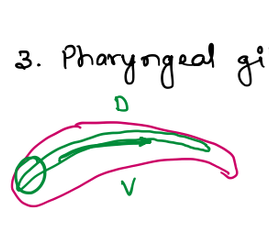
Thursday, 5 August 2021 6:53 AM

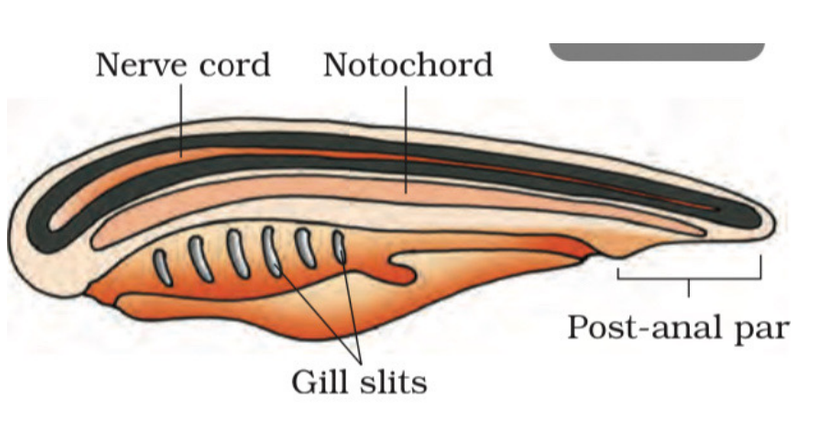
Phylum :- chordata

* chordates are most highly evolved multicellular animals
* They are characterised by four basic (fundamental) features present either throughout or during early embryonic life.

1. Notochord :→ It is mesodermally derived solid flexible rod like structure situated on mid dorsal side b/w the CNS & alimentary canal.
2. Dorsal hollow tubular N. cord :→ CNS is always hollow and lies dorsal to the notochord. The cavity of CNS is neurocoel. → filled c̄ CSF
   (Ectodermal)
3. Pharyngeal gill slits :- All chordates possess at some stage of life, a series of paired openings - the gill slits on the lateral side of pharynx.



4. Post anal tail → It may be reduced or absent in many adult chordates.



All chordates → ✓organ system level of organisation
✓Bilaterally symmetrical
✓Triploblastic
✓ Eucoelomate (Entero)
✓ Possess closed circulatory system.
✓ CNS is dorsal, hollow and single
✓ Heart is ventral

N: D(H) V(N.S)
C: D(N.S) V(H)

Uro = tail
SAD = DAS
Cephalo => Head

Phylum chordata
| Sub-phylum
① Urochordata (Tunicata) ② Cephalochordata ③ Vertebrata (craniata) (Higher chordates)
lower chordates or protochordates

Urochordata:
* Exclusively marine
* Notochord +nt only in larval tail
* Ex. Ascidia, Salpa, Doliolum ✓
* covering => Tunicin (cellulose like) substance

Cephalochordata:
* Exclusively marine
* Notochord extended from Head to tail region & persistent throughout their life.
Example :- Branchiostoma = (Lancelet or = Amphioxus)

Vertebrata (Division)
- Agnatha (lacks Jaw) → class → 1. cyclostomata
- Gnathostomata (bears Jaw) → ③ superclass
  - Pisces ✓ [True fish] (Bear fins) → class
    1. Chondrichthyes (Cartilagenous fish)
    2. Osteichthyes (Bony fishes)
  - Tetrapoda (Bear limbs) → class
    1. Amphibia ✓
    2. Reptilia ✓
    3. Aves ✓
    4. Mammalia ✓

Icthyology → "Study of fish"

Vertebrata :- (craniata)

* They are advanced chordates
* Member of this subhylum possess notochord during the Embryonic period. ✓
* The notochord is replaced by cartilagenous or bony vertebral column.
* "Thus all vertebrates are chordates but all chordates are not vertebrates"
* They have ventral muscular heart with two, three or four chambers.
* Possess Pair of kidney for Excretion and osmoregulation.
* They have paired appandages which may be fins or limbs.
* They are unisexual and Lack asexual reproduction.

class :→ cyclostomata (ap) = (circular mouth)

