

PARASITOLOGY

- **General Characteristics of Trematoda**

Phylum

Class

PLATYHELMINTHES

TURBELLARIA

ASCHELMINTHES

TREMATODA

ACANTHOCEPHALA

ANNELIDA

CESTODA

TURBELLARIA

- They live freely.
- They are mostly marine organisms.
- Their size can be from microscopic size to 60 cm.
- Exm; Planaria; Dugesia

Turbellaria

They generally live freely at the bottom in sea and fresh waters.

Movement

- Movement occurs with the help of Cilium, mucus and muscle contraction (turning, twisting, etc.)

Nutrition

- Turbellaria are carnivores and feed on predatory and the residual of dead animals.
- Planarians have a strong muscular pharynx that can easily absorb prey.
- Since the intestines are multi-sectioned, the digestion and absorption surface is very high.

• *Sense organs:*

- Sense organs are well developed.
- They are negative phototropics.
- They have simple light sensitive eyes, mechanoreceptors and chemoreceptors.

Reproductive:

- Turbellaria has asexual reproduction, and it has a hermaphrodite and regeneration feature.
- Usually cross-fertilization takes place.
- During copulation, one partner injects sperm by piercing the penis with the other's body (**hypodermic impregnation**).

Phylum

Class

PLATYHELMINTHES

TURBELLARIA

ASCHELMINTHES

TREMATODA

ACANTHOCEPHALA

ANNELIDA

CESTODA



TREMATODA *Flukes*

- Trematoda species bodies are dorso-ventrally flattened .It is like a leaf. It doesn't have body cavities.
- The body is one part.
- All organs are located in the parenchyma.
- They have suckers and/or hooks.
- They usually don't have anus.
- Most (except *Schistosomatidae*) are hermaphrodites.
- They can develop directly or indirectly.

TREMATODA



Subclass:

MONOGENEA

ASPIDOGASTREA

DIGENEA

MONOGENEA

- There are about 1100 species
- It is found on cold-blooded and aquatic animals (fish, amphibia, reptiles).
- They usually live as an ectoparasite.
- They are viviparous or oviparous.
- Their larvae are similar to adults.
- There are suckers and hooks on the back.
- They develop directly.

