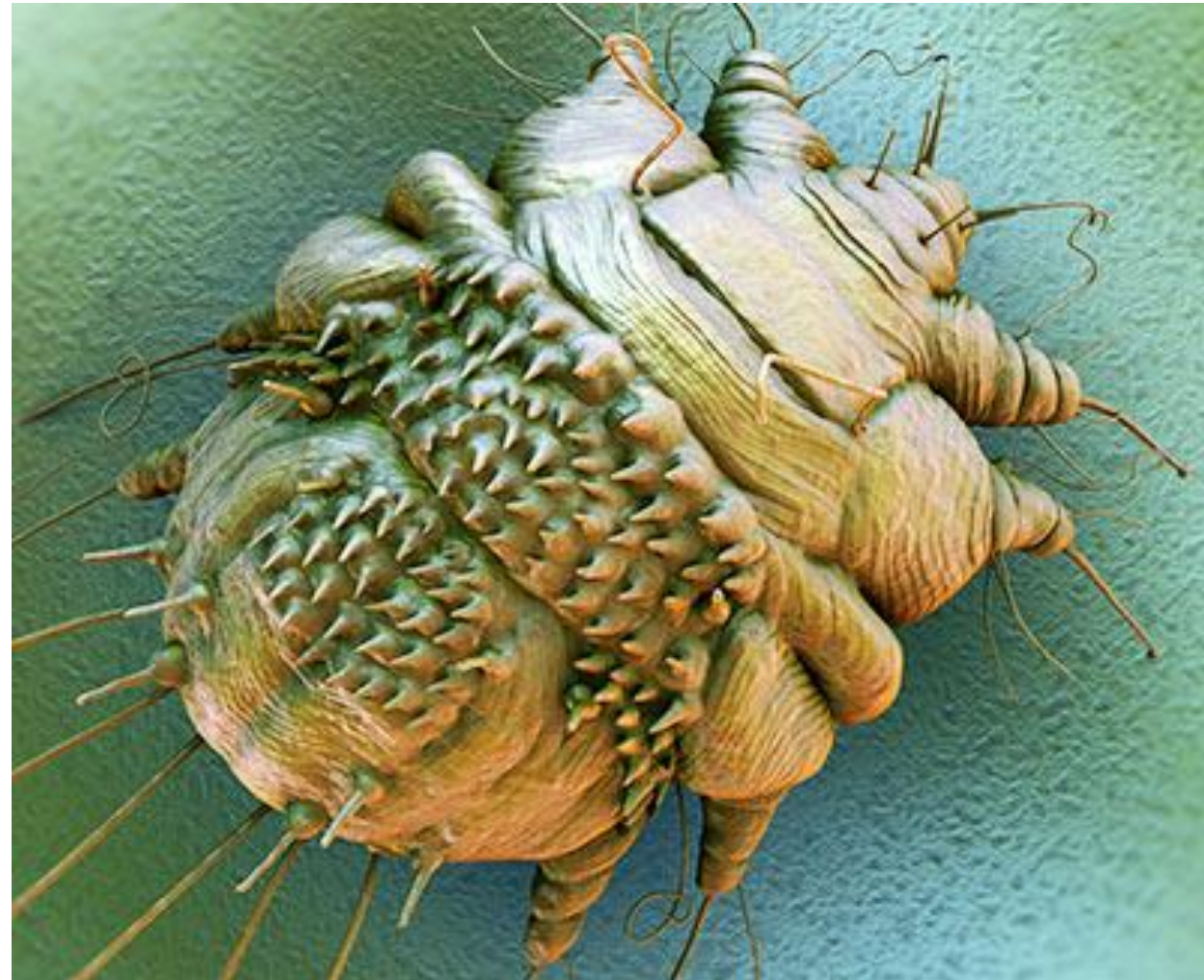




Advanced Parasitology

(ZOO 510)





LECTURE (6)

Phylum Platyhelminthes (Tubellaria)



Lecture contents

1 **General characters of Platyhelminthes**

2 **General body form of *Dugesia***

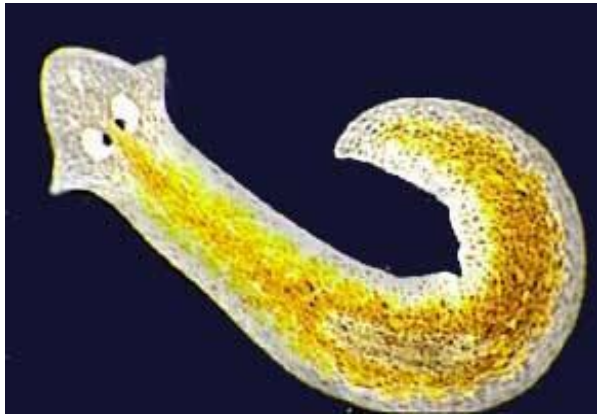
3 **Digestive system of *Dugesia***

4 **Excretory system of *Dugesia***

5 **Nervous system and sense organs of *Dugesia***

6 **Reproduction in *Dugesia***

7 **Reproductive systems in *Dugesia***



Kingdom Animalia
Subkingdom Metazoa
Branch Eumetazoa (Enterozoa)
Division Bilateria (Triploblastica)
Section Acoelomata
Phylum Platyhelminthes (Flatworms)



General characters

- 1- Body dorso-ventrally compressed with bilateral symmetry.
- 2- Triploblastic animals.
- 3- Epidermis is soft and ciliated as in *Turbellaria* or covered by tegument and with external suckers or hooks or both for attachment to host as in Monogenea, Digenea and Cestoda.
- 4- There is no secondary body cavity (acoelomate).
- 5- Muscular system is well developed.
- 6- Incomplete digestive system (with mouth, no anus).
- 7- Excretory system represented by flame cells.
- 8- It is the first phylum possesses some sense organs and central nervous system.
- 9- Sexes usually monoecious or hermaphrodite (except *Schistosoma*) with a complicated reproductive system.
- 10- No skeletal, circulatory or respiratory systems.

