examples:
- Polychaeta: eg. Nereis :- (sandworm), Aphrodite (sea mouse), Chaetopterus (Paddle worm) ↳ bioluminent
Polynoe (scale worm) ↳ Bioluminent.

- Oligochaeta: eg. pheretima (Earthworm), Tubifex (Blood worm), Lumbricus (European earthworm) Megascolex (south indian earthworm).

- Hirudinea: e.g. Hirudinaria (cattle leech), Hirudo (Medicinal leech), Pontobdella (Fish leech or skate sucker), Acanthobdella (leech with setae)

- Archiannelida: e.g. Polygordius

Pheretima Posthuma

Q. Movement of earthworm against (towards earth gravity) soil surface is :-
(a) -ve Geotaxis (b) +ve Geotaxis

* External Features

1. External openings/Apertures
2. Setae
3. Clitellum
4. Segmentation
5. Color

Q. Septa (Muscular partition) found in all segments of earthworm except :-
(a) First Four (b) 1st, last & clitellar → setae
(c) last four (d) Post-clitellar segment

Q. clitellum of pheretima :-
(a) Non-glandular around of 14-15th seg.
(b) Glandular around of 14-16th seg.

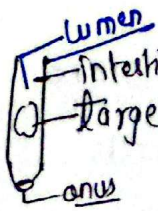
1. External opening/Apertures :- 8 types of ext. opening.
(1) Mouth (2) Anus (3) Dorsal pores (4) Male genital pores
(5) Spermathecal pores (6) Female genital pore (7) Nephridiopores
(8) Genital Papillae / Accessory Male genital papillae / copulatory papillae (2 pair (17 & 19th seg.)
↳ Accessory gland का opening

* Mouth: peristomium – 1st segment
→ cresentic shaped (half moon)
• mouth bearing 1st segment
↳ Proto Peristomium



↳ Boring organ
fig: Ant. end

* Anus: is located in last segment.
- anus bearing last segment is called Pygidium

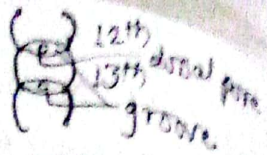


Note: In paramecium
cell- mouth → cytostome
a - anus → cytopyge / cytoproct

Note:
Stome → Mouth
Pyge - Anus

→ Post Typholosolar region - store & eject as worm cast/casting

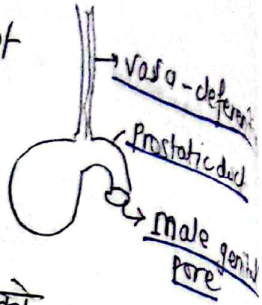
③ **Dorsal pores:** starts from 12th/13th segment.



→ are meant for discharge of coelomic fluid.
→ start intersegmental groove between 12/13th upto 2nd last segment
→ Number:- Single in each ~~segn~~ inter segmental grove.
→ communicate with coelomic chamber.

• Dorsal pores ले 2 वटा condition हुदा मात्र coelomic fluid discharge गर्छ
① If skin is dry
② If earthworm disturbed or irritate

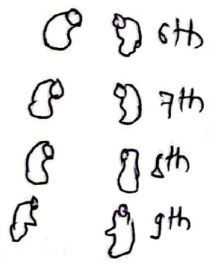
④ **Male Genital Pores:** 1 pair- ventro laterally in 18 segment ~~1 pair~~



Q. Each male genital pore recieve how many duct?
ⓐ 1 ⓑ 2 ✓ⓒ 3 ⓓ 4

• A pair of vasa-deferentia र single prostatic duct को common opening is → ~~male~~ male genital pores.
- Release sperms as well as prostatic fluid during copulation.
└ activation of sperms.

⑤ **Spermathecal pores:** 5/6th, 6th/7th, 7th/8th, 8th/9th.
- ventro laterally; 4 pairs



Spermatheca: 6th, 7th, 8th, 9th.
└ 4 pairs
└ भाडो र यसको मुखलाई spermathecal pores

→ Intersegmental groove between: 5th/6th, 6th/7th, 7th/8th, 8th/9th

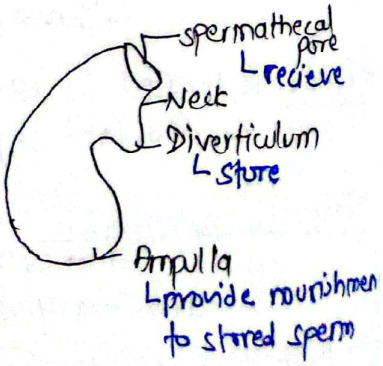
Copulation को Bela मा Male genital pore बाट जे release हुन्छ त्यसलाई recieve गर्ने काम opposite mating individual को ~~spermathecal~~ pores ले गर्छ।
└ recieve sperm & prostatic fluid during copulation

Q. Which of the following release sperm during copulation?
→ Male genital pores

Q. which of the following recieve sperm during copulation?
→ Spermathecal pores

Q. which of the following stores sperm during copulation?
→ Spermathecae

Note:
Diverticulum → store
Ampulla – Nourish



⑥ Female genital pores: single, mid-ventrally in 14th seg.
→ release ova during cocoon formation



⑦ Nephridiopores:

Q. Nephriodiopores and Nephrostomes are respectively found in:-
(a) septal and pharyngeal nephridia
(b) septal and integumentary nephridia
(c) Integumentary and septal nephridia
↳ यसको Mouth हो Nephrostome → जो coelom मा खुलेको छ।

→ Duct of each integumentary nephridium opens exteriorly through the nephridiopore
→ Location: Start from 7th segment. (यदि 7th दैन भने 3rd seg. लगाउने)
→ Number: 200 to 250 in each segment.
→ Meant for discharge of excretory waste.

