University of Mosul
Lecture No.: 2
College of Veterinary Medicine
Date:2024-2025
Unit of Scientific Affairs
Website: https://uomosul.edu.iq/veterinarymedicine

Lecture title: Digestive system

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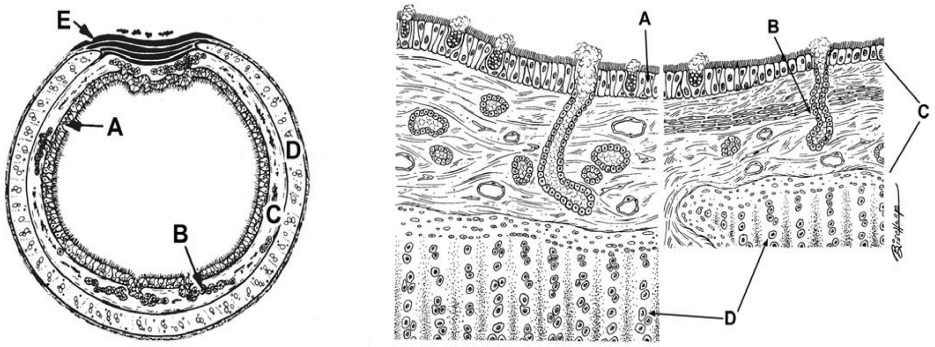
Trachea
bronchus



a cross section of the trachea and detailed sections through parts of the wall of the trachea and a bronchus. Note the differences in the height of the epithelium (A), the glandular density (B), the thickness of the soft tissue in the propriasubmucosa(C), the presence of hyaline cartilage as rings in the trachea versus plates in the bronchus (D), and the location of smooth muscle (E).

The laryngeal cartilages are connected to each other, to the trachea, and to the hyoid apparatus by ligaments. Most of the laryngeal cartilages are of the hyaline type. The epiglottis, the cuneiform and corniculate cartilages or processes, and the vocal process of the arytenoid cartilage contain elastic cartilage.

The trachea is the larger in diameter and more longer than these tubes, provides the air passage way between the larynx and the bronchi. It is a semiflexible and semicollapsible tube that extends from the larynx into the thoracic cavity.

The lining epithelium of the tracheobronchial tree is respiratory epithelium containing ciliated cells, brush border cells, secretory cells, bronchiolar exocrine cells, basal cells, and neuroendocrine cells.

Goblet cells are the predominant secretory cell type in domestic mammals.

The neuroendocrine cells are identified with histochemical methods .

The tracheal propria-submucosa consists of loose connective tissue and a subepithelial layer of longitudinally oriented elastic fibers; cells include fibrocytes, lymphocytes, plasma cells, globule leukocytes, and mast cells. The propria-submucosa contains tubuloacinar seromucous glands that open into the lumen via ducts that are lined with ciliated cells, mucus-secreting cells, and various intermediate cells. The tubular portions of the **tracheal glands** are lined by mucus-secreting cells, and their acinar portions are lined primarily by serous secretory cells.

The most distinctive feature of the trachea is hyaline cartilage, which in most species occurs as roughly C- or U-shaped separate pieces. The dorsal free ends of the cartilages are bridged by the **trachealis muscle,** a band of smooth muscle. Nerves and large blood vessels are generally associated with the smooth muscle band.

The external perichondrium is surrounded by the loose connective tissue of the adventitia.

Within the thoracic cavity, the trachea terminates by bifurcating into two **primary bronchi.** Distal to the bifurcation, the primary bronchi provide branches that enter the lungs. The structural characteristics of primary bronchi are the same as those of the trachea, except that cartilage is in the form of irregular plates.