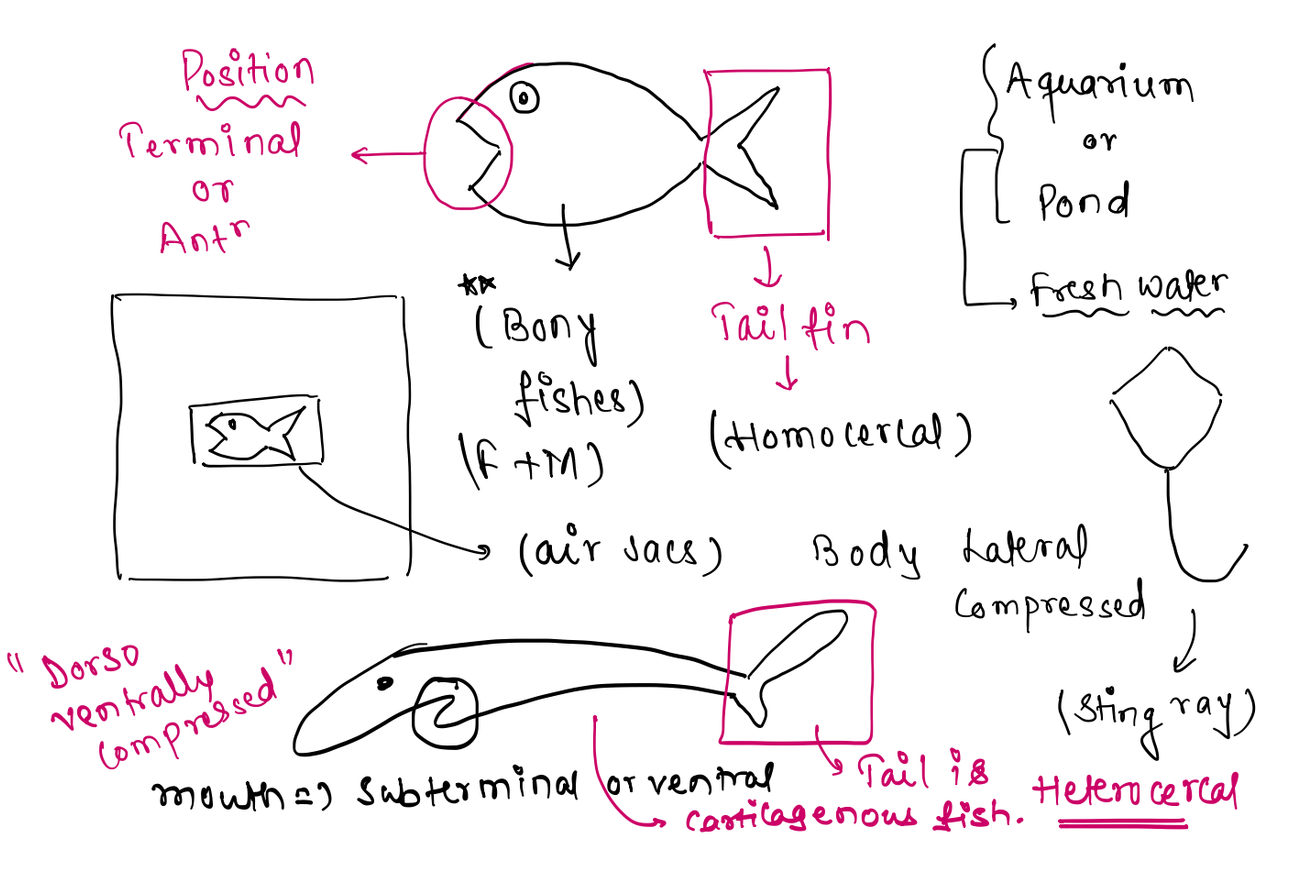
* Habitat :→ Petromyzon (Lamprey) - Marine as well as Fresh water.
  Myxine (Hag fish) - Exclusively marine
* All living members of class cyclostomata are ectoparasite on fishes.
* Digestive system :- They have sucking and circular mouth without jaws.
* circulatory system :→ closed type, two chambered Heart. → auricle & ventricle
* Respiratory system :→ Respiration by 6-15 pairs of gill slits for respiration. 6 15 (1+5) = 6
* Excretory system :- Mesonephric kidney
* Reproduction :→ unisexual, external fertilization, they are are marine but migrate for spawning to fresh water. After spawning, within a few days, they die. Their Larvae, after metamorphosis, return to the ocean.
  eg. Larva found in Petromyzon ∴ developement is indirect.
  In myxine Developement is direct. → (larva stage Absent)
* They have elongated body devoid of scales and paired fins. (unpaired fins are +nt).
* cranium and vertebral column are cartilagenous.
* They are called Jaw less fish (not true fishes)

