Wednesday, 14 July 2021 4:55 PM

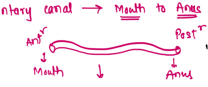
(1) Digestion | Digestive system.
- Intracellular (with in the cell) → Porifera
- Extracellular (occur outside the cells)

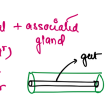
**Coelentrata & ctenophora :→ Extra (1st) + Intra (2nd)

Platyhelminthes → chordates => Extracellular

Digestive system :→ Alimentary canal + associated gland

Alimentary canal → Mouth (Antr) to Anus (Postr)





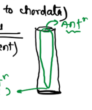
" Tube with Tube ① body plan"

complete alimentary canal → (Aschelminthes to chordata)

Platyhelminthes → Mouth (Present) | Anus (Absent)

(Incomplete alimentary canal)

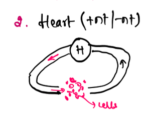
② (Blind sac body plan)



③ cell aggregate body plan => Porifera

(2) Circulation | Circulatory system.
↳ (Start from Annelida)

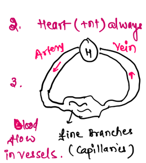
open
1. Cell or tissue directly bath in blood
2. Heart (+nt / -nt)



3. Blood flow in open sinuses.
(flow is irregular + flow with low pressure)

Example :-
- → Arthropoda
- → mollusca
- → Echinodermata
- → Hemichordata

closed
1. cell or tissue do not directly bath in blood
2. Heart (+nt) always



Blood flow in vessels.
(Blood flow regular + flow with High Pressure)

****Example :-
- → Annelida
- → Chordata
- → class cephalopoda of phylum mollusca.

(3) Respiration and Respiratory system [Exchange of Gases]

** Porifera, Coelentrata, ctenophora, platyhelminthes. [General body surface]

** Annelida → moist cuticle [cutaneous Respiration]

** Arthropoda → (Class)
- → Insecta = Cockroach [**Tracheal system]
- → Arachinida = Spider, scorpion [Book Lungs or Lungs]
- → Crustacea (aquatic) = Prawn [Book gill | gills]

* If Respiration occur by lungs => Pulmonary Resp.

* -"- -"- -"- -"- gills => Bronchial Resp.

* -"- -"- -"- -"- skin => Cutaneous Resp.

**** ** Mollusca → A feather like structure is +nt help in Respiration as well as Excretion.

(4) Excretion | Excretory system

* Porifera, coelentrata, ctenophora → General body surface.

* Platyhelminthes → ****Flame cells / solenocytes / Protonephridia

* Aschelminthes → Simple tubular structure

* Annelida → Nephridia

* Arthropoda →
- Insecta – Malphigian tubules
- Arachinida – Coxal gland
- Crustacea – Antennal gland or Green gland

* Mollusca → feather like gills.

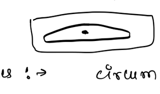
* Echinodermata → (exc. system absent) "Part of their body"

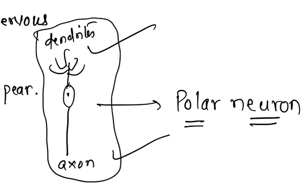
* Hemichordata → single glomerulus on their probocis.

(5) Nervous System :→

** Porifera :→ only phylum without nervous system.

** Coelentrata :→ first time neuron appear. Non-polar neurons.



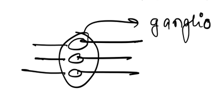


** Platyhelminthes :→ circumpharyngeal N. ring

" ladder like Nervous system"

→ ventral solid N. cord arises

** Annelida onwards → **ganglionated solid N. cord are +nt



(6) Endocrine System :→

* first time appear in **arthropoda** **

- Pheromones :→ To attract opposite sex
- Moulting (Ecdysis) :→ Ecdyson
  (change their outer layer) during the process of development

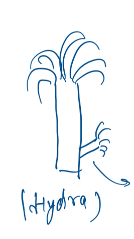
(7) Reproductive system :→

- Asexual → only in lower animals.
- sexual → found in all organism in animal kingdom.

① fragmentation :→ eg → Porifera, Coelentrata

Part of body is detached by chance. ↳ develop into whole organism.