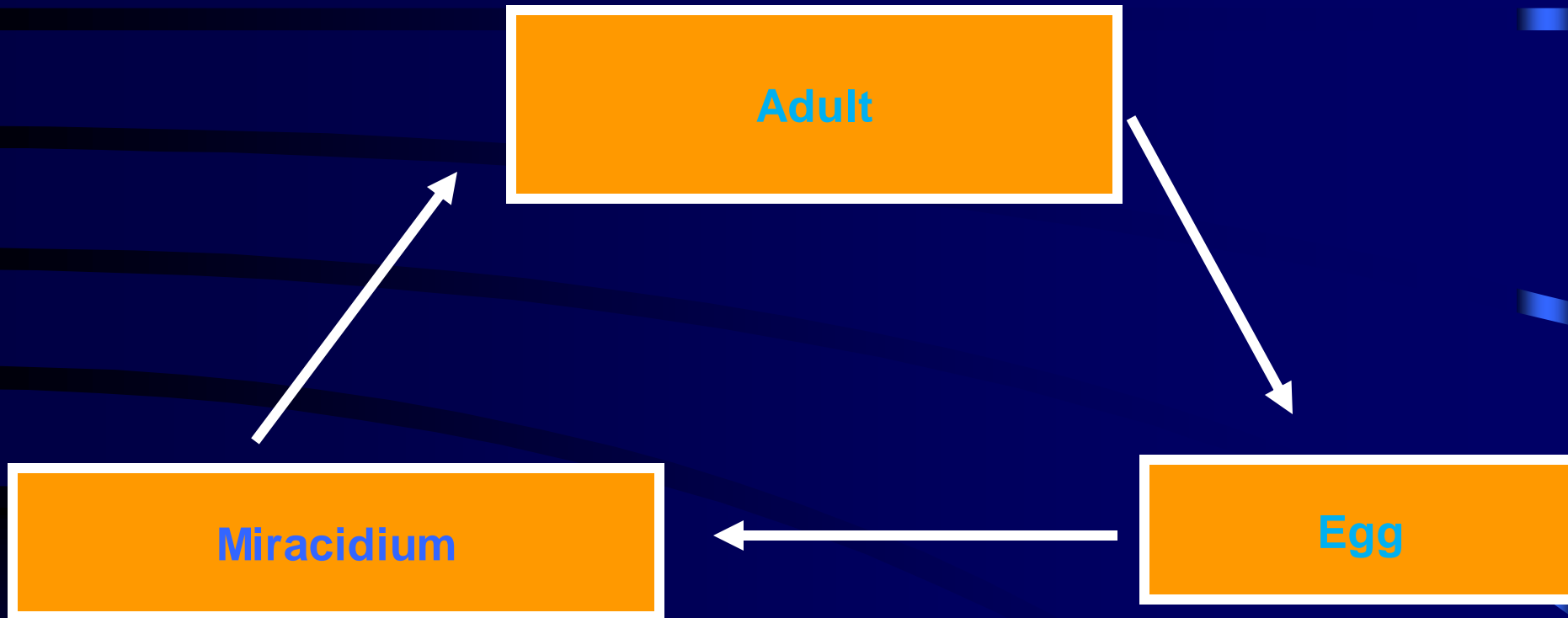
Monogenea

Dactylogyrus

Gyrodactylus

Monogenea

Life cycle



- It holds on to the host with its sucks and hooks at the back.

monogenean haptor

ASPIDOGASTREA

- There are about 80 species.
- They live on fish, slimy crustacea and turtles.
- It is morphologically similar to digenea.
- They can live a few days or weeks in water and salt water solution outside the host.
- They carry a ventral disc with multiple alveoli or sucks.
- They have no hooks.
- There are microtubules in their teguments.
- There is a suck on the back of the larvae form.
- They live as ecto and endo parasites.

DIGENEIA

- Their size ranges from 0.3mm to 10cm.
- There are about 11000 species.
- They are parasites that have health and economic importance.
- Their bodies are consist of one section.
- There is no body cavity.
- It is hermaphrodite except for *Schistosomatidae*.
- They are facultative anaerobic creatures.

Digenea

Body shape

It is generally leaf-shaped, dorso-ventral flattened.

Digenea

Body shape

Short-plump

(Paramphistomum)

Thin and long

(Schistosoma)

Digenea

Body shape

Some species have a collar-like formation with one or two rows of thorns/spine on the front parts of the body.

(Echinostomatidae)

Digenea

Tegument structure

Smooth

(Dicrocoelium sp.)

Or

Thorned/spined

(Fasciola sp.)

Digenea

Holding organelles

It has 2 **suckers** (**mouth** and **abdominal** sucker).

But, there is an other third sucker (**genital sucker**) in the *Heterophyes* genus.

Digenea

Nervous system

nerve collar



Reproductive System:

It is a hermaphrodite except for *Schistosomatidae*.

Male reproductive organs

Testis (*Usually 2 pieces,
4 in Schistosomatidae*)

Vassa efferens

Vassa defferens

Sirrus sac

(*Vesikula seminalis + sirrus*)

Female reproductive organs

Ovarium (*Single*)

Oviduct

Ootype

(*Surrounded by Mehlis glands*)

Uterus

Genital hole



Digenea

- Egg yolk material is formed in the vitellogen glands on both sides of the parasite and pass through the ootype.

Digenea

- Eggshell is formed from the secretion of the mehlis glands.

Digenea

- Fertilization occurs in the Ootype.

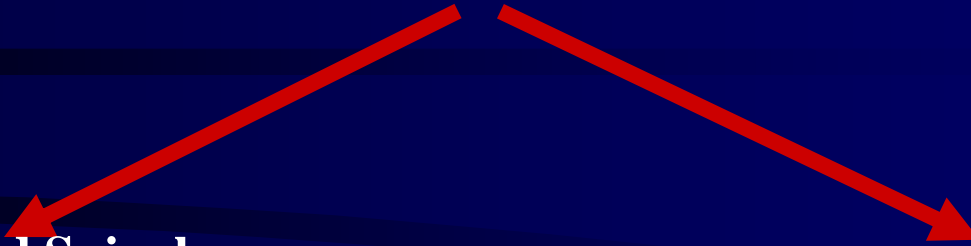
Digenea

Egg Types

There are 2 types of eggs.

Operculum and Spineless

Spined and not operculum



Larval Stages

Digenea

A) Miracidium

- The front is wide and the back is narrow.
- It is covered with cilia.
- There is a spine at the front end for penetrate the intermadiate host.
- Some species have one or two eye spots on the front.

Larval Stages

Digenea

B) Sporocyst

It is in the form of a thin-walled bladder.

There are cells in its inner wall that are capable of division.

Larval Stages

Digenea

C) Redia

It has a cylindrical structure.

It has mouth sucker (oral sucker) on the front.

The digestive tract and excretory system are developed.

There is a birth hole that opens to one side of the body.

Larval Stages

D) Cercaria

- Their bodies consist of the trunk and the tail.
- It has mouth, abdominal suckers, digestive tract, excretory and nervous system.
- The tail can be single or forked (**Furcocercaria** / *Schistosomatidae*).
- **Cercaria** shape differs by species.