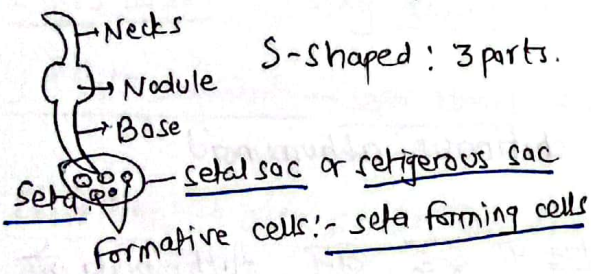
⑧ Genital papillae / copulatory papillae / Male genital papillae :-
→ openings of accessory glands
↳ 2 pairs each in 17th & 19th segment



→ Accessory gland को secretion लाई Release गर्छ।
↳ unite, attach or bind two earthworm during copulation.
→ Genital papillae ले attachment को बेलामा 2 वटा earthworm लाई hold गर्छ or, anchorage

Setae :- Locomotory organs of earthworm.

→



S-shaped : 3 parts.

→ Number → 80 - 100 in each segment - but in lumbricus → 1 or 2 pairs of setae in s
→ present in all segment except 1st, last and clittelar region (14, 15 & 16) [IOM

→  → Setea arranged in each segment in circular ring, the arrangement setae is Pericheatine
↳ around, hairlike seta

Q. Which is/are associated with locomotion in earthworm?
(a) Setae only (b) Muscles only (c) both (d) None

→ Muscle को contract हुँदा Setae चल्छ → Setae चल्दा Locomotion हुन्छ।

* Muscles which are involved in movement of setae are:-

1. protractor muscle
2. Retractor muscle
3. Circular muscle
4. Longitudinal muscle

> setae की movement

> associated with locomotion

Circular muscle	Longitudinal muscle
(1) Found among the body	(1) Found along the length of body
(2) is pigmented → contain porphyrin pigment	(2) non-pigmented.
(3) Due to contraction body becomes long which helps in forward movement.	(3) Due to contraction, body becomes short which helps to provide energy for next stroke

Protractor muscle: contracts:- setae - extension

Retractor muscle: contracts: setae - withdraw

Cuticle को KOH या Heat से उबाला, cuticle KOH या dissolve हुई लेकिन setae dissolve हुए।

↳ because it is made up of Nitrogenous substance called chitin.

So, it is chitinous

Q. Cuticle is:-

(a) chitinous (setae) (b) Non-chitinous

Q. Cuticle of pheretima:-

(a) chitinous and non-albuminoid (b) non-chitinous, albuminoid

Note: Earthworm की case में chitin → setae में हुई अन्य Arthropoda की case में chitin → cuticle में हुई।

It forms the exoskeleton of Arthropoda.

Coloration: ~~Dark~~ Dorsal side is more dark brown color की हुई due to porphyrin pigment.

Note:- The respiratory pigment of earthworm is Haemoglobin.

Q. Which one is odd?

(a) Haemoglobin (b) Porphyrin (c) Haemocyanin (d) Chlorocruorin

(a, c, d) - respiratory pigment

→ Porphyrin pigment is derived from Chlorophyll.

- Earthworm – feeds Humous → org. component in soil which is formed by decomposition of plants and animals.
  - plants → leaves → cellulose, Chlorophyll → absorb by intestine & change into porphyrin
  - animals → Arthropoda → Chitin — digest with help of chitinase enzyme
  - digest with help of cellulase enzyme

Note: Porphyrin pigment लाई Dorsal blood vessel को circular muscles मा deposit गर्छ। (so, pigmented muscle.)
↳ closed type circulation

Segmentation: True-metamerically segmented body | metamerism
↳ seg. both external & internal
- in ring: annulus (singular) → annuli (many)
- septum (singular) → septa (many)

Q. Septa found in all segment of earthworm except?
(a) 1st four segment (b) 1st, last and clitellar
(c) Post clitellar region (d) None



No-muscular partition so, septa absent

- 1st four segment मा septa absent due to Protusible buccal cavity and suctorial pharynx.
  ↳ extend हुन सक्ने
  ↳ भित्र तान्ने

Annuli को exception (ring) → clitellum

Q. What will happens when Buccal cavity is removed? (Sensory in nature → gustatoreceptor (Taste), → of Factoreceptor (Smell))
→ Earthworm dies due to starvation.

- 14, 15 & 16th → ring absent due to presence of thick glandular clitellum.
- 9 & 10th segment → septa absent due to Testes को area लाई फराकिलो बनाउनको लागि

Clitellum: → also known as cingulum
↳ encircling

→ is highly glandular, pink color, collar or ~~circle~~ gridle like structure.
→ is permanent, found around 14, 15, 16 segment तर clitellum throughout present life but breeding season मा मात्रै active हुन्छ।
but in leech → clitellum is only seen during breeding season.

- Function:- Cocoon formation
  ↳ जहाँ Fertil. पुरा हुन्छ।

→ On the basis of clitellum, Body of earthworm – has 3 types
1. ~~Pre-clitte~~ Pre-clitellum → 1th – 13th
2. ~~Clitter~~ Clittellar region → 14 to 16
3. Post-clitellar region → 17 to last

Q) A cocoon contains:-
(a) Many Fertilized eggs
(b) one Fertilized eggs
(c) one earthworm
(d) Many earthworm

Prostate gland की Region → 16 to 17 upto 20 or 21st segment.

Body wall → is moist, soft, elastic
→ outermost to inner → 4 layers
1. cuticle
2. Epidermis
3. Musculature
4. Coelomic epithelium / parietal peritonium

(1) Cuticle- is double layered, non-cellular, non-chitinous, albuminoid, composed by collagen fibres and polysaccharides.
→ is formed by Epidermis.
secreted by epidermis.

(2) Epidermis:- single layered, cellular
4 types
- supporting cells
- Glandular cells — Mucus cells, Albumin cells
- Basal cells
- receptor cells / sensory cells

(3) Musculatures:- Circular, Longitudinal, Protractor, Retractor

(4) Coelomic epithelium - also called parietal peritoneum.