Classification of Phylum Platyhelminthes:

- Five classes of Phylum Platyhelminthes are recently recognized:

1- **Class:** Turbellaria, mostly free living.

2- **Class:** Monogenea, typically ectoparasitic.

3- **Class:** Aspidogastrea (Aspidobothrea)

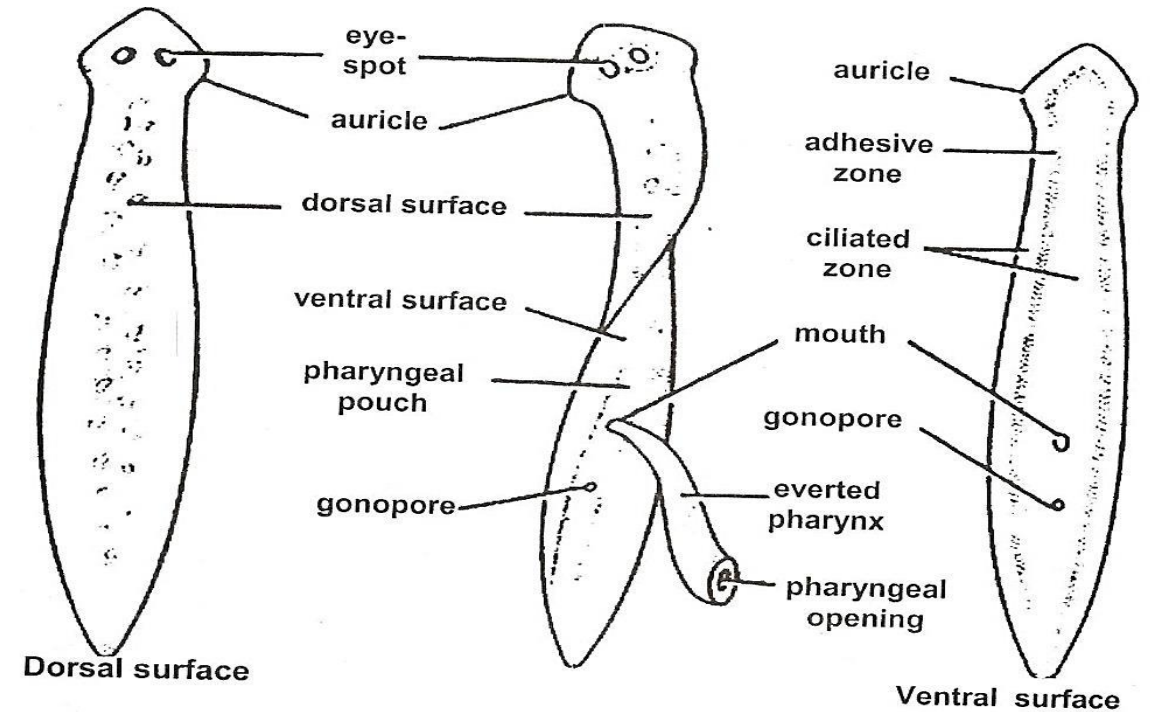
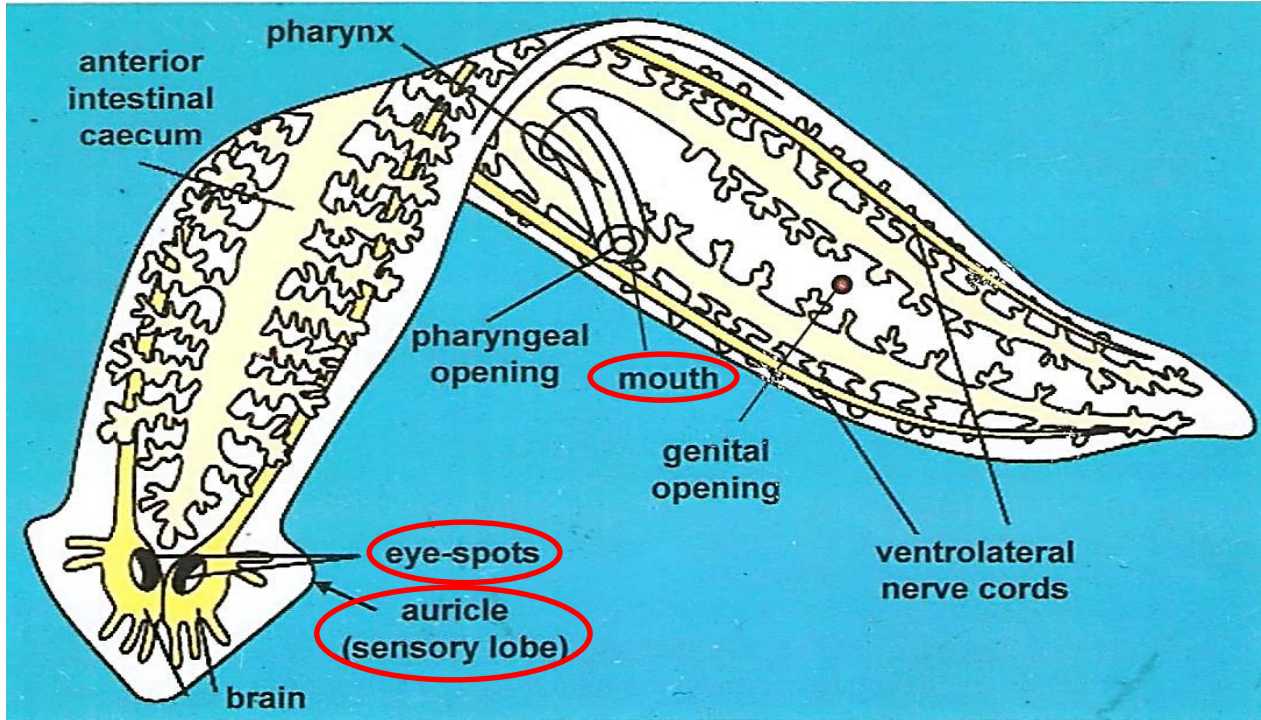
4- **Class:** Digenea, endoparasitic.

