RESPIRATORY SYSTEM OF VERTEBRATES

In vertebrates there are two main types of respiratory organs they are gills and Lungs. Gills for respiration in water and lungs for respiration in air. Both gills and lungs may occur in same animal. But respiration may also occurs by several other parts of the body as well, though not to the same extent.

IN FISHES:

In Elasmobranchs the respiratory organs are gills which are borne by gill pouches. There are five pairs of gill pouches. Each with communicate with the pharyngeal cavity by the large Internal branchial aperture and opens to outside by exterior gill slits. The mucous membrane lining the gill pouches gives a series of highly vascular horizontal branchial lamellae. The first gill pouch lies between the hyoid and first branchial arch and the last gill pouch is present between 4th and 5th branchial arches. There are two types of gills — (i) Holobranch or complete gills when a branchial arch bears Two sets of gill lamellae and (ii) Demibranch or hemibranch or half gill, when single set of gill lamellae is present. The hyoid arch support only a demibranch and the first four branchial arch Support holobranch. The last branchial arch is gill less.

Dipnoans (lung fishes) capable of breathing in air by lungs. Although dipnoans posses gills as well as lungs. The nostril help in aerial respiration. The external nostril lies at margin of mouth and the internal nostril open into short trachea through buccal cavity and slit like glottis. The trachea passes into lungs which are similar to other tetrapods in structure and function. The lungs is placed dorsal to the gut while in tetrapods it is ventral.

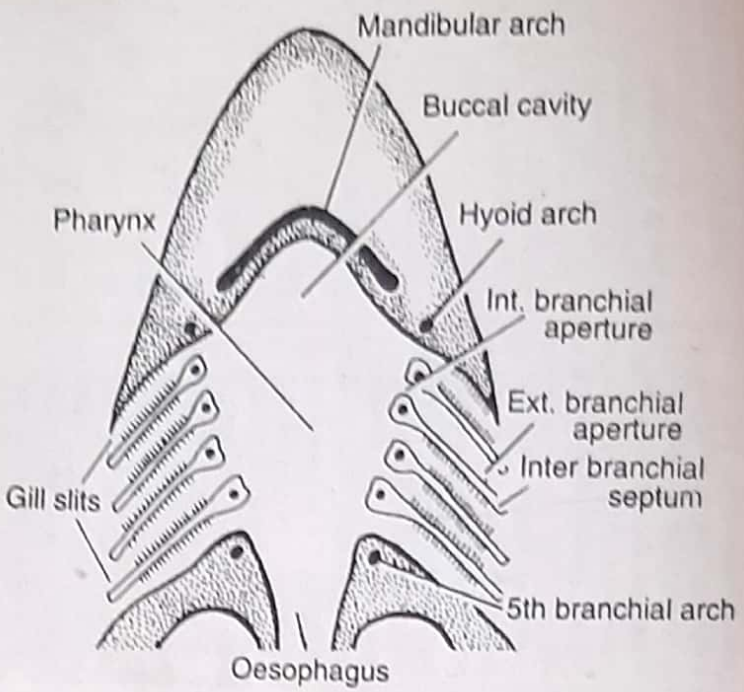

Fig. 11.1 Horizontal section of the anterior region to show the position of gills

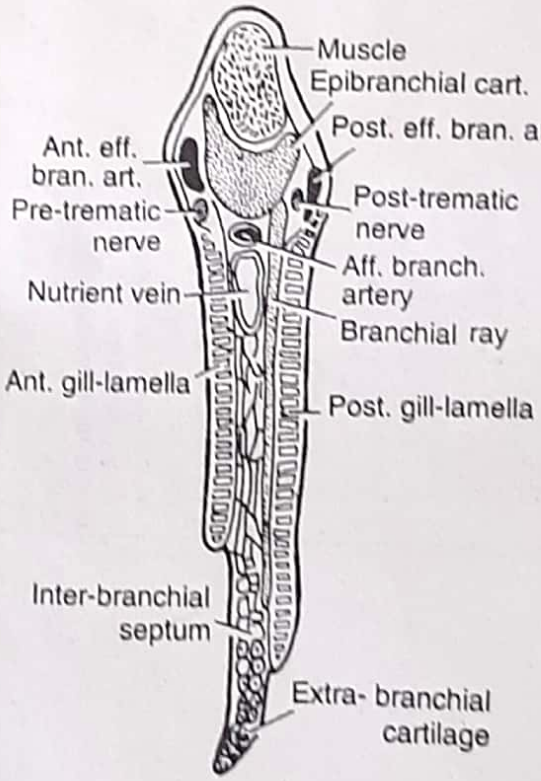

Fig. 11.2 Horizontal section through a holobranch

IN AMPHIBIANS.