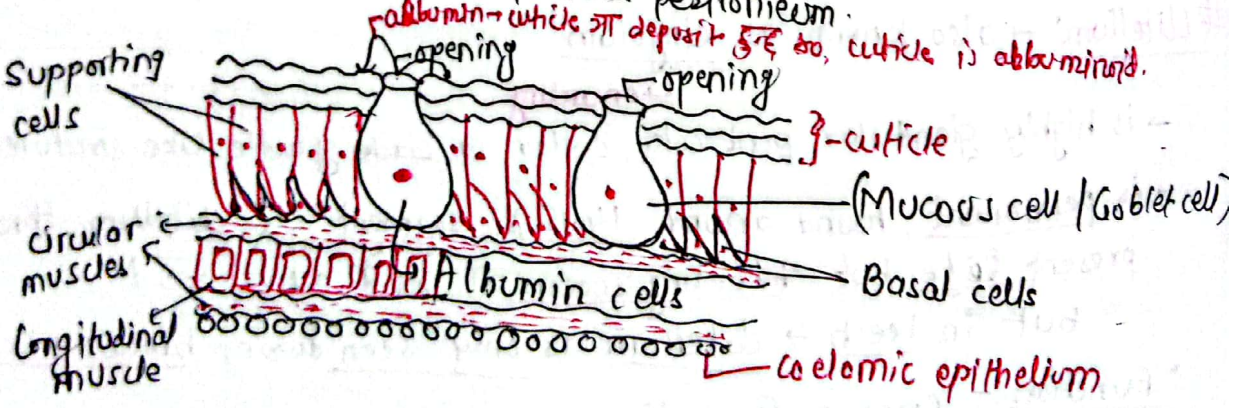


Fig:- T.S of body wall of Earthworm

(a) # Supporting cells → maximum no. in epidermis.
→ forms the main bulk of epidermis

(b) Glandular cells:
- Mucous (Goblet cells): to make skin moist for cutaneous respiration.
- albumin cells:- Nutritive in function.
↳ provide nutrition to the embryo (inside cocoon)

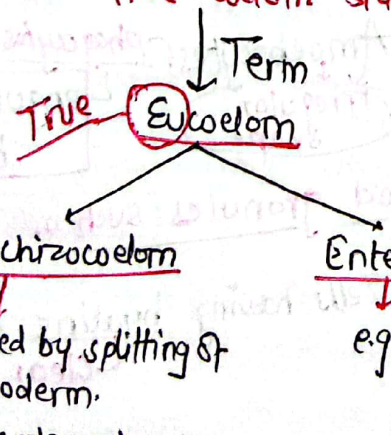
(c) Basal cells: located at the basal end of supporting and glandular cells.
→ called totipotent cells of earthworm.
↳ which are capable to giving rise of supporting and glandular cel

(d) Receptor cells / sensory cells:- present in epidermis.
↳ both on dorsal and ventral body wall.
↓ ↳ Thigmoreceptor
Photoreceptor

Coelom: is the fluid filled space.
- between body wall and alimentary canal (Gut wall)
→ is divided into compartment or chambering septa
→ Coelomic fluid serve as Hydraulic skeleton.
↳ Flexible pseudocoelom which is supported by coelomic fluid.
↓ Function
① Burrowing
② Locomotion

Q. is/are associated with earthworm?
(a) Setae only (b) Muscles (c) coelomic fluid (d) All

→ Porifera, Coelentrata, Platyhelminthis → Acoelomate
→ Nemathelminthis → Pseudocoelomata (= Blastocoelom)
→ Annelida → true coelom start



Schizocoelom
↓
formed by splitting of mesoderm.
→ Mesodermal origin
eg. earthworm

Enterocoelom
↓
eg. Echinodermata, Hemichordata, chordata

• In Earthworm, the mesoderm split to form parietal & visceral peritonium. The gap between these two peritonium is called coelom. Thus, the coelom of earthworm is called shizocoel, which is formed by splitting of mesoderm.

Q. Shizocoelom is lined by:- Peritonium

filled with → Shizocoelomic fluid
- Milky white
- contains:- water, protein, salt & coelomic cells / corpuscles.
  - 4 types:
    - Chloragogen cells (Star like yellow cells)
    - Amoebocytes
      - phagocytes / granulocytes
    - Leucocytes
      - circular nucleated cells
    - Mucocytes
      - elongated fan shaped
  - Function → uncertain

Q. Not found in coelomic fluid of earthworm?
(a) water (b) Protein (c) Salt (d) Haemoglobin

(1) Chloragogen ~~tissue~~ cells:
- Deamination of amino acids and formation of urea.
- Detoxification
- storage i.e. Glycogen + Fat.

So, are analogous to vertebrates → Liver
- elimination of silica which is composed along with food (Humus).

Note: Earthworm मा Major excretory organs → Nephridia
↳ Accessory excretory organ → Chloragogen cells.

• leech मा पनि Major excretory organ → Nephridia
↳ accessory excretory organ → Botryoidal tissue

(2) Largest and maximum no. मा पाइने cell → Amoebocytes: phagocytosis
→ Function & work of Amoebocytes:
Irregular shape
↳ engulf or ingest bacteria
also called granulocytes → storage of food granules such as bacteria.

3) Leucocytes: Vertebrates blood corpuscles like cells having hyaline cytoplasm.
↳ clear

Reproductive system of earthworm

Q In earthworm, the ovaries are found in septa between:-

(a) 10/11th (b) 11/12th (c) 12th/13th (d) 13th/14th

Q. Self Fertilization does not occur due to:-

(a) Protogynous (b) Hermaphroditism (c) Protandrous (also Hydra) (d) none

Q. Which one is correct about copulating pair of earthworm?

(a) cross and external (b) cross and reciprocal

→ Earthworm is bisexual or monocious or hermaphrodite.
- → characterised by two pairs of testes and 1 pair of ovaries
- → and protandrous (male gamete matured earlier than female gamete)
  - → as a rule → cross fertilization and takes place in coocon, external fertilization
    - Formed by glandular clitellum.

