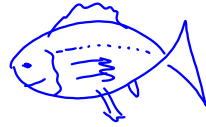


Osteichthyes "Bony Fish"

- K → Animals
- P → Chordata
- C → Osteichthyes

I. External Anatomy



a) Body shape



→ designed for efficient swimming
 ↳ "hydrodynamic"
 ↳ limits resistance/friction of the water

- ① Frictional drag
- ② Form drag
- ③ Turbulence

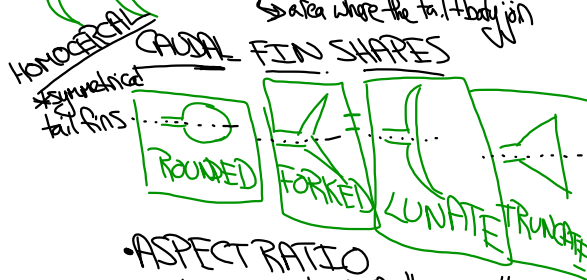
b) Tail → Caudal Fin



• function → propulsion (moving forward)

• NO MUSCLE in the tail
 • S-waves = UNDULATIONS (wave-like motion) from the head that travels to the tail

• CAUDAL PEDUNCLE
 ↳ area where the tail + body join

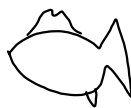


• ASPECT RATIO

↳ put a number to the "effectiveness" of the tail

$$A.R. = \frac{\text{fin height}}{S.A. \text{ (surface area)}}$$

↑ A.R. = fast
 ↓ A.R. = slow



Dorsal Fin + Anal Fin
 "Medial Fins"
 * Balance/Stabilization



"Paired Fins"
 i. Pectoral
 ii. Pelvic

function → turning
 Pectoral → "side to side" left to right
 Pelvic → "up/down"



Single-lens eye
 ↳ SPURIL (BLACK PART of Eye) → don't dilate → don't adjust for different kinds of light
 ↳ NO EYE-LIDS
 ↳ protruding eyes (stick out of the head)
 ↳ increase the field of vision
 ↳ see in color

f)



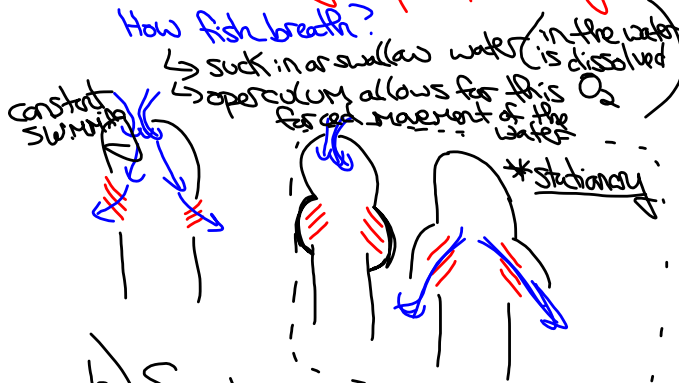
Mouth → "points the head" anterior
 teeth → sharp/tearing teeth
 vertical "belly side"

g)



Operculum → gill cover
 ↳ gill flap
 ↳ bony plate protects the gills

How fish breathe?



h) Scales

↳ tiny overlapping bony plates that cover the fish's body
 ↳ have different shapes
 ↳ protective

i)

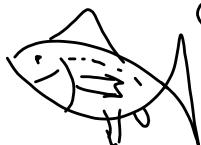


Lateral line

↳ a hollow tube that runs along the side of the fish's body
 extending from operculum → caudal peduncle

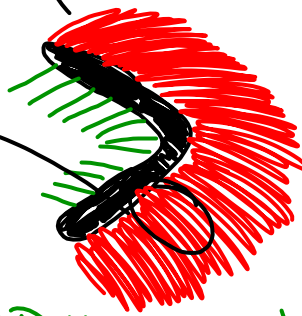
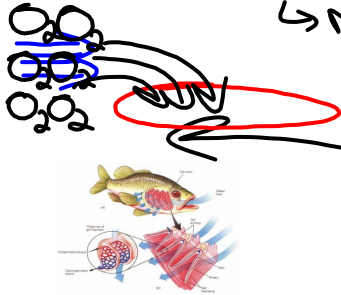
Function

- ① Detects vibrations in the water (allows schooling)
 ↳ sense surroundings
- ② Detects pressure !!



