. minute teeth is present

Each jaw contains 42 to 54 button

like structure. That is called salivary papillae. Its opening of salivary gland.

Pharynx:

\* The buccal cavity leads into a muscular chamber, that is called

pharynx. The salivary secretion contain hirudin. so that prevent the coagulation of blood.

oesophagus:

\* It is a short & narrow following pharynx.

crop:

\* The segment of 9 to 10 segment. It consists of 10 chambers.

The chamber communicate with

small apertures surrounded by a

sphincters. crop store enormous

quantity of blood.

stomach:



\* The last chamber of crop is called stomach.

Intestine:

\* stomach leads into a intestine.

The segment of 19 to 22.

Rectum:

\* Intestine end in a region

of rectum. The segment of 23 to 26.

Anus:

\* Rectum opens into outside

by Anus.

Digestion:

\* Blood is passed drop by drop into a stomach. It digested by a peptolytic Enzyme.

Absorption:

\* Digested blood Absorbed stored in by the intestine.

Respiration:

\* No special respiratory organ is present. Skin serve as a

respiratory organ. The capillaries contain in Haemocoelic fluid. The exchange of gas takes place by diffusion.

circulatory system:

\* There are no true blood vessels. Blood vessels are replaced by a canals. That is called Haemocoelic canals. It is called Haemocoelic fluid. Four canals are present.

1. one dorsal - Above the alimentary canal.

2. one ventral - Below the alimentary canal.

3. Two lateral - Either side of alimentary canal.

The four canals are connected together at the posterior end. There is no heart is present.

## Nervous System:

\* A brain above pharynx formed by a supra pharyngeal ganglia. Sub pharyngeal ganglia present below the pharynx. circum pharyngeal connectives each side of pharynx. Totally 21 segmented ganglia is present.

## Excretory system:

\* It is formed of nephridia. 17 pairs of nephridia is present. There are two nephridial is present.

1. Testicular
2. Pre-testicular

## Testicular nephridia:

\* This nephridia connected with testes. The segment of 12 to 22. This segment called testicular nephridia.

## NEPHRIDIUM:

\* Each nephridium has following

parts:

1. Initial lobe

2. Apical lobe

3. Inner lobe

4. Main lobe

5. vesicular duct

6. vesicle

7. nephridiopore.

Nephridium is a horse-shoe shaped.

Pre-testicular nephridia:

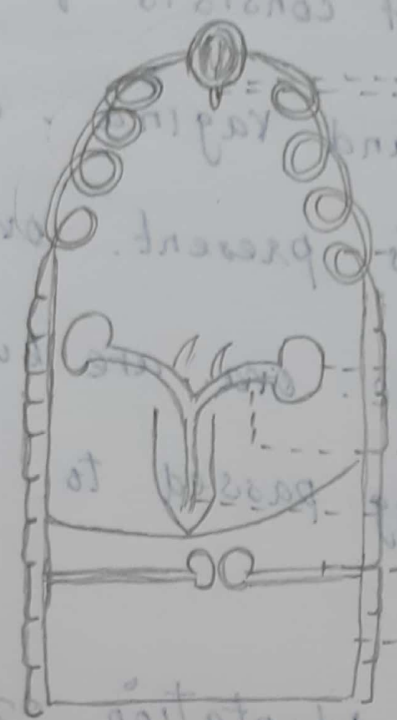
\* This nephridia resemble testicular nephridia except that initial lobe. They are not connected to testes.

Reproductive system:

\* It is a Hermaphrodite.

Male reproductive system:

\* The male reproductive system followed by.



The male reproductive system has following parts: Testes, vas efferens, vas deferens, Ejaculatory duct, Epididymis, Atrium. A pair of testes is present. The segment of 12 to 22. Testes arises a short duct that is called vas efferens. vas deferens become to form the Epididymis. It's store the sperm. The Epididymis follows the short narrow duct called ejaculatory duct. It's followed the Atrium is present

## Female reproductive system:

\* It consists of ovary, oviduct, ovarisac and vagina. Single pair of ovaries is present. ovaries are enclosed by ovarisac. ova are budded from ovary. so the egg passed to oviduct through vagina.