5- **Class:** Cestoda (Tape worms), endoparasitic & segmented.

Class Turbellaria

Order Tricladida

EX. *Dugesia* (Planaria)



Rod like small bodies when discharged into water swell and form a protective gelatinous sheath around the body which serves in adhesion, capturing the prey and in protection against enemies.

rhabdites

ciliated epidermal cells

basement membrane

circular muscle layer

longitudinal muscle layer

Muscular system composed of Three layers:
1- Circular muscle layer
2- Longitudinal muscle layer
3- Vertical muscle layer

intestinal caecum

testes

epidermis

excretory pore

flame cell

mesenchyme

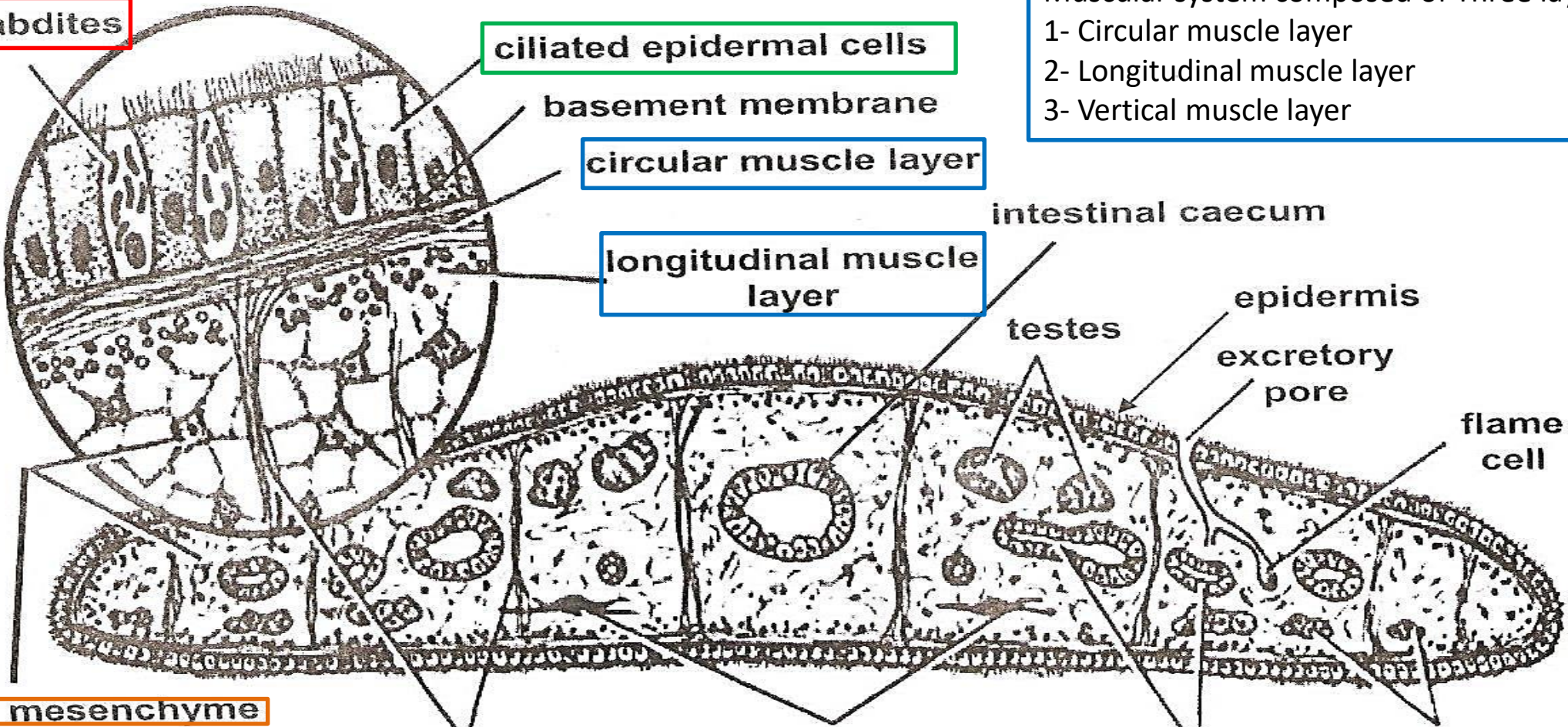
vertical muscle strands

lateral nerves

intestinal diverticula

vitelline glands

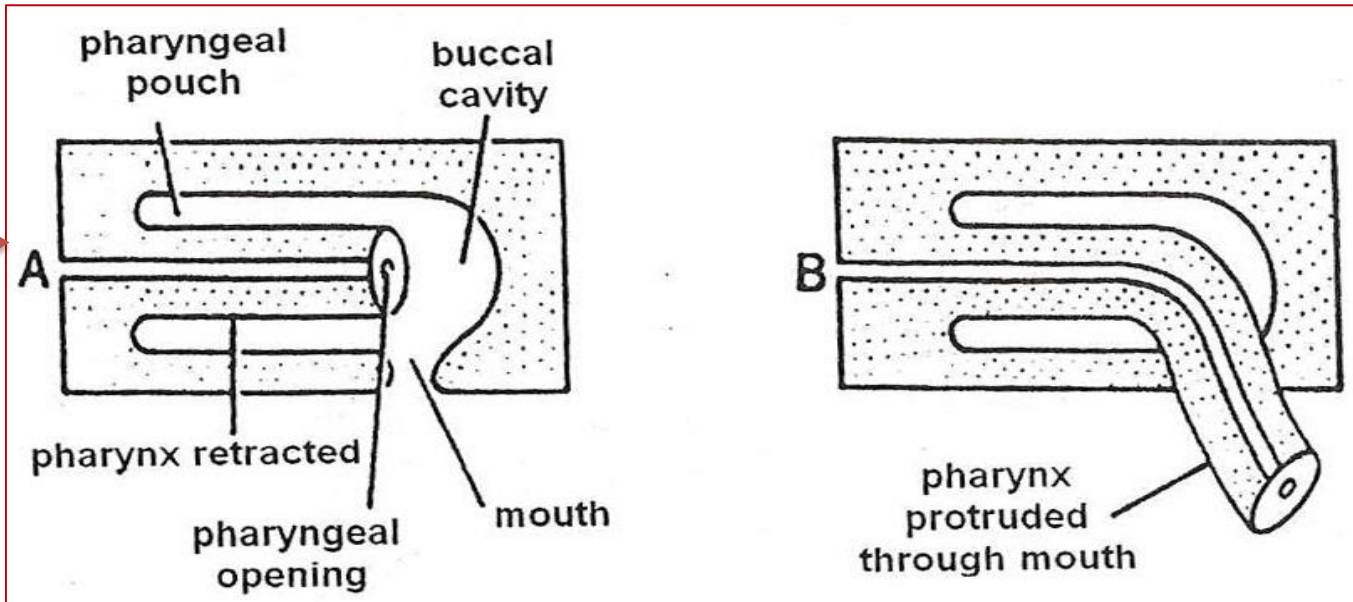
= Parenchyma (no body cavity) (acoelomata)



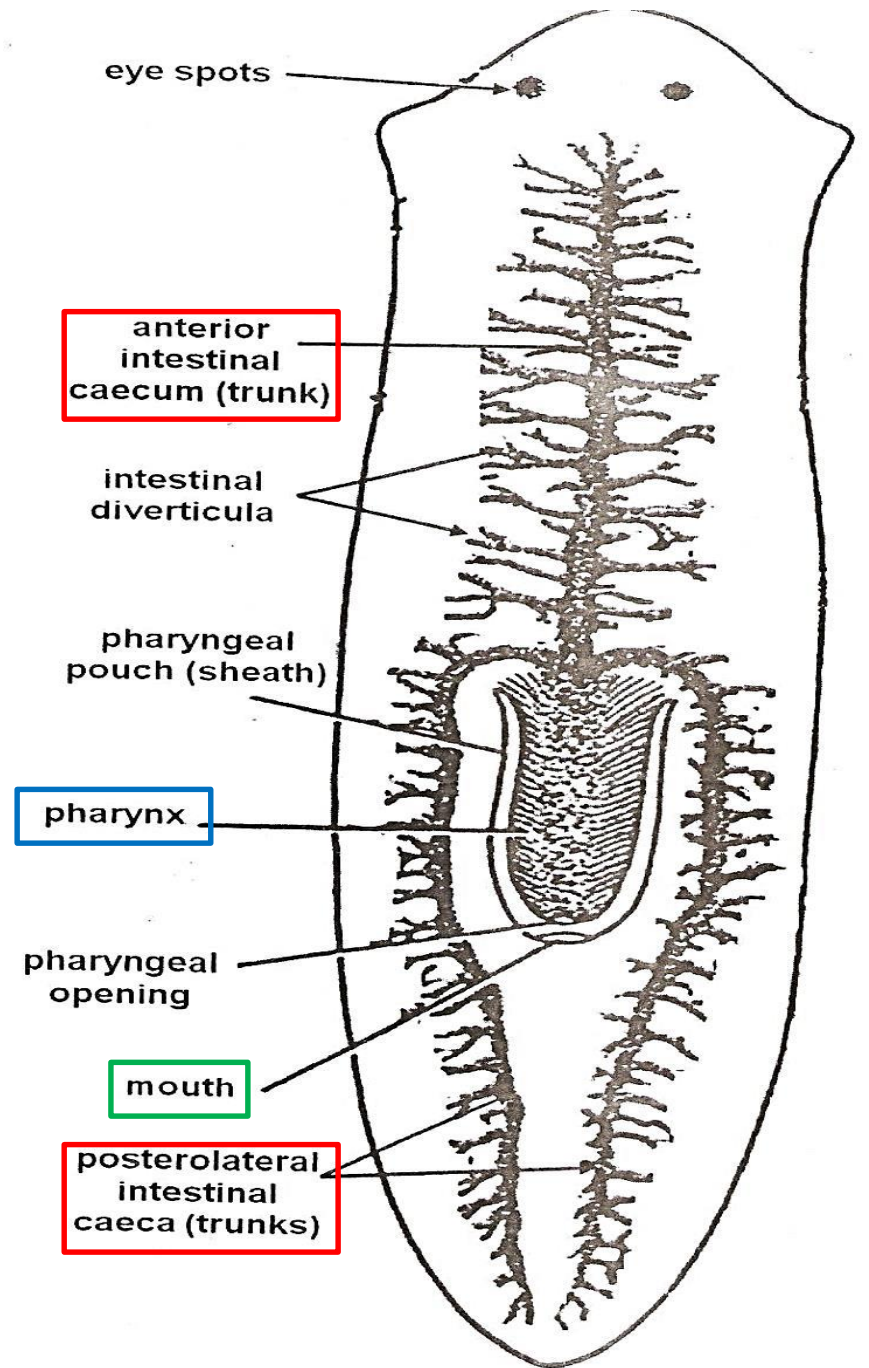
Digestive system of *Dugesia*

It consists of three parts:

- 1- **Mouth:** opens in the mid-ventral line
- 2- **Pharynx:** protrusible to capture the prey
- 3- **Intestine:** divided into three intestinal caeca (one anteriorly and two posteriorly)



Dugesia is carnivorous as its food consists of animals, living or dead.