Fertilization
- → cross
- → external
- → reciprocal
  - → mutual transfer of sperms between two mating types.

Earthworm

Male R. parts

1. Testes → 2 pairs in 10th & 11th seg.
2. Testes sac → 1 pair in 10th & 11th seg.
3. Spermiduccal funnel / ciliated funnel → 2 pairs in 10th & 11th seg.
   - sperm collect
4. Seminal vesicles → 2 pairs in 11th & 12th seg. → spermatogenesis हुन्द
   - outgrowth of septa so called septal pouch
5. Vasa-deferentia → 2 pairs in 10th & 11th upto 18th seg → joined at prostate gland.
6. Prostate gland → 1 pair, 16th or 17th upto 20 or 21st. seg.
7. Male Genital pore → 1 pair in 18th seg.
8. Accessory gland → 2 pair in 17 & 19 seg.
   - → openings लाई Genital papillae

Female R. Parts

1. Spermatheca → 4 pairs in 6 to 9th seg
2. Ovaries → 1 pair in 13th seg.
3. Oviduccal / ciliated funnel → 1 pair in 13th
4. Oviduct → 1 pair (13th – 14th)
5. Female genital pore → single, 14th seg.

Q. Which of the following protozoal parasite found in seminal vesicle of earthworm? [IOM 2018]

(a) E. Histolytica (b) Trypanosoma
(c) Monocystis (d) Plasmodium
↳ class: sporozoa

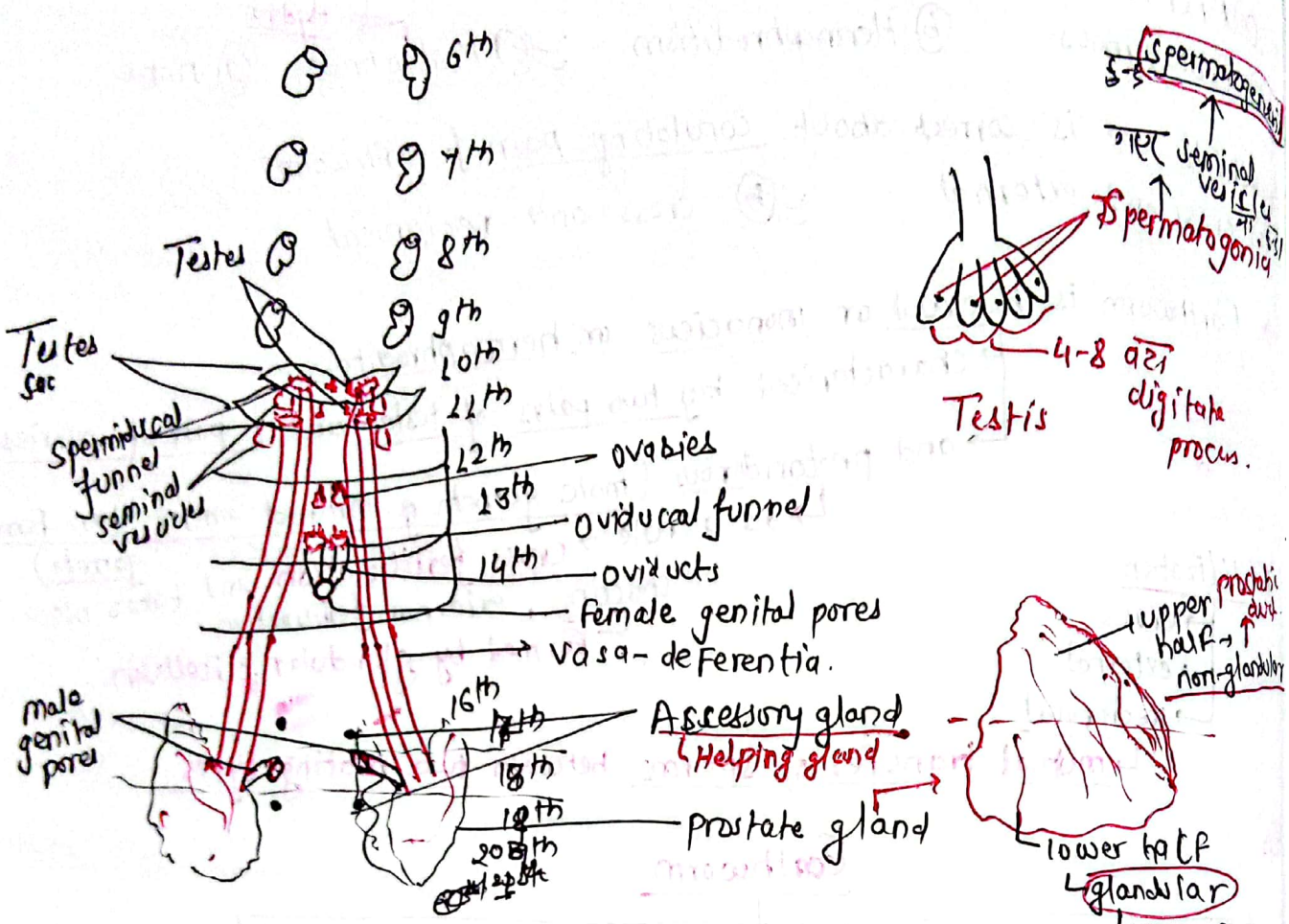
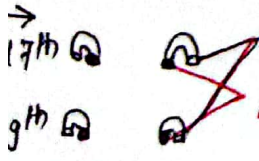


Fig: Reproductive system of earthworm

Q. Testes, Testes sacs, Vasa deferentia and seminal vesicles पाइने कुन segment हो?

(a) 10th (b) 11th (c) 12th (d) 13th

1. यदि तिमिले earthworm को 20th seg. लाई Transverse section गा काट्दा कुन part exhibit हुन्छ? → Prostate gland



F.B.I

• Spermathecae:

