

RESEARCH MICROSCOPIC MORPHOLOGY OF LUNG IN SMALL RUMINANTS

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***Abstract:** Goat lungs contain within their structure intrapulmonary airways consisting of intrapulmonary bronchi, bronchioles and terminal bronchioles composed of pulmonary lobules, respiratory alveolar ducts and alveoli of the lungs. In the pulmonary stroma the parenchymal gap is made up of loose connective tissue and outside the pulmonary alveoli.*

Extra-lobular bronchi within pulmonary stroma have the following histological structure: mucosa, lamina propria, muscular mucosal tunic and the fibrocartilagenous adventitia. The terminal bronchioles wall is formed by an epithelium that is simple cubic and Clara cell secretory granules that present the apical pole.

Lamina propria is composed of smooth muscle and elastic fibers that gradually decrease and adventitia is reduced to extinction. Intralobular bronchioles or bronchi are located in the respiratory parenchyma lumen presents a characteristic festooned with pleats or folds mucosa showing longitudinal ciliated columnar epithelium simple with few goblet cells. In the respiratory bronchioles we find simple cubic epithelium and the alveolar epithelium is the ducts flattens. Alveoli presents a very thin wall papered by simple squamous epithelium.

Noted that the interalveolar septum consists of two layers of squamous cells separated by thin elastic fibers, fiber cross-linking, typically the capillaries, connective matrix and cells of alveolar septal cells or macrophages. Alveolar macrophages are located between alveolar epithelial cells or inside the alveoli and presents an oval-shaped nucleus placed excentric.

Alveolar epithelium shows cells arranged in a single row and consists of: First order pneumocytes or membranous pneumocytes, order II pneumocytes or pneumocytes granulosa with a brushed edge and alveolar macrophages. In the First-order alveolar cells they appear extremely flattened, with a heterochromatic nucleus that protrufes in the lumen and covers the alveoli. The second order alveolar cells appear interspersed among the first-order alveolar cells and appear clustered in interavleolar septa. They cubical spheroid core is centrally located and acidophile cytoplasm.

***Keywords:** intrapulmonary bronchi, lung alveoli.*

MATERIAL AND METHODS

The research was conducted on permanent histological preparations made from sheep lung parenchyma from clinically healthy. For this purpose initiated an experiment examined microscopic lung morphology in small ruminants.

Histological specimens were prepared as follows: 10% formalin fixing, paraffin embedding and sectioning inclusion microtome. Large sections were stained on slides after staining following methods: hematoxylin eosin, hematoxylin eosin methylene blue staining and Mallory.

Histological preparations obtained were examined by light microscopy Labophot type 2 shooting device equipped with Nikon DX AFK-making photomicrographs.

RESULTS AND DISCUSSION

On histological examination is observed pulmonary stroma consisting of lung parenchyma and lax connective tissue outside the pulmonary alveoli (Figure 1).

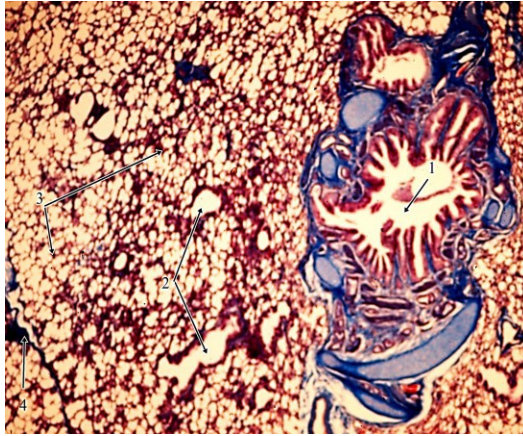


Figure 1. Sheep lung. (Mallory, ob.4x);
1-the extra-lobular bronchus; 2-terminal bronchioles;
3-pulmonary alveoli; 4-blood vessels.

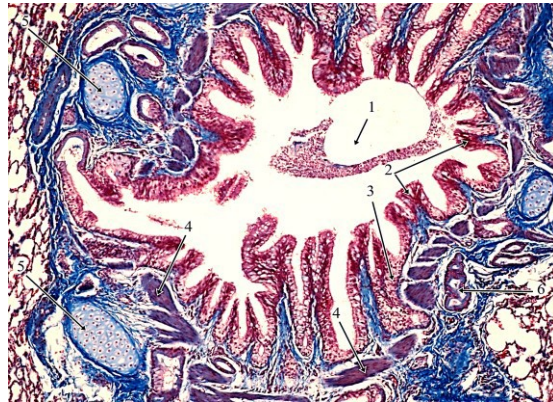


Figure 2. Extra-lobular bronchi. (Mallory, ob.10x)
1-lumen of bronchus; 2-pseudostratified ciliated columnar epithelium;
3-lamina propria; 4-bronchial muscle;
5-islands of cartilage (nodules);