② Budding :→
- → Endogenous (Inside the body) => "Gemmule" eg. Porifera
- → Exogenous (outside the body) eg (Coelentrata)



** Ctenophora onwards → only sexual reproduction is present.

Sexual reproduction :→

- gametes are formed
  - ♂ → male gamete (n) [Testis]
  - ♀ → female gamets (n) [ovary]
- ♂ + ♀ → (2n) diploid Zygote
  ↓
  fusion of male & female gamete is k/a sygamy or fertilization.

Two type of organism
- (Testis + ovary) in single body of organism → Bisexual or Monoecious or Hermaphrodite
  eg. (Porifera, Coelentrata, Ctenophora, Platyhelminthes)
- Testis → found in male; ovary → found in female → unisexual / Dioecious (Sexes separate)
  eg. Aschelminthes & onwards
  Ascaris { longer female; Smaller male }
  Exception => "Earth worm" (Bisexual)

Type of fertilization :→ ② types

① Internal fertilization => occur inside the body
{ * Terrestrial organism; * endoparasite }

② External fertilization => occur outside the body (occur in water)
eg. Almost all aquatic organism
{ exception :→ Phylum porifera → Internal fer.
:→ class chondrichthyes → Internal fer.
"(Although they are aquatic)" }

Type of Development :→

① Indirect → If larva Stage is present.

② Direct → If larva stage is absent.

* larva stage looks completely different from adults.

frog → larva => Tadpole
↳ development is indirect.

** Phylum :→ Porifera (Pore bearing organism) => Primitive multicellular animals

Commonly :- Sponges

(1) Habitat :→ Mostly marine organism, some are fresh water → (eg. spongilla = fresh water sponge)

(2) Level of organisation :→ Cellular

(3) Symmetry :→ Mostly assymetrical, some are radially symmetrical

(4) Germ layers :→ Diploblastic < ectoderm, endoderm

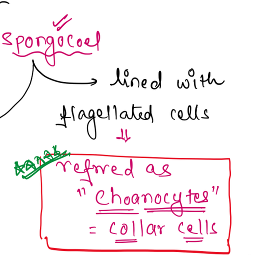
(5) Coelom :→ Acoelomate

(6) Digestion :→ Intracellular

(7) circulation

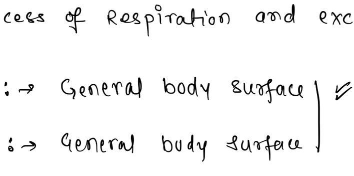
**** ** Canal system :→ or Water transport system

Water → Ostia → Canal → spongocoel → osculum



"Canal system & choanocytes are characterstic feature of sponge"

" flagella help in development of water current"



→ lined with flagellated cells ⇓ refred as "Choanocytes" = collar cells

** water transport system help in gathering of food, process of Respiration and excretion.

(8) Respiration :→ General body surface | Diffusion

(9) Excretion :→ General body surface |

(10) Nervous system :→ only animal phylum without Nervous system.

(11) Reproduction :→
- Asexual Reproduction < fragmentation; Gemmule formation (Endogenous bud) → Budding
- sexual reproduction :-
  - → Hermaphrodite | Bisexual
  - → Cross fertilization
  - → Internal fertilization
  - → Larva stage present (Indirect development) ↓ (Morphologically different from Adult)

* They are non-motile

* They have endoskeleton made up of < spicules; spongin fibres

Spicules → Inorganic < CaCO$_3$; SiO$_2$

(3) Ctenophora :→ Comb jellies | Sea walnut (common name)

(1) Habitat :→ Exclusively marine

(2) Level of organisation :→ Tissue

(3) Germ layers :→ Diploblastic

(4) Coelom :→ Acoelomate

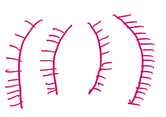
(5) Symmetry :→ Radial

(6) Digestion :→ Extra cellular + Intracellular

(7) Circulation :→ Circulatory system absent

(8) Resp | Ex. :→ GBS (General body surface)

(9) ** 8 - ciliated raw of comb plates used for locomotion (characterstic of ctenophora)



(10) Reproduction :→ "Only sexual reproduction"
- External fertilization
- Bisexual
- cross fertilization
- Larva +nt => Indirect developement

(11) ** Instead of cnidoblast they have "lasso cells"

(12) They produce their own light => Bioluminiscence **

Examples :- Ctenoplana, Pleurobrachia

** Helminthes = Generally endoparasite → They will complete their life cycle inside the body of host organism

Some important features of endoparasite
1. Their body is protected by thick cuticle.
2. Sense organ are simplified
3. They have well developed reproductive system.
4. Their digestive system is ill-developed or Absent
5. They have special mouth organs like hook and suckers
6. They have many larva stage in their life cycle.