Super class - Ⓟ study of fishes = icthyology

class → characters ↓	Chondrichthyes (Cartilagenous fishes)	Osteichthyes (Bony fishes) (Bachpan) ✓
1. Habitat	Marine	Marine + fresh water
2. Paired Appandages	+nt ✓	+nt ✓
3. Jaws	+nt ✓	+nt ✓
4. Exoskeleton	Placoid scales	cycloid/ctenoid or ganoid scales
5. Endoskeleton	Cartilagenous	Bony
6. digestive system	Mouth → ventral ✓ Cloaca +nt	Mouth - Terminal ✓ Anus +nt
6a. circulatory system	② chamb Heart ✓	② chamb Heart ✓
7. Respiratory system	gills 5 or 7 pairs gill slits are separate without operculum	4 pairs covered by operculum on each side
8. Excretory system	• Mesonephric kidney • ureotelic (Urea)	• Mesonephric kidney • Ammonotelic (Ammonia)
9. Nervous system	• 10 pair cranial N.	• 10 pair cranial Nerves.
10. Reproductive system	• In males pelvic fins bear claspers (copulatory organ) ∴ fertilization is internal. • Sexes are separate • Many of them are viviparous Direct development	• External fertilization • Sexes are separate • Mostly ovi - parous direct development
11.	Notochord is persistent throughout life. Skin is tough Teeth are modified placoid scales, backwardly directed. Jaws are very powerful Due to absence of air bladder, they have to swim constantly to avoid sinking. Poikilotherms Heterocercal tail fin.	air bladder is +nt provide buoyancy. Homocercal tail fin

(Phylum Porifera)
(class chondrichthyes) (sexual dimorphism)
(Internal fertilization although aquatic)

Shark
Skates
rays



warm blooded → Body temp is not affected by environment.
or
Homeotherms ↳ Two classes → Birds (Aves), mammals.

"Cold blooded or Pokilotherm" ↳ All except birds & mammals.

Two classes (current cut)
air current → Aves (streamlined body)
water current → fishes

Examples :- (CST₂P)
- C → Chorcharodon (Great white shark)
- S → Scoliodon (Dog fish)
- T → Trygon (Sting ray)
- T → Torpedo (Electric ray)
- P → Pristis (Saw fish)

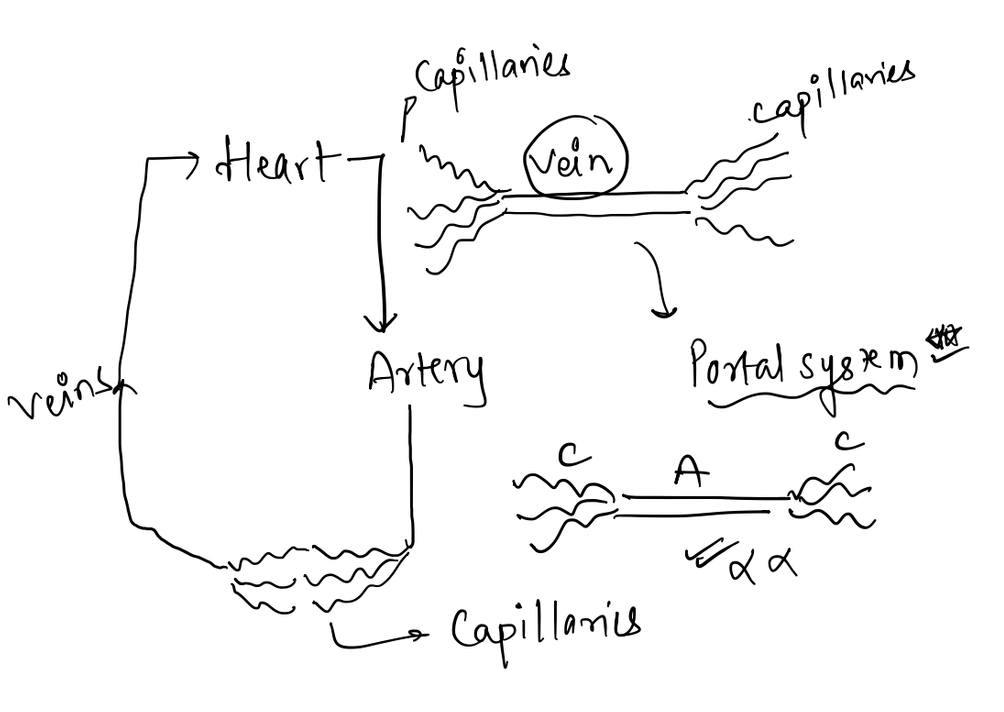
(Small power) Electricity is produced by muscles

