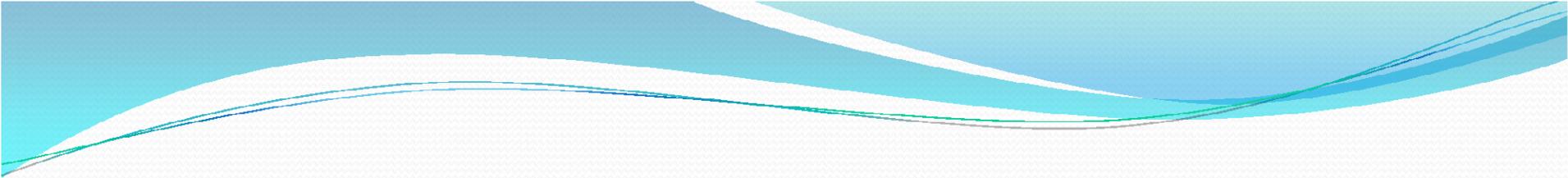


# Pseudobranch



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- The term pseudobranch was used for hemibranch which has lost its respiratory function and receives already oxygenated blood from the efferent branchial artery
  - It develops early in the embryo and may be respiratory in embryonic stage but not in the adult
  - It present in large number of teleost but absent in cat fishes (as *Wallago*, *Mystus*), the eels and species belonging to *Gymnarchus* and *Cobitis*
  - In sharks, rays, chondrosteans and holosteans, the pseudobranch derived from the posterior mandibular hemibranch but in teleost it is derived from posterior hyoidean hemibranch

# Structure

- It varies in shape, size and location in various teleost but its blood supply and innervations suggest a common plan
- Three types of pseudobranch
  1. free type
  2. covered type
  3. Glandular type

**Free type:** Reduced gill like structure with a row of free filaments and lamellae. eg: *Hilsa, Gadusia*

**Covered Type:** Gill like structure covered with the opercular membrane and connective tissue. eg: *Glossogobius, Gadus, Cyprinus*

**Glandular Type:** Pseudobranch is deeply embedded in the thick connective tissue of opercular cavity or the buccopharynx. eg: *Channa, Anabas, Notopterus*

# Histology

- Each lamellae of pseudobranch has a central vascular core and epithelial layer on each side
- Pseudobranch in teleost contains large number of acidophilic secretory cells
- Chloride cells and mucus cells are also present in the free pseudobranch

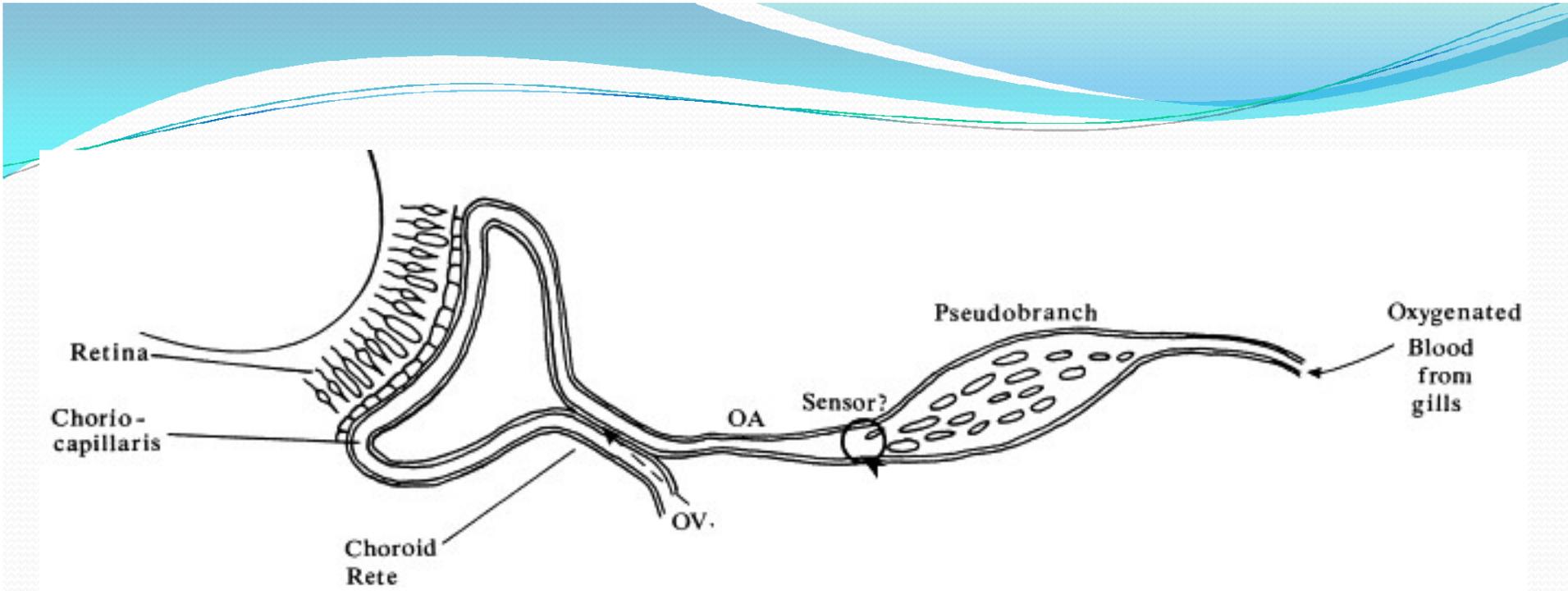
# Function

- Pseudobranchial cells may produce carbonic anhydrase like enzyme which help in concentration of oxygen in the blood going to retina and regulation of intraocular pressure
- Pseudobranchial chloride cells perform osmoregulatory function and regulate uptake and secretion of Na and Cl ions from water
- Associated with sensory function such as  $O_2/CO_2$  tension in blood, monitoring blood pressure in the arteries and detection of pH level.
- In Channa and Anabas performs the function of an oxygen multiplier



## Blood supply to the fish eye

- Blood is titrated in the pseudobranch to a pH value just above that which induces the Root effect.
- Subsequently, only a small amount of acid needs to be released from the retina to switch on the Root effect in the choriocapillaris and to liberate oxygen from the hemoglobin.
- The resulting increase in oxygen partial pressure induces a back diffusion of oxygen in the choroid rete mirabile and thus generates high oxygen partial pressures that are necessary to ensure the oxygen supply to the avascularized fish retina



## Blood supply to the fish eye