(4) Platyhelminthes :→ Commonly k/a **Flat worms** **
Because their body is dorso-ventrally flattened

(1) Habitat :→ Mostly they are endoparasite in animals including humanbeings. some are free living → Planaria (Dugesia) (Aq + Terr.)

(2) Level of org :→ Organ

(3) Symmetry :→ Bilateral

(4) Germ layers :→ first triploblastic | Triploblastic Acoelomate

(5) Coelom :→ Acoelomate

(6) Digestion | Digestive system :→
Incomplete alimentary canal < mouth +nt; Anus -nt
(Blind sac body plan)
** * Digestive system is absent in **Tenia** **
(They absorb food through their body surface)
(* If Digestion +nt mostly Extracellular)

(7) Circulation :→ No circulatory system

(8) Respiration :→ GBS (endoparasite :→ Anaerobic Respiration)

**** (9) Excretion :→ flame cells or Solenocytes or protonephridia
Ⓕlatworm → Ⓕlame cells
"It perform the function of excretion as well as osmoregulation" (2 function)

(10) Nervous system :→ ladder like

(11) Reproduction :→
- Hermaphrodite = Bisexual
- Other cross — Tenia (Tape worm) ↓ "(Self fertilization)"
- Internal
- Many larva stage (Indirect development)
- mostly sexual — Asexual ↓ Process of Regenaration ↓ ** Highest power of Regeneration eg. Planria (Dugesia)
- well developed Reproductive Reproductive system

* some endoparasite have mouth organ like hooks, suckers.

③ Examples :→
- Planaria (Dugesia) → free living
- Liver fluke → fasciola hepatica
- Tenia → Tape worm ↓ (Intestinal parasite)

T. Saginata (Beef Tapeworm) ; T. Solium (Pork Tapeworm)

cysticercus larva → Infective stage
disease is also k/a cysticercosis

* Aschelminthes :→ Body is circular in cross section Hence named Roundworms. **
(Nematodes)

1. Habitat :→ A large number are free living, may be aquatic or terrestrial. There are several parasitic species which live within the body of animals or plants. , endo

2. Level of organisation :- organ-system ✓

3. Symmetry :- Bilateral ✓

4. Germ layers :- Triploblastic ✓

5. Coelom :- **Pseudocoelomate**

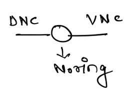
6. Digestive system :- Complete alimentary canal (mouth + Anus) ** (Tube with in Tube body Plan)
Alimentary canal with a well " developed muscular pharynx." **

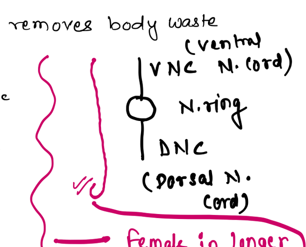
7. Circulatory system :- Absent ✓

8. Respiration :- Through GBS (General body surface)

9. Excretion :- Excretory tube removes body waste from the body

10. Nervous system :→





(11) Reproductive system :→
- sexes are separate (dioecious)
- sexual dimorphism +nt (male & female are distinct) — Female is longer; male is shorter & its tail curved ventrally
- Fertilization internal
- * Development may be → direct (young one resembles the adult) or → Indirect (young one do not resemble with adult)

Examples :-
- Ascaris (Round worm)
- ** Wuchereria (filarial worm) => viviparous → It blocks lymphatic vessels. ↓ "Elephantiasis" or filariasis — vector culex mosquito
- Ancylostoma (hook worm)
- Trichinella spiralis → viviparous
- {Oxyuris or Enterobius → pinworm. (itching occur in anal part)}

*** (Monogenetic parasite) — Intestine
Those parasite which complete their life cycle in single host.

Phylum = Annelida (Latin, annulus : little rings) (metameres)