⑦
- F → Fresh water → RCC: Rohu = Labeo ✓, Catla = Catla ✓, Clarias = Magur ✓
- A → Aquarium (ABP) → Betta fish (fighting fish), Pterophyllum (Angel fish)
- M → E → Exclusively Sea → Sea horse (Hippocampus) → swim vertically; male → Brood pouch → (Take care of eggs of female); Exocoetus (Flying fish) (long Dorsal fin (gliding))

class :- Amphibia (Amphi - dual, bios - life)
(Live in aq. as well as terrestrial life)

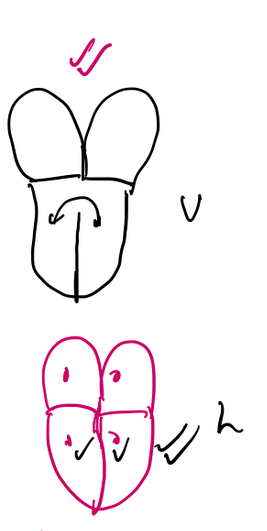
* first vertebrates to invade the land
1. Habitat :→ Live in moist soil and fresh water → for Reproduction process
2. Digestive system :→ Acrodont teeth, Alimentary canal, urinary & reproductive tract open into a common chamber cloaca.
3. circulatory system :→ Heart is ③ chambered (2 Auricle + 1 ventricle)
4. Respiratory system :→ Occur through gills, lungs, buccal cavity and skin. frog → skin, Lungs, Bucco pharyngeal cavity; moist skin
   Tadpole → occur only by gills. Extra-?
5. Excretory system :→ Pair of kidney. (mesonephric) Ureotelic,
5a. Nervous system :→ 10 pair of cranial nerve.
6. Reproductive system :→ unisexual, oviparous, external fertilization, indirect development (larva +nt) eg. Tadpole Larva
   Uro, cauda → Tail
7. Most of them have two pair of limbs.
8. Body is divisible into head and trunk. → Neck is absent → frog → order Anura
9. Amphibian skin is moist (without scales)
10. The eyes have eyelids. (Third Eye lid) Covers middle ear)
11. A Typanum represents ear. (middle + Internal ear +nt)
12. Hepatic & Renal portal system well developed.

Example
- F → Frog (Rana)
- R → Icthyophis (limbless amphibian)
- T → Toad (Bufo)
- T → Tree Frog (Hyla)
- S → Salamander (Salamandra) → "Larva +nt" → Viviparous + tail



class - Reptilia

* Latin repere or reptum, to creep or crowl.
* The class name refer to their creeping or crawling mode of Locomotion.
* Reptiles are first vertebrates, which have fully adapted to terrestrial life
* Jurassic Period :- Golden Age of Reptiles. Period → Evolutionary
* Habitat :- Mostly terrestrial. A few such as tortoise, crocodile etc, live in water
* Digestive system :- • Alimentary canal leads to cloaca • Acrodont teeth in both jaws.
  Reptiles, Birds, Terr. Insects → uricotelic
* circulatory system :- Three chambered Heart ② Auricle ① ventricle incompletely divided by septum.
  crocodile, Alligator Heart is completely four chambered.



* Respiratory system :- only through lungs
* Excretory system :- • Pair of kidney → metanephric (Reptiles birds mammals) • chief excretory product uric acid in land forms and urea in aq. forms.
* Nervous System :- 12 pairs c. Nerves. → (Reptile | Birds | mammals)
* Reproductive system :- • Internal fertilization • oviparous • Direct Development • unisexual, exhibit sexual dimorphism → male & female → External features
  "cleidoic eggs" → covering CaCO₃
  Terrestrial → Lungs
* Reptiles have dry and non-glandular skin. Their body is covered by dry & cornified skin, skin is covered by exoskeleton of bony epidermal scales or scutes.
  "scales prevents loss of water" → scales, scutes → Adaptation for terr. life
* Snakes & Lizards shed their scales as "skin cast" by process called moulting
* They do not have external ear openings, Typanum represents ear.
* Limbs when +nt, two pairs.
* All Poikilotherms. [ectotherm or cold blooded]
  Bird & mammals → warm blooded

Example [10]
* four chambered Heart → ② → crocodile (crocodilus), Alligator (Alligator)
* Max life span → ② → chelone (Turtles), Tortoise (Testudo)
  Study => "Saurology"
* Three Lizards → ③ → Wall lizard (Hemidactylus), chameleon (Tree lizard), calotes (Garden lizard)
  Study => Serpentology
* Three snakes → ③ → viper (vipera) - Haemotoxic, cobra (Naja), Krait (Bangarus) - Neurotoxic
  all given ex. (Poisnous) venom.