II. Internal Anatomy

a) Gills ($O_2 + CO_2$)
 ↳ site of gas exchange between the water + blood of the fish
 ↳ made up of 3 different parts



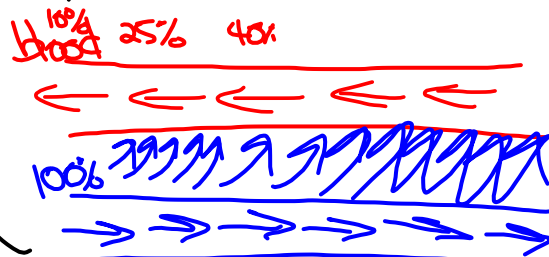
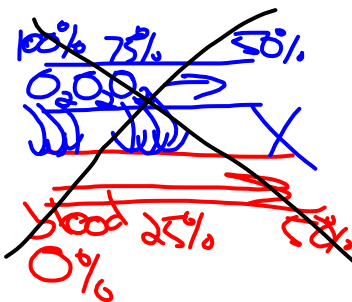
- ① Gill raker
- ② Gill arch
- ③ Gill filament

① Gill Raker → separates solid particles and prevents clogging

② Gill Arch → supportive structure

↑ S.A. ③ Gill filaments → oxygen exchange occurs "fil" are up w/ O_2 ↑

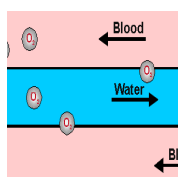
- Counter-current exchange
 ↳ two mediums (liquids) move flow in opposite directions
 ↳ allows for maximum exchange of materials



↳ allows for maximum O_2 absorption into the blood

- All respiratory surfaces must be moist!

↳ fish remain in water
 ↳ fish out of water dry up, the gills dry out suckly + stick together leading to suffocation.



II. Internal Anatomy

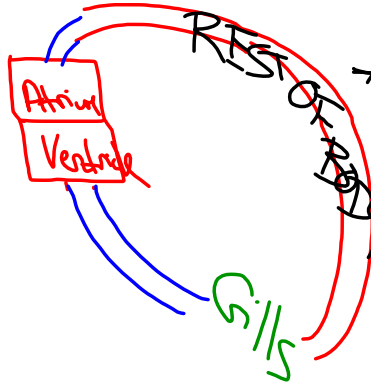
b) Heart

↳ pumps blood



* ECTOTHERMIC = "cold-blooded"

↳ body temp. is controlled by the external environment



* Single-loop circulation

* Two chamber heart

* Myoglobin
protein in muscle
designed to hold on to O₂

c) Swim Bladder

↳ controls buoyancy → ability to float



• gas gland
• oval organ

↳ increases or decreases in size

↳ result is density

↳ result is density

↳ inflating the S.B. raises the fish
deflating the S.B. lowers the fish

* exceptions NO S.B.

SHARKS TUNA
CATFISH
FLOUNDERS

d) Reproduction

① Courtship

↳ all the behaviors displayed to attract a mate

↳ mating season

② Reproduction

i. Spawning (external fertilization)
↳ egg + sperm fuse outside the body
↳ many eggs

ii. Copulation (internal fertilization)
↳ egg + sperm fuse inside the body
↳ fewer eggs

③ Hermaphroditism

↳ male + female reproductive structures

↳ deep sea fishes

④ Sex reversal

♂ M → ♀ F

♀ F → ♂ M

* dwarffish
↳ male will change to female if the female dies/leaves