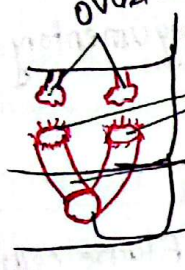


- spermathecal pore → sperm recieve → 5th/6th, 6th/7th, 7th/8th, 8th/9th
- Neck
- Diverticulum → store sperm
- ~~Ampulla~~
- Ampulla → provide nourishment to sperm.

but in Lumbricus: English or european earth)
↓
उल्टो
└ Ampulla → storage

Diverticulum
└ nourishment

Flask shaped



ovaries - produce ova → during cocoon formation
↓ release
12th
oviduccal funnel
13th
oviduct
14th
Female genital pore

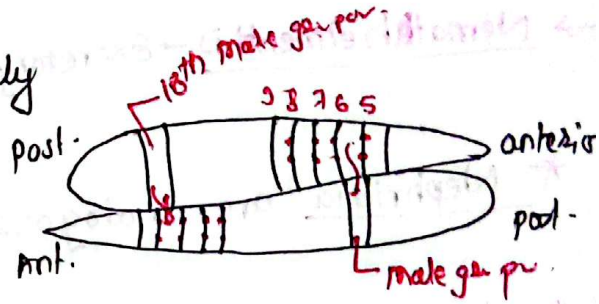
Key points:

① Copulation :- opposite and ventrally
└→ at night, rainy season.

② Cocoon is formed by glandular clitellum.

③ life-cycle → no larva → Direct development
└→ no metamorphosis

④ clitellum ले cocoon formation गर्ह
└→ Fertn पुप हुन्द



Excretory system of earthworm (Nephridial system EEE

Q. Pharyngeal nephridia of earthworm are found around of :- [IOM]
ⓐ Mouth and buccal cavity
ⓑ Buccal cavity & pharynx → poured int
ⓒ Pharynx and ~~Nep~~ oesophagus
ⓓ Oesophagus & Gizzard

Q. Septal excretory duct and supra-intestinal duct are associated with :- [BHU]
ⓐ Pharyngeal nephridia
ⓑ Integumentory ~~duct~~ nephridia
ⓒ Septal nephridia
ⓓ All

Q. Enteronephric nephridia of earthworm are poured into :-
ⓐ Buccal cavity
ⓑ Pharynx
ⓒ Intestine
ⓓ All

→ Excretory organs → Nephridia (Nephridium) ↳ eota लाई
- → microscopic
- → coiled tubular structure
- → segmentally arranged.

Note: Largest and most coiled type → Septal Nephridia

Smallest and most numerous → Integumentary nephridia (200 to 250 each seg)

Q. Not found in ~~ead~~ earthworm? [IOM 2017]

(a) Septal (b) Pharyngeal ✓ (c) Macronephridia (d) Integumentary

Q. Renette cells are found in:- protonephridia

→ Platyhelmenthis → Excretory organ called protonephridia having Flame cells ↳ solenocytes

→ Nemathelmenthis → Excretory organ → protenephridia having Renette cell.

* Nephridia are analogous to vertebrates Kidney / Nephrons / uriniferous tubules.

* Nephridia are derived from embryonic ectoderm. So, are ectodermal origin.

* On the basis of structure and position, Nephridia are 3 types:-

1. Pharyngeal nephridia ↳ around pharynx
2. Septal nephridia ↳ muscular partition → called septa मा
3. Integumentary nephridia ↳ skin मा

एउटा earthworm मा Ciliated funnel नाम गरेको 3 वटा structure present हुन्छ →
1. Nephrostome
2. Oviduccal funnel
3. Spermiduccal Funnel

Q. Not correct about septal Nephridia of earthworm?

(a) are absent in anterior 14th seg
(b) having complex nephrostome
(c) conserve water
✓ (d) open exteriorly through the nephridiopores. ↳ integumentary मा हुन्छ।

③ Terminal duct of septal nephridia opens into :-
→ Paired septal excretory canal.

→ Ate

(1) Pharyngeal Nephridia: collection लाई bunch भनिन्छ।

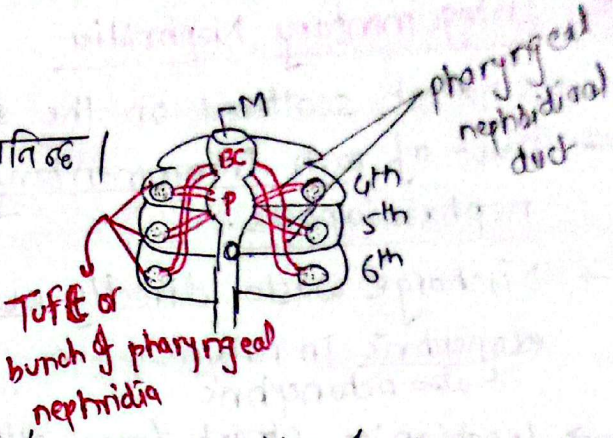
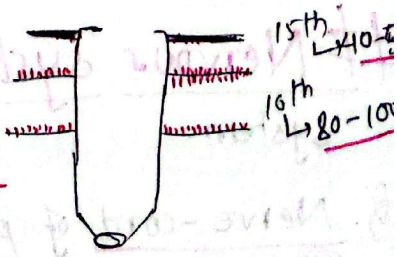


Fig: Location of pharyngeal nephridia

- These are occured as paired bunch on either side of pharynx and oesophagus on 4th, 5th & 6th segment.
- Duct of 6th segment opens into buccal cavity while the duct of 4th & 5th segment open into pharynx.
- Pharyngeal nephridia poured waste into buccal cavity and pharynx. so, these are enteronephric or endonephric in nature.
- No nephrostome (septal) and no nephridiopores (integumentary)
- Being enteronephric in nature, pharyngeal nephridia are responsible for conservation of water and salt.
- are also called peptonephric nephridia.
  → पुछ Nephridia को duct alimentary canal को upper part मा खुल्छ त्यो Nephridia लाई Peptonephridia भनिन्छ
- Pharyngeal nephridia are closed type.
  ↳ due to absence of nephrostome
  ↳ also in integumentary → closed type
  ↳ present → septal → open type

(2) Septal Nephridia :-

- Location :- start behind 15 seg & upto second last septum.
  or, start intersegmental septum between 15th & 16th upto 2nd last segment



- no → 15th seg → 40-50
  16th seg upto 2nd last seg → 80-100
- Each septal nephridium consists of :- 4 parts
  यसमा ① Nephrostome / Nephridiostome / ciliated funnel → coelom मा खुलेको हुन्छ।
  ② Neck
  ③ Main body

• are also called Typical Nephridia.