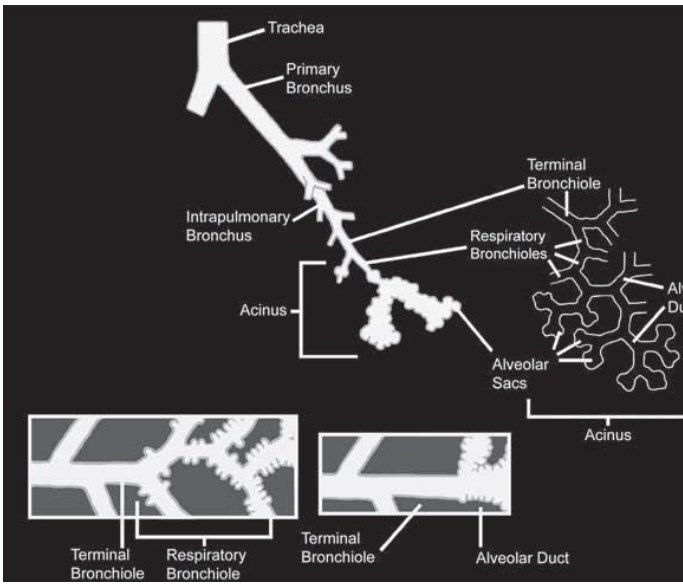
LUNG

The lung of mammals may be divided into intrapulmonary conducting

airways, gas exchange area (parenchyma), and pleura.

The intrapulmonary conducting airways (bronchi and bronchioles) compose approximately 6% of the lung. The gas exchange area, consisting of respiratory bronchioles (also referred to as transition zone), alveolar ducts, alveolar sacs, and alveoli, comprises approximately 85% of the lung. The lung is encapsulated by a layer of connective tissue

covered by mesothelial cells termed the **visceral (pulmonary) pleura.** Along with the pleura, the



intrapulmonary nervous and vascular tissue (pulmonary arteries, pulmonary veins, and bronchial arteries) comprise the remaining 9 to10% of the lung.

Intrapulmonary Conducting airways:-

Bronchi(bronchus)

The bronchial tree is formed by a primary bronchus and the various orders of airways that it supplies .

The largest segments of the intrapulmonary conducting airways are called **lobar bronchi,** each of which enters a lobe of the lung at its hilum. The

lobar bronchi divide into two smaller branches, which divide again, and this process continues until the gas exchange area is reached. The first two or three generations of branching from a lobar bronchus supply portions of the lung lobe called **bronchopulmonary segments.**

The histologic appearance of a bronchus is generally similar to that of the trachea, except that the various layers are thinner . Bronchi are lined by a respiratory epithelium composed primarily of ciliated cells, secretory cells, and basal cells.

The propria-submucosa is loose connective tissue containing mixed glands (**bronchial glands**) in all species except goats;

bronchial glands are less abundant in distal bronchi. The hyaline cartilage of the proximal bronchi is in the form of irregular plates.The muscle cells are generally arranged in a circular fashion, perpendicular to the long axis of the airway. The adventitial connective tissue is primarily loose, with many collagen fibers and variable numbers of elastic fibers and nerve plexuses

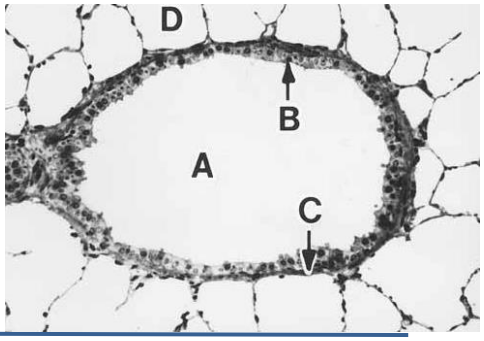
Bronchioles

Bronchioles arise from bronchi, branch into several generations ,and terminate as terminal bronchioles .

Bronchioles have roughly circular cross-sectional profiles and are lined with simple columnar or cuboidal epithelium composed of ciliated cells and **bronchiolar exocrine cells** (Clara cells). These cells have characteristics of both secretory cells and cells capable of metabolizing xenobiotic compounds.

The propria-submucosa is sparse loose connective tissue; glands and cartilage are absent. The smooth muscle is arranged in separate circular and oblique fascicles. Numerous nerve fibers occur in the area immediately below the epithelium and interspersed between muscle fascicles.

The adventitia is loose connective tissue, including elastic fibers oriented circularly or obliquely. The outer border of the adventitia is



attached to the alveolar gas exchange area and is lined by alveolar epithelial cells and a pulmonary capillary bed.

Cross section of a bronchiole. The airway lumen