①

Unit -I (B)

Air bladder and its modification

The air bladder is a dorsal gas filled hydrostatic organ in bony fish that regulates buoyancy allowing the fishes to remain at specific depths without swimming.

It develops as a dorsal outpocket from alimentary canal which later on gets converted into lungs in lungfishes, sound production, sound detection etc.

It is of two main types ① Physostomous (connected to the gut ② Physoclistous (closed) type.

① Physostomous (open type)

These bladders retain a connection to the esophagus through a tube called the pneumatic duct. fish with these types include Salmon and eels, they gulp air at the surface to fill the bladder and can release air through the gut.

Physoclistous - No connection to the gut
eg (cod, haddock) Gas levels are
regulated via diffusion through
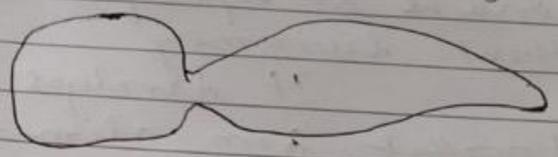Specialized blood vessels called the
rete mirabile and or red gland.

Diagram of Swimbladder

Functions of air bladder →

① Buoyancy - its primary role is
to help fish maintain buoyancy and
control their depth, by adjusting the
volume of gas inside, fish can rise
or sink without loss of energy on
swimming.

② Respiration → In lungfishes the air
bladder acts as an accessory
respiratory organ. It allows the
fish to gulp air and absorb
oxygen in low oxygen environm

③ Sound production — Many fishes use air bladder as a resonating chamber to produce sounds (eg drumming and croaking)

④ Auditory functions. It acts as a resonator to recieve sound in certain species, the weberian apparatus connects the air bladder to the inner ear, enhancing their hearing

⑤ Sensory / Pressure Regulation. It can sense the changes in external water pressure helping the fish to main equillibrium.

Conclusion → The swim bladder or air bladder is most important organ in fishes that helps in many vital physiological functions in fishes like pressure estimation, Respiration buoyancy, sound production etc.