② Integumentary Nephridia

- smallest, scattered on the inner surface of body wall.
- Duct of each integumentary nephridium opens exteriorly through the nephridiopores.
- → Discharge waste directly outside through the nephridiopores. So called exonephric in nature.
  └ also ectonephric
- → location:- start from 7th segment.
- → Number → 200-250 in each segment.
- → Clittellar segment is called Forest of nephridia because there is presence of 10 times more than other segment i.e. 2000 to 2500.

Q. In 15th segment, which type of nephridia is/are found?
(a) Septal only (b) Pharyngeal only
(c) Integumentary only (d) both (a) & (c)

Note: ① Being enteronephric in nature, septal & pharyngeal nephridia are responsible for conservation of water & salt.

② Earthworm is → (a) ureotelic (b) ammonotelic
(c) both (d) Uricotelic
└ if both देखा मतलब → ureotelic

③ If plenty of water is available → ammonotelic

Nervous system:-

Earthworm posses a well developed nervous system.

Q. Nerve-cord of pheretima:-
(a) Ventral, single, Hollow (b) ventral, double, solid → in all invertebrates
(c) dorsal, single, hollow (d) dorsal, double, solid

Q. In pheretima, the neurohormone (or brain hormone) is produced by:-
(a) Sub pharyngeal ganglia (b) Cerebral ganglia

Q. ~~Septal~~ Segmental ganglia found in all segment except:

(a) 1st two (b) 1st three (c) 1st Four (d) 1st Five

N.S — C.N.S < ostakior: y-shaped 3rd & 4th Nerve ring
ventral n. cord – thread like
└ 5th to last
— P.N.S
— A.N.S → (+) of only sympathetic nerve cord

Cerebral ganglia → 3rd seg मा

Sub-pharyngeal ganglia → 4th मा

Nerve cord → 5th to last seg

└ starting from 5th seg, nerve-cord has swelling in each segment → segmental ganglia

Q. Not Found in Body wall of earthworm:-

(a) cuticle (b) peritonium (c) epidermis (d) epineurium — N.S.

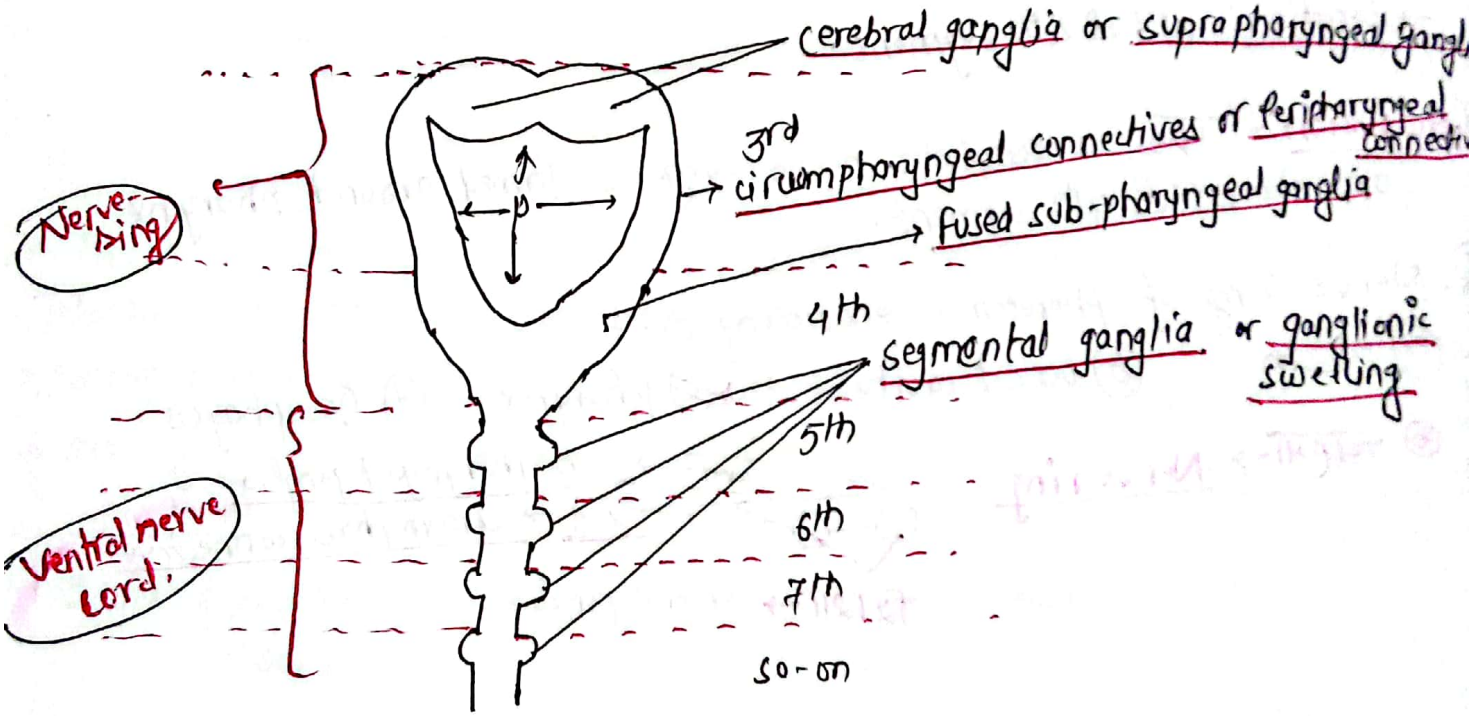


Fig: Central Nervous system

(A) Central Nervous system

(a) Nerve ring:-

(i) Cerebral ganglia:- 1 pair in no.