The tadepole larva of amphibians respire by means of external and internal gills in addition to skin. The external gills are epithelial extensions and contain blood capillaries. The gill can absorb oxygen dissolved in water and give out Carbondioxide.

The terrestrial mode of respiration in amphibia are of three types. They are pulmonary, buccopharyngeal and cutaneous respiration. The pulmonary respiratory organs are — ① External nostrils ② Internal nostrils ③ Buccal cavity ④ Glottis ⑤ Laryngeotracheal chamber ⑥ Bronchi ⑦ Lungs. The laryngeotracheal chamber gives off two extremely short bronchi. Each bronchus opens into a thin walled spongy lungs. Internally the lungs have innumerable simple sacs known as alveoli or air sacs. Each alveolus is highly vascular structure and is site of gas exchange.

In Buccopharyngeal respiration, the mucous membrane lining the buccopharyngeal cavity is always keep moist and is highly vascular. Though this membrane exchange of gases occurs normally.

Cutaneous respiration is continuous process whether the animals remain in water or land. The skin is highly vascularized and exchange of gases takes place by simple diffusion.

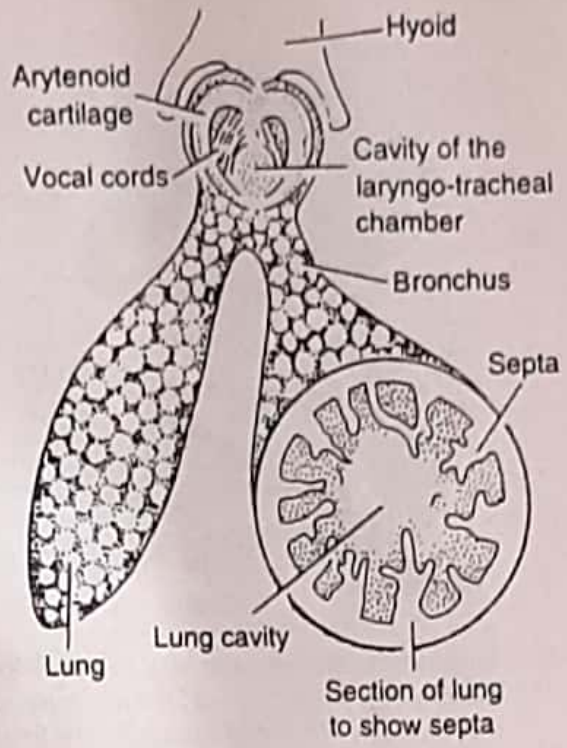

Fig. 11.3 Laryngo-tracheal chamber and lungs

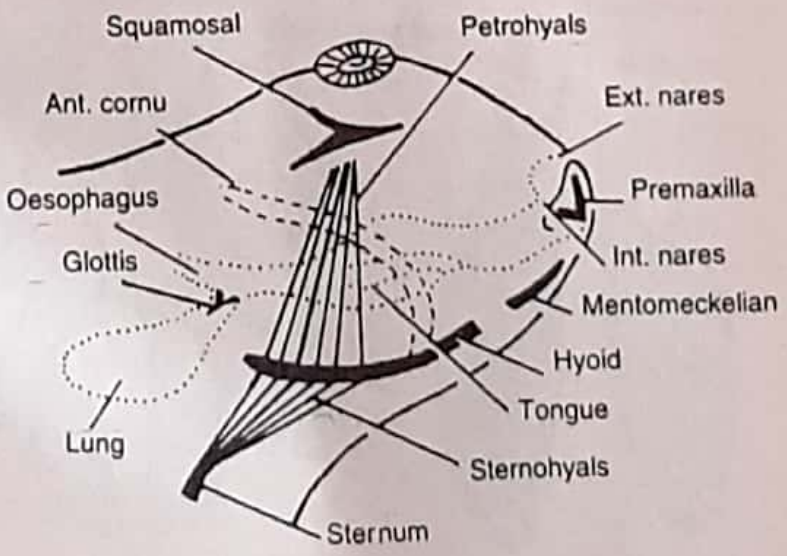

Fig. 11.4 Muscles connected with pulmonary respiration