class - Aves (Birds) = Body is stream lined

* Study of birds is called ornithology
(1) Habitat :- occur everywhere.
(2) Digestive system :→ The jaws in birds are modified into beak. ("Teeth absent") The digestive tract of birds has additional chambers, the crop and gizzard. Alimentary canal leads into "cloaca".
(3) circulatory system :→ Heart is four chambered. (2A, 2V) closed circulatory system.
(4) Respiratory system :→ It is occur by inelastic lungs. Air sacs connected to lungs supplement respiration.
(5) Excretory system :→ Metanephric kidney. urinary bladder is absent except Rhea. Excretory matter is chiefly "uric-acid"
(6) Nervous system :→ 12 pair of cranial Nerves.
(7) Reproductive system :→ • sexes are separate with sexual dimorphism.
   • Fertilization is internal. • Developement Direct
   • cleidoic eggs.
   • oviparous.
(8) The forelimbs are modified into wings. The hind limbs generally have scales and are modified for walking, swimming or clasping the tree branches. "Birds are evolved from Reptiles"
(9) skin is dry without glands except the oil gland at the base of tail (uropygeal or preen gland) = oil gland
(10) Endoskeleton is fully ossified (bony) and long bones are hollow with air cavities (pneumatic) → "Adaptation for flying"
(11) They are warm-blooded (homoiothermous) (endotherm) animals i.e. they are able to maintain a constant body temperature.
(12) Streamlined body, characteristic features of Aves are the presence of feathers and most of them can fly except flightless birds (eg ostrich)

A → 5
R → 10
A → 7
M → 14

Examples :- ⑦
- P → Pavo (Pea cock) (National bird of India)
- C → Corvus (Crow)
- C → Columba (Pigeon)
- P → Psittacula (Parrot)
- A → Aptenodytes (Penguin) flightless
- N → Neophron (vultures)
- S → Struthio (Ostrich) flightless

class - Mammalia (mamma - Breast)

* They are most successful animals today. Aq. mammals → "Absent in order - cetacea"
* They are hairy animals, (mostly +nt) the females which have milk producing mammary gland (functional mammary gland) to suckle their young ones.
(1) Habitat :→ They are found in variety of habitats. polar ice caps, deserts, mountains, forest, grasslands and dark caves.
(2) They have two pairs of limbs, adapted for walking, running, climbing, burrowing, swimming (whale) or flying. (Bats)
(3) The skin of mammals is unique in possessing "hair" (Absent in aq. mammals => order cetacea)
(4) External ears or pinnae are present. (Absent in aq. mammals)
(5) Digestive system :→ Alimentary canal opens out by Anus (cloaca) ✗
(6) circulatory system :→ ④ cham. Heart.
(7) Respiratory system :→ elastic lungs, +nt of diaphragm. Larynx = Sound box.
(8) Excretory System :→ Pair of kidney (metanephric). Ureotelic. (urea)
(9) Nervous system :→ 12 cr. Nerves.
(10) Reproductive system :→ Sexes separate, internal fertilization, viviparous (mostly) Development direct.

Class mammalia
| sub-class

Prototheria ✓	Metatheria ✓	Eutheria ✓
(egg laying mammals)	(marsupials)	(Placental mammals)
✓ Egg laying mammal	* Ear pinnae +nt ✓	* Pinnae +nt ✓
✓ cloaca +nt	* Corpus callosum absent	* corpus callosum +nt ✓
✓ cleidoic egg	* viviparous ✓	* viviparous ✓
eg. Ornithorhynchus (Platypus) → Ear pinna absent → mammary gland lack nipples → Corpus callosum absent → Placenta absent	② eg. Macropus (Kangaroo)	③ eg. Pteropus - flying fox ④ Balaenoptera (Blue whale) "Largest animal on Earth" ⑤ Equus (horse) ⑥ Canis (Dog) ⑦ Felis (cat) ⑧ Elephas (Elephant) ⑨ Rattus (Rat) ⑩ Camelus (camel) ⑪ Macaca (Monkey) ⑫ P. tigris (Tiger) ⑬ P. leo (Lion) ⑭ Delphinus (Dolphin)

order cetacea → Hair & Pinna absent

order - cetacea include whales, dolphins, porpoises
↓
skin smooth and hairless
External Ear absent