→ Located mid dorsally just above the pharynx. So, called suprapharyngeal ganglia.

→ A pair of these ganglia unite to form a combined mass of brain.

so, Brain is located in 3rd segment.

└ मा Neurosectory cells हुन्छ & produce Neurohormone or Brain hormone — poorly developed

└ काम → (1) Development of clitellum
(2) Help in formation of cocoon.

(ii) Sub-pharyngeal ganglia

→ located mid ventrally just below the pharynx.

- being fused together it appears as single but actually of 1 pair

→ location: 4th segment

(iii) Circum-pharyngeal connectives

→ also called peripharyngeal connectives.

→ 1 pair को circum p. connectives जो ~~cent~~ cerebral ganglia को sides बाट abide भएर pharynx लाई अंगालो मार्दै 4th seg को sub-pharyngeal ganglia मा जोडिएको हुन्छ।

→ connect: cerebral ganglia to sub-pharyngeal ganglia.
or brain

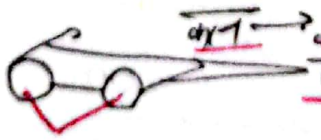
→ location: 3rd & 4th segment.

Conclusion:- Thus, a complete nerve ring is formed around pharynx around 3rd & 4th segment.

Q. Nerve ring of pheretima encircling the:-

(a) Mouth (b) buccal cavity ~~(c)~~ pharynx. (d) Oesophagus.

(e) चरमा → Nerve ring



कान → sub-pharyngeal ganglia

फेम → circum phar connective.

शिशा → cerebral ganglia

From septal Nephridia

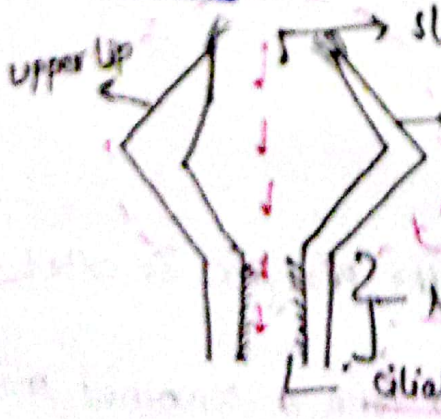


Fig:- Nephrostom...

- Nephrostome → septal Nephridia मा मात्र
- septal Nephridia derive waste from coelom.

intestine = enteronephric
↑
paired supra intestinal canal

Coelom → Nephrostome → Neck → Main body (Ciliated) → Terminal duct → paired septal ext canal

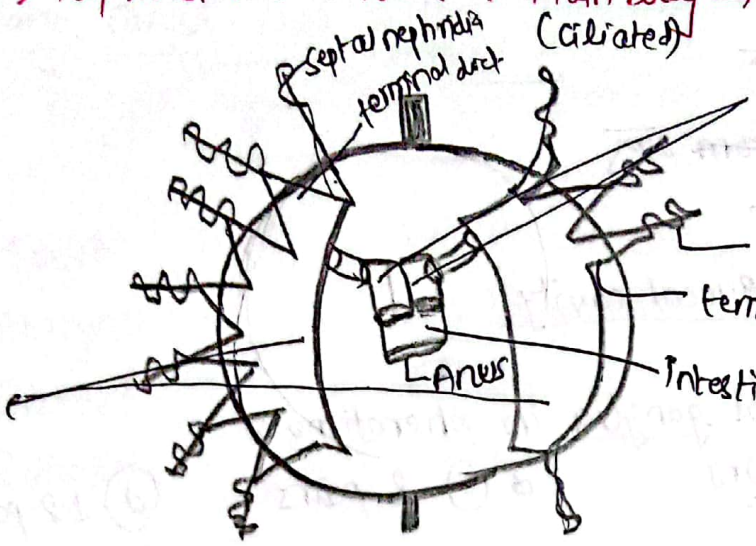
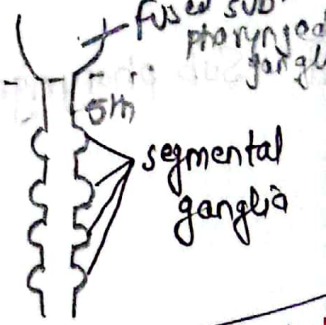


Fig: Septal Nephridium



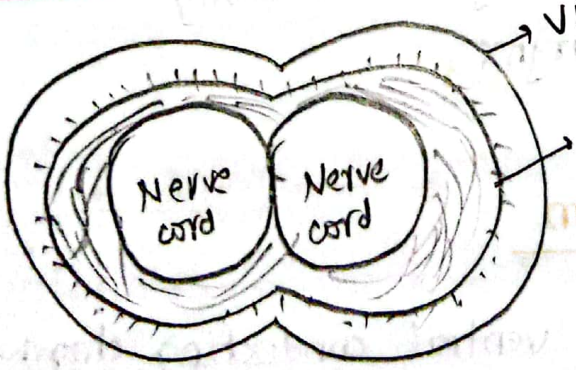
Nerve cord

→ Arise from posterior end of sub-pharyngeal ganglia and extending mid-ventrally upto last segment.

→ Nerve cord → thread like structure just below the alimentary canal. (so ventral)

→ starting from 5th seg. nerve cord has swelling in each seg. called segmental ganglia or ganglionic swelling.