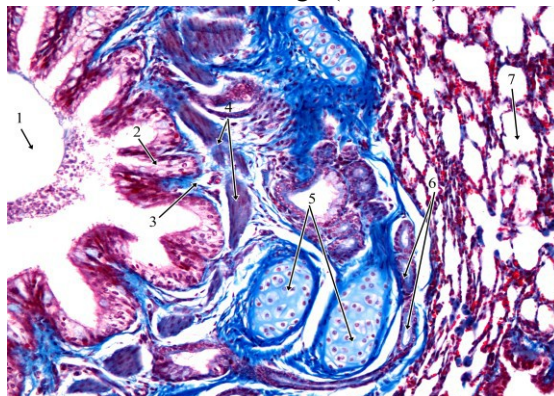


Figure 3. Extra-lobular bronchi. (Mallory, ob. 20x)
1-lumen of bronchus; 2-Pseudostratified ciliated columnar epithelium ; 3-lamina propria;
4-bronchial muscle; 5-islands of cartilage (nodules); 6-mucous glands.

Extra-lobular bronchial mucosa shows formed pseudostratified prismatic ciliated epithelium. Lamina propria consists of loose connective tissue fibers rich in elastic fibers, infiltration and lymphatic glands seromucose. Muscular lining is composed of smooth muscle fibers arranged in circular or spiral, located between epithelial and cartilaginous skeleton and represents the continuation of tracheal muscle (Figure 3). Tunica fibrocartilaginosa is made up of the islands of cartilage tissue (Figure 6).

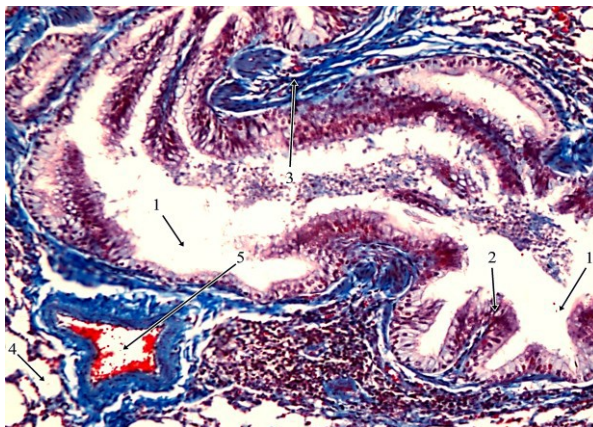


Figure 4. Sheep lungs. (Mallory, ob.20x)

1. intralobular bronchus; 2. epithelium; 3. bronchial muscle;
4. wafers; 5. blood vessel

Intralobular bronchi presents longitudinal folds mucosa, being composed of ciliated columnar epithelium simple, with few goblet cells (Figure 4). Bronchiolus terminal wall is formed of a simple cubic epithelium is located and Clara cells (Figure 5). Lamina propria is composed of smooth muscle and elastic fibers gradually decrease and adventitia is reduced to extinction (Figure 7). Respiratory bronchioles wall shows interrupted here and there by opening alveoli. The epithelium is simple cubic nonciliated simple squamous epithelium and alternate with alveolar type around the opening alveoli. Under the epithelium is a layer composed of smooth muscle and the elastic fibers arranged spiral.

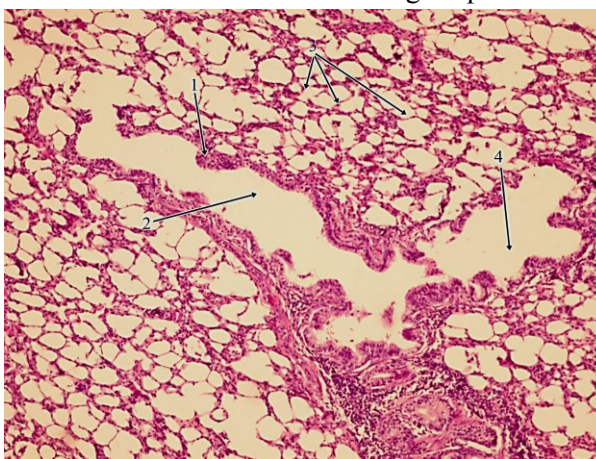


Figure 5. Sheep lung (HE, 10x)

1. epithelium terminal bronchiolitis; 2. alveolar duct.
3. pulmonary alveoli; 4. alveolar sac.

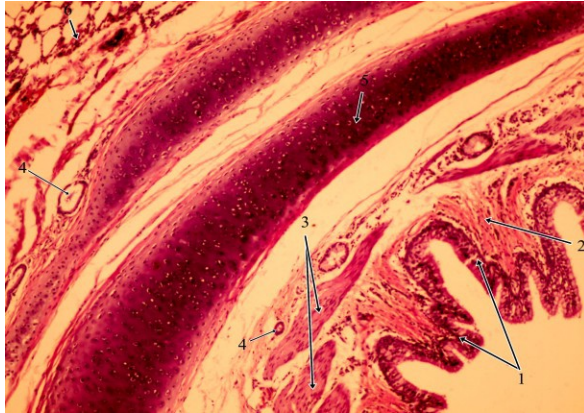


Figure 6. Extra-lobular bronchi. (HE, ob.20x)
 1-pseudostratified ciliated columnar epithelium; 2-lamina propria;
 3-bronchial muscle; 4-blood vessels; 5-islands of cartilage; 6-adventitia.