1. Habitat :- They may be aquatic (marine or freshwater) or terrestrial; free living and sometimes parasite. → "Leech" (Ecto parasite) (earthworm)

2. Level of organisation :- organ-system ✓

3. Symmetry :- Bilateral ✓

4. Germ layer :→ Triploblastic ✓ (first Eucoelomate)

5. Coelom :→ Eucoelomate (schizo)

6. Digestive system :→ complete alimentary canal with muscular pharynx.

7. Circulatory system :→ closed, Respiratory pigment dissolved in plasma (Haemoglobin)

8. Respiration :→ occur through moist cuticle. (as in earthworm) **

9. Excretion :→ Nephridia help in Excretion & osmo regulation → "Earthworm" ↓ Pharyngeal, Septal, Integumentary = (skin)

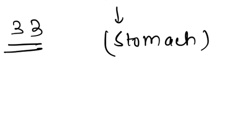
10. Nervous system :→ Paired ganglia connected by lateral nerves to a double ventral solid N. cord.

11. Reproductive system :→
They may be unisexual → Example Nereis (aquatic form) → (male & female are different)
or Bisexual → Example Earth worm (pheretima) (Terrestrial); Leech (Hirudinaria) → Ectoparasite ↳ "Blood sucking leech" (sanguivorous) **
** (larva (Absent) Development is direct)
Sexual reproduction, cross fertilization
Development may be → direct or Indirect ✓

** • Body is metamerically segmented

✓ They possess longitudinal (inner) and circular (outer) muscles which help in locomotion **

** Leech the no. of body segments are fixed = 33



epi cuticle

✓ Body is covered by thin moist cuticle, secreted by epidermis

✓ Aquatic Annelids like Nereis possess lateral appandages, Parapodia which help in swimming.

✓ Earthworm posses chitinous setae which help in locomotion.

*** Phylum :- *** Arthropoda (Arthros - joint, poda - Appendages)
they have jointed appendages.
** [Largest phylum of Animalia include insects) **

1. Habitat :→ found in all type of Habitats. (ubiquitous)

2. Level of organisation :- organ-system ✓

3. Symmetry :- Bilateral ✓

4. Germ layers :- Triploblastic ✓

5. Coelom :- Eucoelomate ✓ (schizo) ** ✓

6. Digestive system :- complete alimentary canal.

** Mouth parts of insects (cockroach)
(1 labium, 1 Labrum, one hypopharynx (tongue), 2 mandible and 2 maxillae)
Ex. of Homologus organ

(1) • Biting & chewing type – cockroach, Grasshopper, termites, beetles, caterpillars.

(2) • Piercing & sucking type – Mosquitoes, bedbugs, fleas, aphids

(3) • chewing & lapping type – Honey bee
(Lap means to drink by scooping with tongue)

(4) • Sponging type – Houseflies & fruitfly

(5) • Siphoning type – Butterflies & moths

7. Circulatory system – open type, Blood is colorless & called haemolymph and contain white corpuscles.

8. Respiratory system –
- Crustacean (aq. form) – gills ✓
- Insecta – Tracheal system
- Arachnida – Book lungs or tracheae

*** Limulus (king crab) respire by book gills

Spongin fibre → organic substance (Protein)

*** point → ** canal system, choanocytes, internal fertilization, without Nervous system

Body plan = cell aggregati

Example → 1 Scypha = Sycon (Marine)

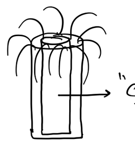
→ 2 Euspongia = Bath sponge (Marine)

→ 3 Spongilla = fresh water sponge

Phylum :- Coelentrata or Cnidaria

(enteron = gut)

Cnidaria ↓ (cnidoblast) special cells



(1) Habitat :→ Mostly marine & some are fresh water (eg. of fresh water coelentrati is Hydra)

(2) Level of organisation :→ Tissue**

(3) Symmetry :→ Radial

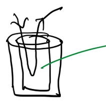
(4) Germ layers :→ Diploblastic

(5) Coelom :→ Acoelomate

(6) Digestion :→ Extra + Intra cellular
1st 2nd
(single opening act as mouth & Anus)
↓
(Blind sac)

(Partial Digestion)

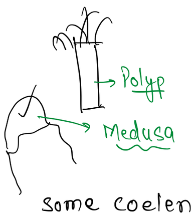
(7) Circulation :→



(8) Respiration + Excretion :→ General body surface

(9) Nervous system :→ ** first Non-polar neuron arises in coelentrates.