Excretory system of *Dugesia*

It consists of:

- 1- Two longitudinal excretory ducts
- 2- Excretory tubules
- 3- Flame cells
- 4- Excretory pores on dorsal surface

Flame cells consists of:

1- Cap (terminal cell)

Long cilia (Flagella) for flickering movement

2- Tubule (Canal cell)

Lattice bars for ultrafiltration

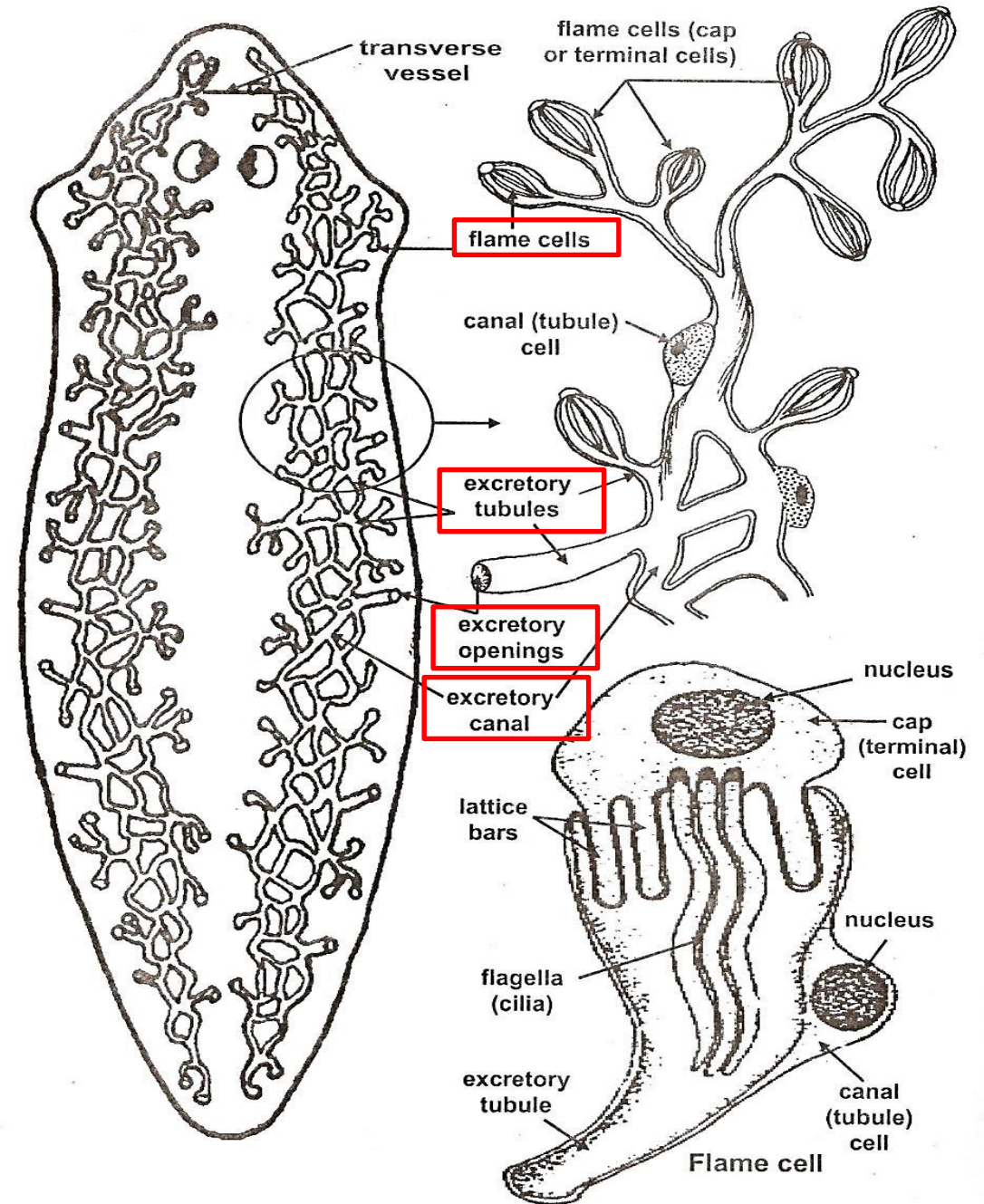
Excretion takes place by two ways:

1- Osmoregulation

- Get rids of excess water/ fluid wastes
- Takes place by flame cells

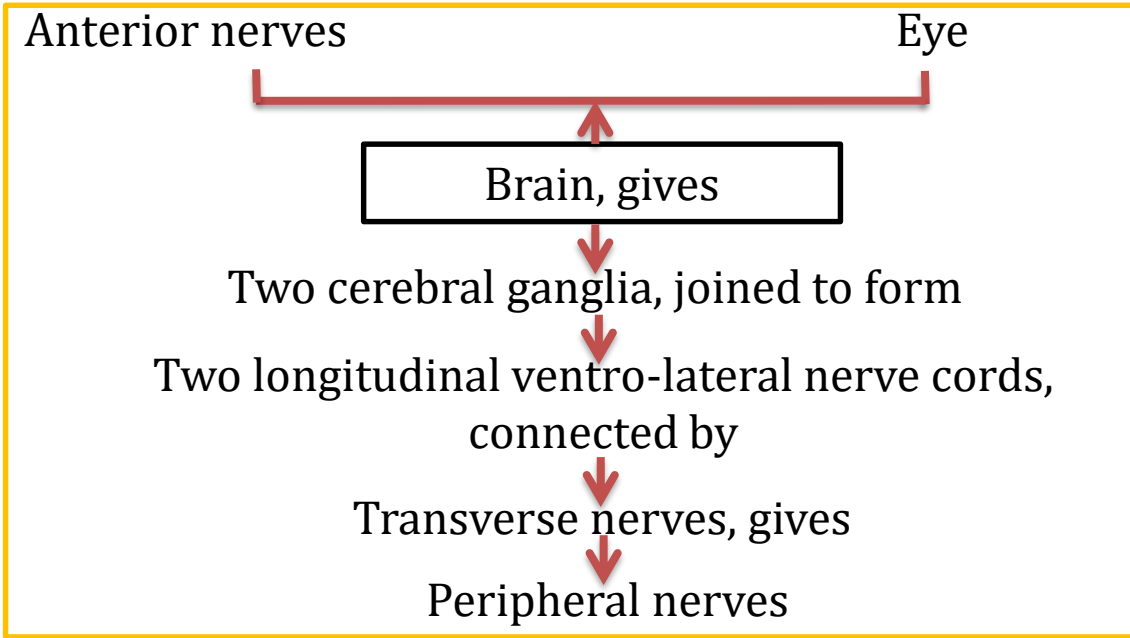
2- Excretion

- Get rids of nitrogenous waste products
- Takes place by simple diffusion



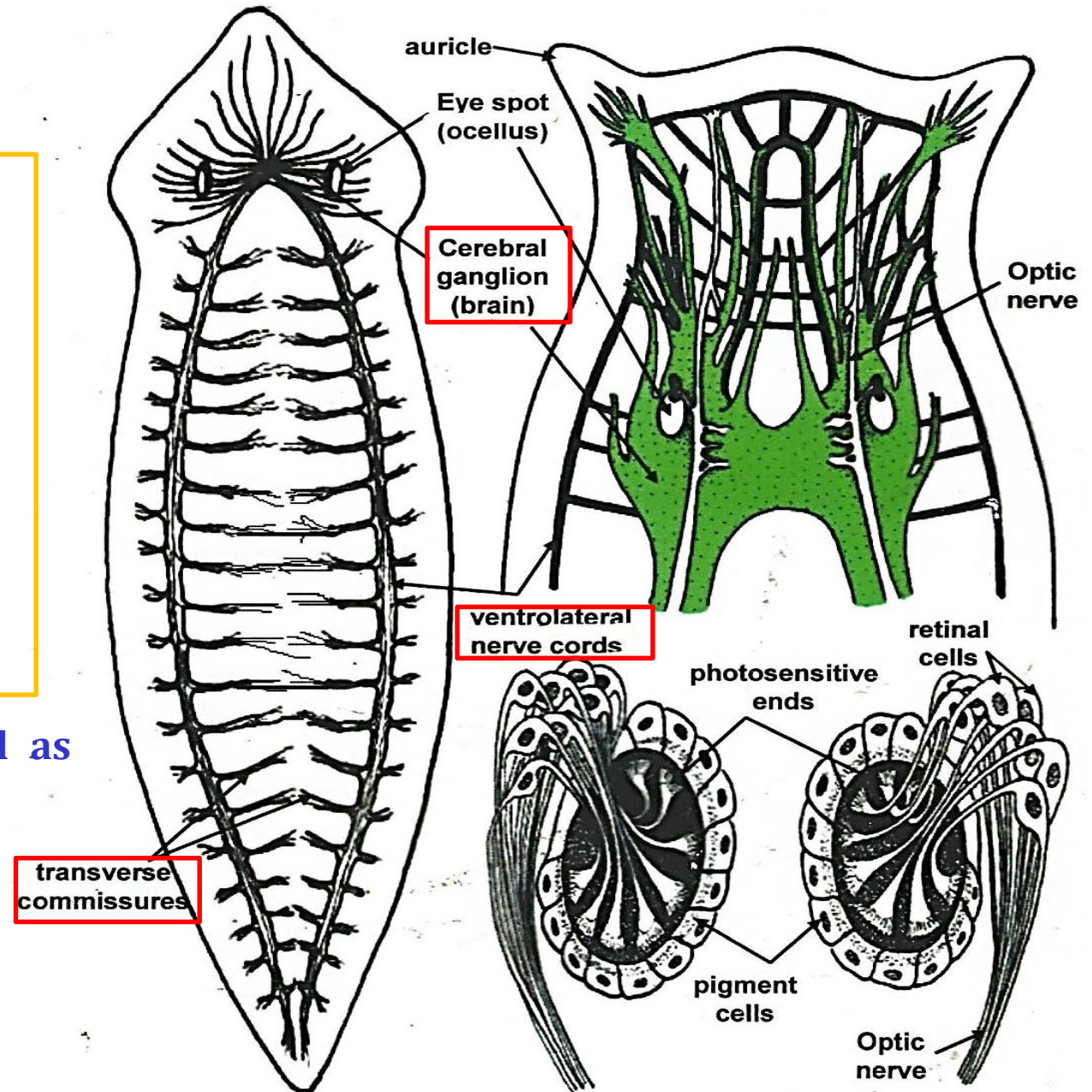
Nervous system and Sense organs of *Dugesia*

Nervous system (Ladder-shape) consists of:



Sense organs are two rounded black spots termed as eyespots, each one consist of:

- 1- Cup-like structure
- 2- Black pigmented cells
- 3- Retinal cells
- 4- Photosensitive ends
- 5- Nerves connected to brain