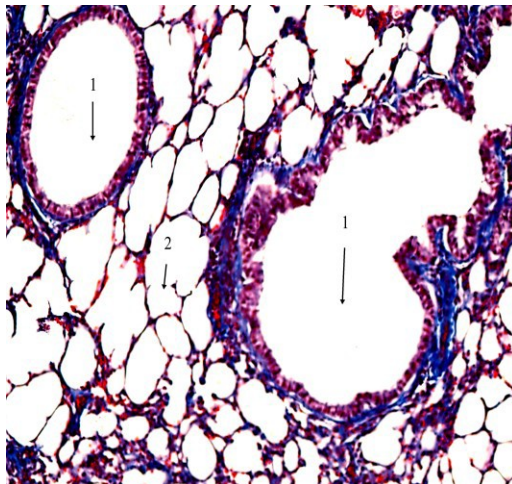


Figure 7. Sheep lungs. (Mallory, ob. 10x) 1. The terminal bronchioles; 2. pulmonary alveoli.

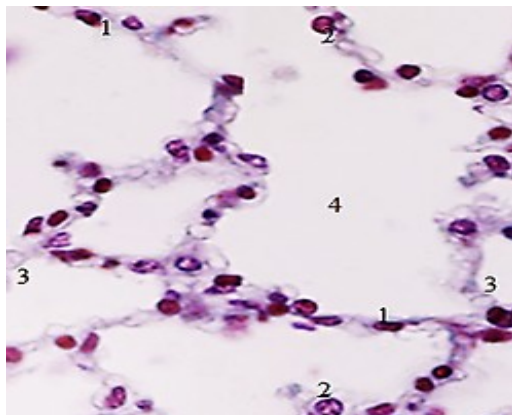


Figure 8. Detailed picture of lung alveoli (Mallory, ob.40x)
 1-I pneumocytes order; 2-II pneumocytes order;
 3-capillary; 4-alveolar sac;

Observe the respiratory bronchioles, alveolar ducts that continue representing narrow cylindrical space in which the wall of the pulmonary alveoli open.

Alveolar ducts are lined by simple squamous epithelium and lamina propria is extremely low. Smooth muscle fibers are arranged in a fine network interalveolar. It is noted that the alveolar sacs open orifices in the alveoli. Epithelium and the alveoli is similar in their walls and the elastic fibers are present cross-linking fibers arranged around the opening of the alveoli. Alveoli presents a very thin wall papered the squamous epithelium simple. Between two adjacent wafers is observed Interalveolar septum made up of two thin layers of squamous cells separated by elastic and reticular fibers, capillaries, connective matrix and alveolar macrophages.

Alveolar epithelium consists of pneumocytes of I, II pneumocytes or pneumocytes order granulosa edge pneumocytes and alveolar macrophages brush. I order pneumocytes were extremely flattened squamous having heterocromatic nuclei that protrude in the lumen. II pneumocytes are interspersed among pneumocytes order-order and appear clustered in two or three septumurile interalveolar (Figure 8). They cubical, spheroidal nucleus is centrally located and acidophile cytoplasm.

Pneumocytes with brush border are closely surrounded by pneumocytes of I realizing a contact surface and alveolar macrophages appear on the surface and inside the alveoli septa interalveolar.

CONCLUSIONS

1. The histological structure of the extra-lobular bronchi enter: mucosa, lamina propria, muscular mucosal tunic and adventitia fibrocartilaginoasă.
2. Extra-lobular bronchi mucosa epithelium is composed of ciliated pseudostratified prismatic
3. Lamina is made up of lax connective tissue fibers, while the muscle lining consists of circularly arranged smooth muscle fibers or spiral.
4. Islands of cartilage are present in the extra-lobular bronchi. They disappear instead of entering the lung lobe.
5. Adventitia consists richly vascularized connective tissue with numerous lymphoid infiltration in the bronchial branching.
6. Intralobular bronchi presents longitudinal folds mucosa, being composed of ciliated columnar epithelium simple, with few goblet cells.
7. In the respiratory bronchioles, lamina propria or chorionic presents lax connective tissue fibers that are willing diffuse lymphoid tissue.
8. Respiratory bronchioles wall shows interrupted here and there by opening alveoli, and this is where gas exchange is performed.
9. Acinar pulmonary respiratory lung parenchyma is the unit and consists of all pipes aerifere and respiratory cavities from one terminal bronchus.
10. Alveoli presents a very thin wall papered the squamous epithelium simple. Between two adjacent wells is a wall called interalveolar septum.

11. Alveolar epithelium consists of cells arranged in a single row and is formed by pneumocytes of I, II pneumocytes order, with pneumocytes and alveolar macrophages brush border.

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