→ Being fused together it appear as single but actually 1 pair. (so solid)

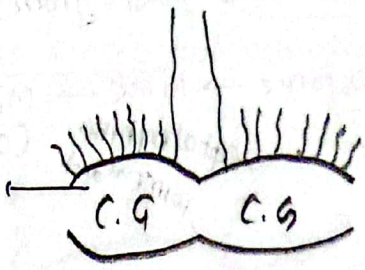


T.S of Nerve cord.

② Peripheral Nervous system

→ Nerves arise from central N.S. and distribute to different parts of the bo

• Reflex arc → controlled by ventral nerve cord in earthworm.



cerebral ganglia बाट
8-10 pairs of nerves arise ~~from~~ भएर
↳ 1 pair → prostomium मा
↳ बाकी pairs → wall of Buccal cavity

Q. Cerebral or supra pharyngeal ganglia in pheretima ?
(a) 1 pair (b) 4 pairs (c) 8 pairs (d) 12 pairs

but cerebral or supra pharyngeal nerves → 8 pairs

Q. Sub pharyngeal ganglion nerves → 3 pairs
↳ 1 pair → 2nd segment
1 pair → 3rd segment
1 pair → 4th segment

Q. Circum pharyngeal connective (1 pairs)
Q. → Circum pharyngeal nerves → 2/3 pairs in distribution
1 pair → peristomium
1 pair → wall of Buccal cavity
1 pair → pharynx

Digestive Gland in Earthworm

Q. Dorsal salivary chamber and ventral conducting chamber are associated with:-
(a) Buccal cavity (b) Pharynx (c) Oesophagus (d) Intestine

Q. The most muscular part of Alimentary canal of earthworm is:-
(a) Buccal cavity (b) Oesophagus (c) Gizzard (d) Intestine

Note:

Earthworm	leech	Cockroach	Bird
(Gizzard)	(crop)	Gizzard	Gizzard
↳ Grinding	↳ storage of food	crop	

Q. Which part of alimentary canal is internally lined with cuticle.
(a) Gizzard (b) Small intestine (c) Buccal cavity (d) Prostomium

Alimentary Canal

→ It is a straight tubular structure starting from mouth and end with anus.

• Parts: ① Mouth ② Buccal cavity
③ Pharynx ④ Oesophagus
⑤ Gizzard ⑥ Stomach
⑦ Intestine ⑧ Anus

• Digestive glands
→ Intestinal caeca → Accessory
→ Calciferous glands } embedded
→ Chromophill cells }
→ Salivary gland cells.

① Mouth :- Crescentic shape (half moon).
→ located in 1st segment is called peristomium.

② Buccal cavity :- 2nd & 3rd segment.
→ Wall is muscular but non glandular.
→ Due to contraction → protusible
→ It is sensory having gustator (taste) & olfactorepeptor (smell).
→ Removal of buccal cavity → earthworm dies due to starvation.

③ Pharynx :- middle of 3rd and 4th segment.
→ muscular and glandular.
• Due to contraction :- Suctorial → Buccal cavity লাই টানে
→ Pharyngeal bulb or mass : composed by chromoph cells or salivary gland cells serve secrete saliva (mucus + proteases)

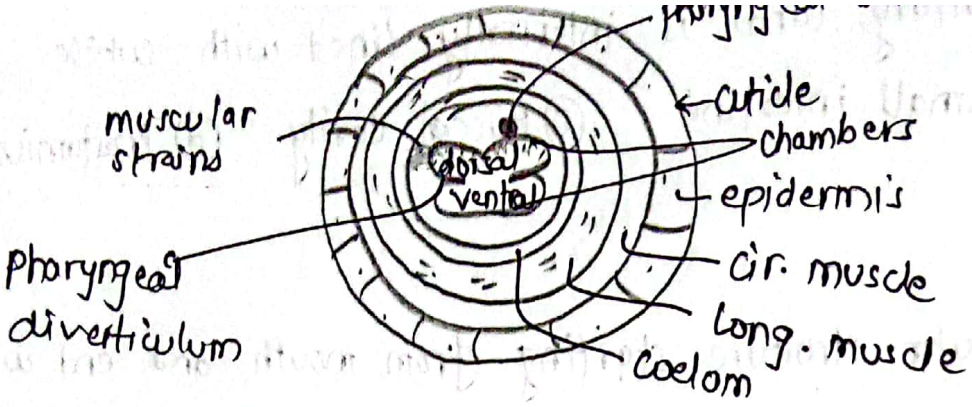


Fig: T.S. of pharynx

Dorsal chamber
└ ciliated
so, salivary chamber

(4) Oesophagus:- Food pipe located from 5th to 7th segment.
→ muscular but not glandular.
→ Due to contraction:- creates downwards proceding waves called peristalsis.

Function: pass food towards gizzard.

(5) Gizzard: location → 8th seg or 8th & middle of 9th seg.
→ hardest part.
→ Internally gizzard is lined by thick cuticle which is covered by thick circular muscle. So, hard.
↳ Due to contraction:- Food Grind
→ most muscular part.
→ longitudinal muscles → Feebly (less) develop.
→ Grinding machine due to thick circular muscle.
→ mechanical digestion occurs.

(6) Stomach:- 9th to 14th seg or middle of 9th to 14th segment.
→ is less muscular, but highly glandular.
└ inner epithelium में calciferous gland पाई जाती है, Gastric glands,
└ secrete gastric juice

Intestinal caeca
↳ secrete amylase.

→ Villi present but larger villi i.e. typhlosole are absent.
→ for digestion and absorbtion.

(b) Typhlosolar region:- 26 or 27th segment upto 75-95 segment.
↳ (last को 23-25 वटा seg छोड़ेर)

→ Villi and typhlosole both are present.
→ main site of food absorbtion.
→ corresponding to ileum of vertebrates.

(c) Post-Typhlosolar region:- After typhlosolar region i.e. last 23-25 वटा segment मा.

→ No villi and no typhlosole.
→ for temporary storage.
→ corresponding to rectum of vertebrates.
→ open exteriorly through the anus called pygidium.
↳ egestion of worm casting.

Abishek singh