(10) Reproduction :→ Asexual :→ fragmentation, Exogenous bud (External bud)
Sexual :→



- * Hermaphrodite or Bisexual
- * Cross fertilization
- * External fertilization
- * larva stage present = Indirect development

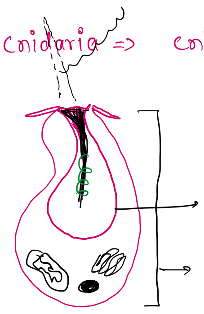
Some coelentrati shows polymorphism**
↓
"more than one morphological form in their colony"

For eg Obelia, Physalia

Cylindrical form = Polyp, sessile
umbrella shape = Medusa, free swimming

(sessile) Polyp —asexually→ Medusa (free swimming)
Medusa —sexually→ Polyp
*** "Metagenisis"
"Alternation of generation"

*** Cnidaria => cnidoblasts or Cnidocyte (Hypostome + Tentacles)
↓
Contain stinging capsule or nematocyst → ** Penetrant
↓
inject toxin in prey



* Anchorage, defense, for capaturing Prey.

Examples = $\boxed{8}$

* Some coelentrats have exoskeleton **** $CaCO_3$ => Corals

****
1. Hydra = Fresh water sessile polyp form only
2. Physalia = Portugese man of war (Polymorphism)
3. Obelia = Sea fur (Polymorphism)
4. Aurelia = Jelly fish (Medusa form only)
5. Adamsia = sea anemone (Polyp form only)
6. Corals = exist only in poly form have $CaCO_3$ skeleton.
↓
Pennatula = Sea Pen
Gorgonia = Sea fan
Meandrina = Brain coral

9. Excretory system — Crustacean - Antennal | Green gland
Insecta - Malphigian tubules
Arachnida - Coxal glands or Malphigian Tubules

9a. Nervous system - ganglionated

10 Reproduction :-
- mostly dioecious (unisexual)
- fertilization usually internal
- Mostly ** oviparous
- Development < Direct or Indirect

(scorpion - viviparous)

Unique :-

(Homopolysaccharide) (1.7 - 1.8 million) (cephalothorax)

- * over 2/3 of the all named species are arthropods
- * Body is covered by chitinous exoskeleton ***
- * Body is divided into Head, Thorax and abdomen
- * Sensory organs like antennae eyes (compound and simple, statocyst or Balancing organs are present (+nt in aquatic form for balancing)
- * Arthropods are first animals to have endocrine system. (Pheromones) / (Ecdyson)

Examples :- ⑧

3+3+2

Three useful insects
- Apis - Honey bee
- Bombyx - silkworm
- Laccifer - Lac insect

Living fossil ↑ Limulus (king crab)
LG → Gregarious pest (Locust)

Three harmful insects (act as vector to transmit disease causing agent)
** (Mosquitoes) I

Female anopheles — Plasmodium
Culex — Filarial worm
Aedes — chicken guinea, yellow fever, Dengue fever. (virus)

LG → Limulus - King crab (Living fossil)
→ Gregarious Pest - Locust

Diagram - Locust, Butterfly, scorpion, Prawn

Crustacean - Aq. arthropod, cephalothorax + Abdomen
* Head bears a pair of antennae and
* a pair of compound eye.
Cephalothorax is covered by shield (chitin) called "$\boxed{\text{Carapace}}$"** → carapace **
Developement include larva stage. (Indirect)
Examples
- Daphnia (water flea)
- Prawn (Palaemon)
- Carcinus (crab)

Palaemon

Arachnida :- - cephalothorax + Abdomen
- Antennae absent
- Development direct
Example
spider (Aranea) and scorpion (Palamnaeus)

Insecta :- ****
* Largest class of animals.
* > 7,50,000 species
* 1-billion insect for every human being
* Insects are most successful land invertebrates and only competitors with humans for dominance.

Other Examples :-
Lepisma - Silver fish
Periplanata - Cockroach
Microtrema - Termite
Pediculus - Head Louse
Xenopsylla - Rat flea
Musca - House fly
Vespa - Wasp

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