Larval Stages

E) Metacercaria

It is the cystized form of the body of the Cercaria.

It is the **INFECTIVE FORM** of Digenea (except *Schistosomatidae*).

Digenea

Larval Stages

S

M

S

M

R

E / M / S / R / S / M

Biological/Life Cycle

Digenea

The developments are indirect. They use one or two intermediate host.

Adult parasite

FINAL HOST

Mammals, humans, etc.

INTERMEDIATE HOST (1 or 2)

1. Snails/Slugs 2. fish, ant etc.

Miracidium



Sporocyst



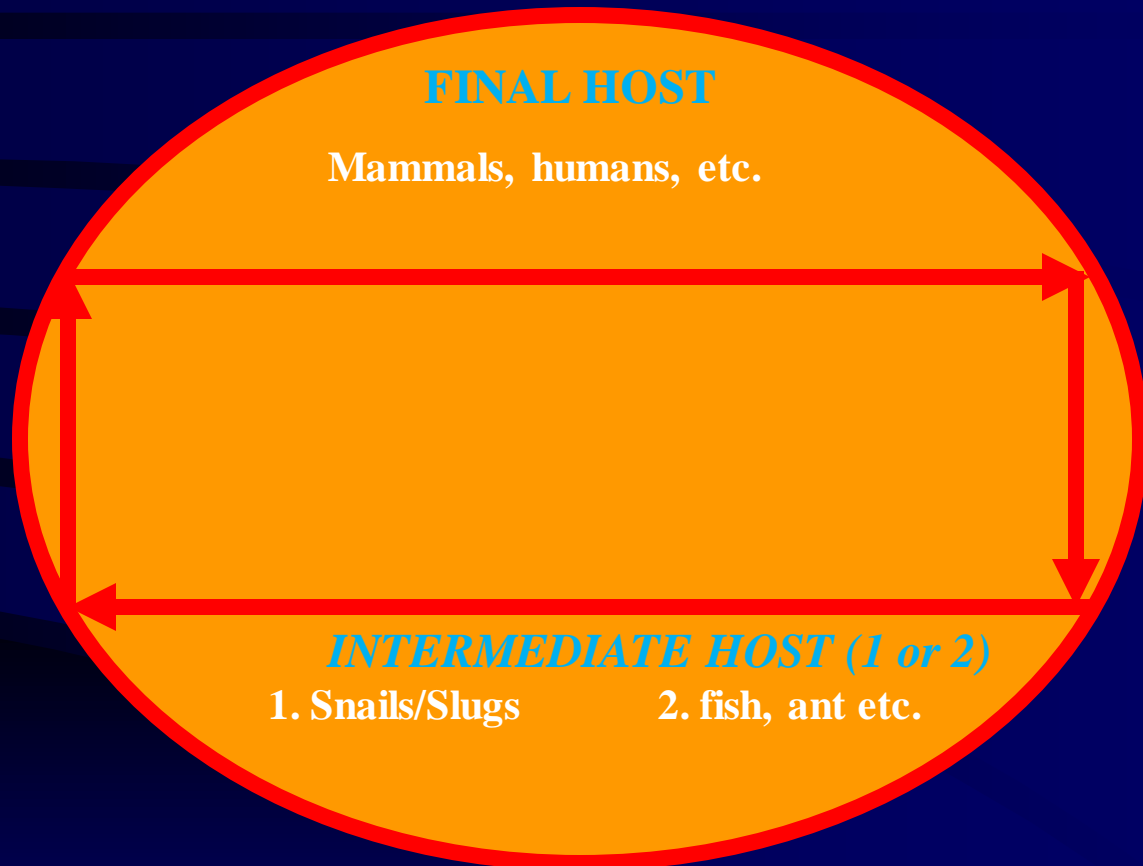
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Cercaria



**Metacercaria /
Furcocercaria**



DIGENEA

1. Family: FASCIOLIDAE

Genus: *Fasciola* - *Fascioloides* - *Fasciolopsis*

2. Family: DICROCOELIDE

Genus: *Dicrocoelium*

3. Family: OPISTORCHIIDAE

Genus: *Opisthorchis*

4. Family: HETEROPHYIDAE

Genus: *Heterophyes* – *Metagonimus*

5. Family: TROGLOTREMATIDAE

Genus: *Troglorema* – *Paragonimus*

6. Family: ECHINOSTOMATIDAE

Genus: *Echinostoma* – *Echinochasmus*

7. Family: PARAMPHISTOMATIDAE

Genus: *Paramphistomum*

8. Family: SCHISTOSOMATIDAE

Genus: *Schistosoma* - *Orientobilharzia*