Planarians respond negatively to light as they mostly active at night

Reproduction in *Dugesia*

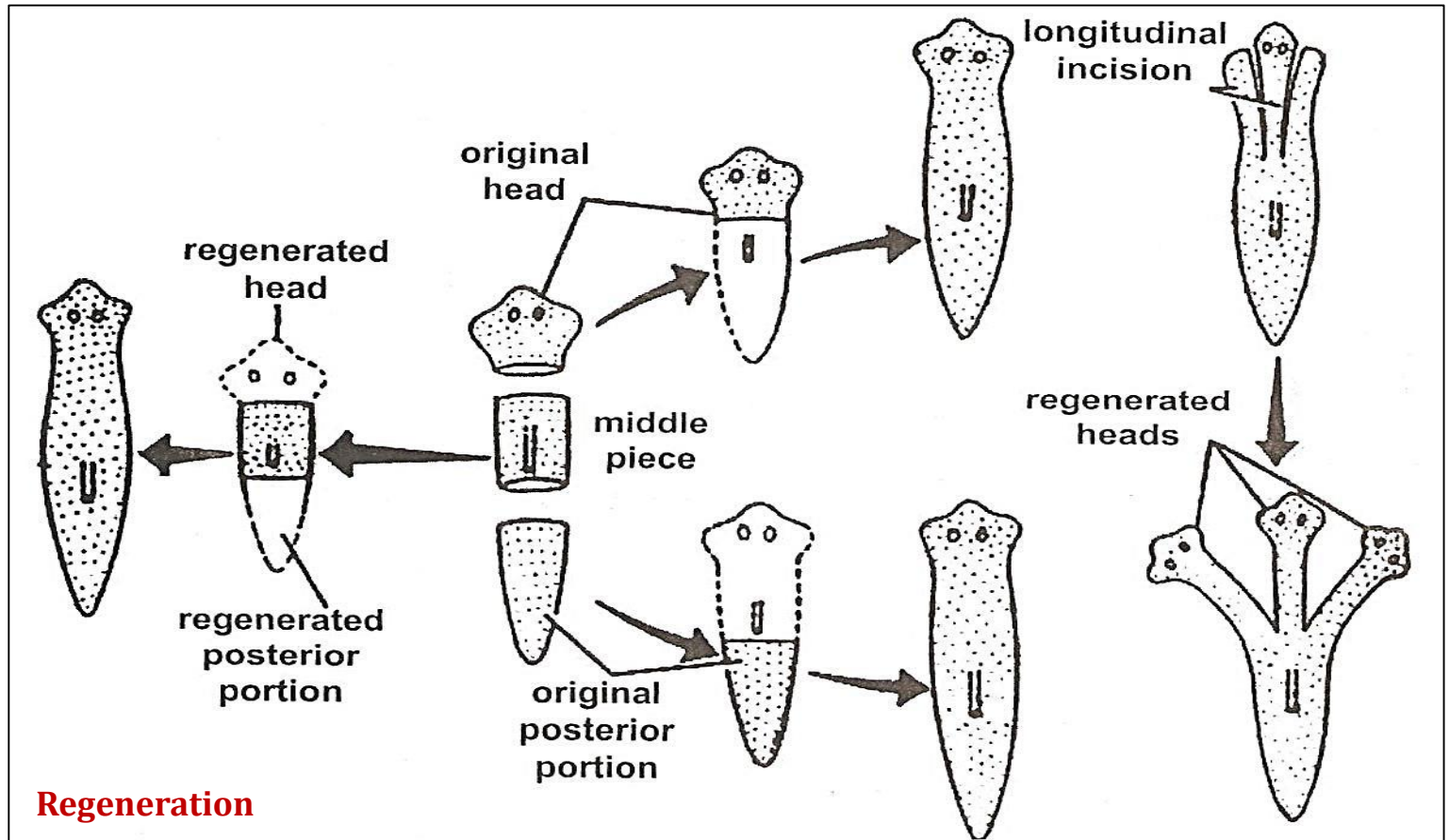
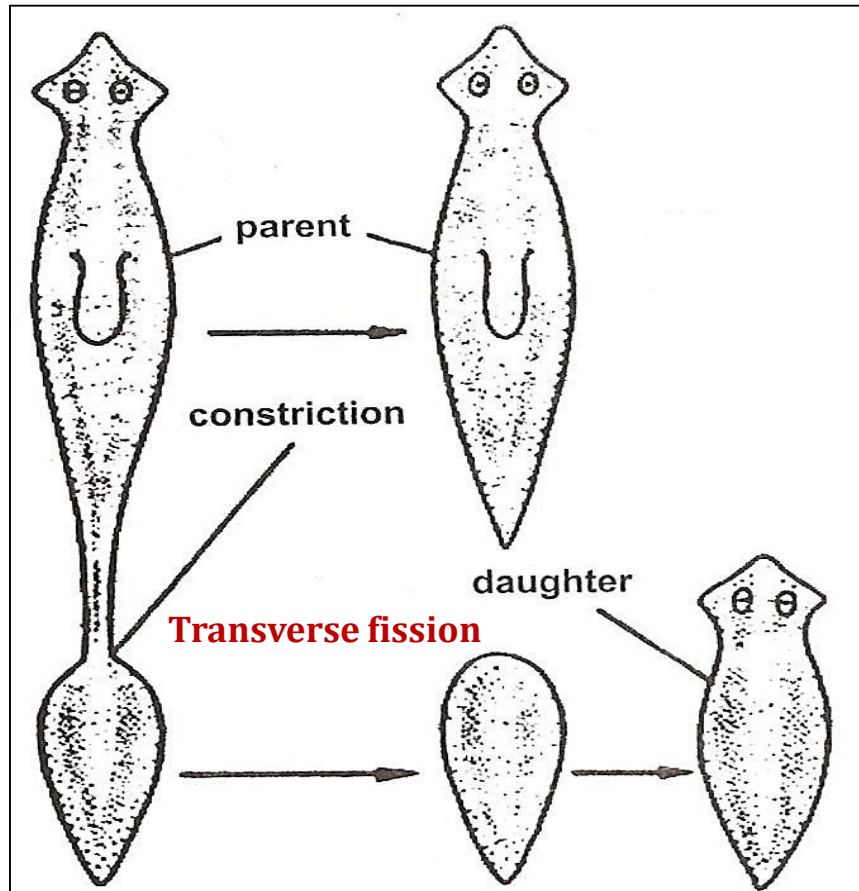
It takes place by two ways:

1- Asexual reproduction

- Transverse fission, each piece regenerate a new worm
- Regeneration, any part of the body can be replaced

2- Sexual reproduction

- Cross fertilization, development is direct with no free larval stage



Female reproductive system

Ovaries, form ova to be collected by

Two long oviducts, join to form

Vagina

Genital atrium

Vitelline glands found on each side having vitelline ducts to open into oviduct

Copulatory bursa connected to vagina, for reception and storage of sperms at mating

Male reproductive system

Testes, form sperms to be collected by

Vas efferentia

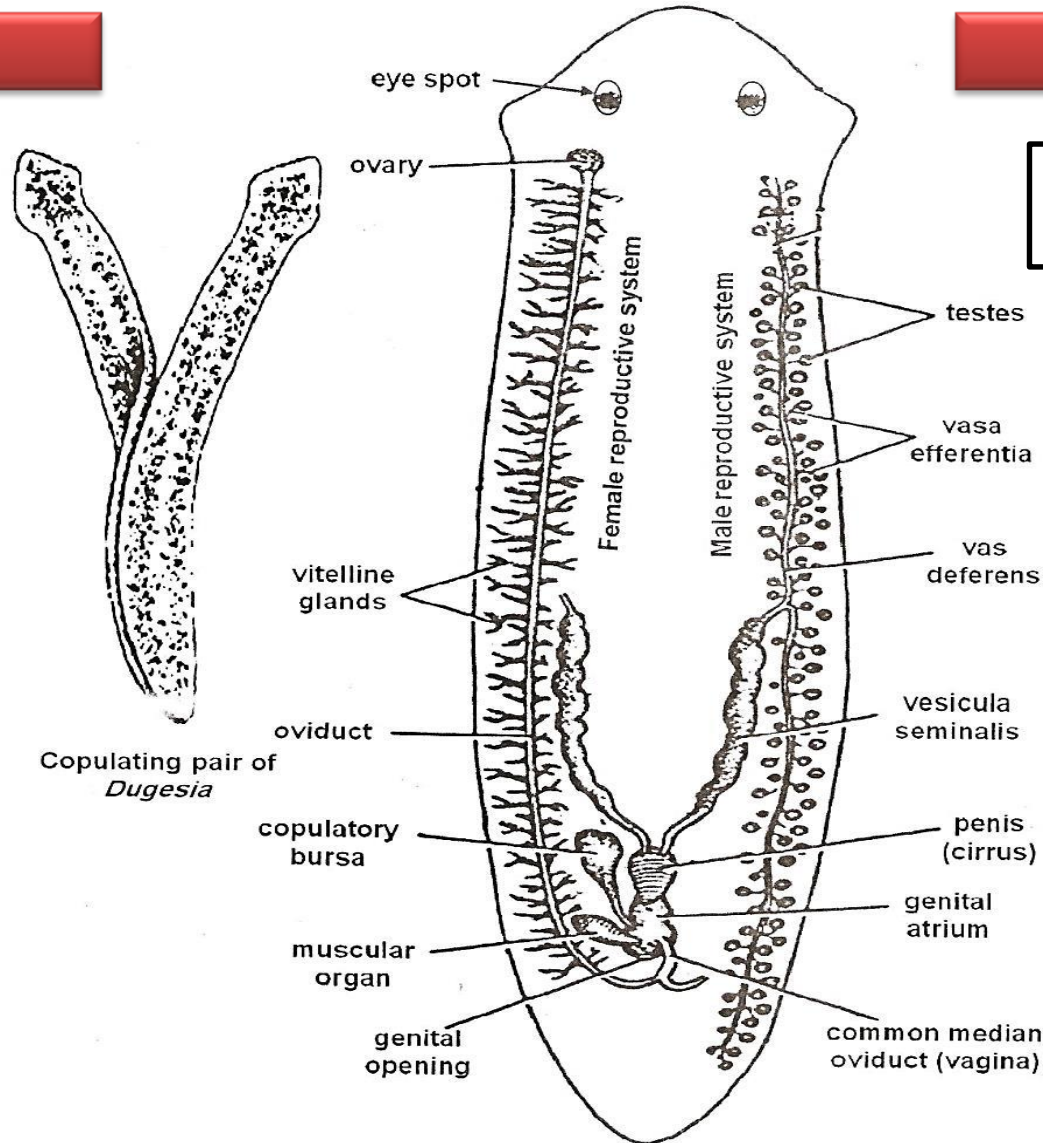
Vas deferens, dilates posteriorly to form

Vesicula seminalis

Cirrus pouch (Penis)

Genital atrium

NOTE: *Dugesia* is monoecious (Hermaphrodite)



Cross fertilization takes place by, two worms will meet by their posterior ventral surfaces, where sperms from seminal vesicle of the worm pass to copulatory bursa of the other. After mating, worms separate and sperms travel from copulatory bursa to oviduct to fertilize egg, forming several zygotes, yolk cells to combine forming egg shell to get outside.

Thank you