

Lungs, structure and function

The lungs are housed in the chest cavity, which is covered from the inside by the serous membrane of the pleura parietalis. At the base of the lung, it passes over the lung and is called the *pleura visceralis*. The space between the parietal and *visceral pleura* is filled with serous fluid, which prevents friction during lung movement. Macroscopically, we distinguish 3 lobes on the right and 2 lobes on the left lung.

Air flows into the lungs using the airways. These are divided into extrapulmonary (nasal cavity, pharynx, larynx, trachea, bronchi) and intrapulmonary, which includes the bronchi and bronchioles that form the bronchial tree.

Bronchioles

Their clearance is 1–0.5 mm. It branches to the bronchiolus terminalis (with a lumen of 0.5 mm), which then supplies the lung lobe. Terminal bronchioles further branch into 1–3 respiratory bronchioles, from which 2–11 alveolar ducts are further divided. There is a gradual change of the epithelium to a single-layer cylindrical one (cilia gradually disappear, goblet cells already in front of them). The mucous membrane of the respiratory bronchioles is moistened by Clara cells, which produce a secretion that fills the space between the cilia. There are no glands in the propria mucosae, the cartilage has also disappeared (only smooth muscle remains). It smoothly passes into the epithelium of the alveoli.

Lung lobes

Secondary lung lobule (lobulus pulmonis secundarius) It is the basic structural and functional unit of the lung ventilated by one **terminal bronchiole**. It has a conical shape with a base of about 1 cm in size, directed to the surface of the lung. The lobules are probably bounded by tissue in which dust particles are deposited and thus condition the marble appearance of the lungs. **Primary lung lobule (lobulus pulmonis primarius)** It is the compartment of the lung ventilated by the **respiratory bronchiole**.

Alveolar ducts (ductus alveolares)

These are long, thin-walled tubes lined with alveoli that contain smooth muscle. They are lined with respiratory epithelium. From the atrium, 2–5 lung sacs depart from the alveoli.

Alveolus

There are up to 300 million alveoli with a surface area of 70–80 m² in the lungs. Their wall is composed of a reticuloelastic blank, which is part of the interalveolar septum. There are pores in them that ensure air circulation => infection. They contain capillaries and are lined by continuous respiratory epithelium. They are without cilia or gland cells.

Cells:

Membrane pneumocytes

A membrane pneumocyte is a flat epithelial cell lining the alveolar ridges, has a lenticular nucleus, and its body is located between the capillaries or enters the alveolus. They are also known as type I pneumocytes

Granular pneumocytes

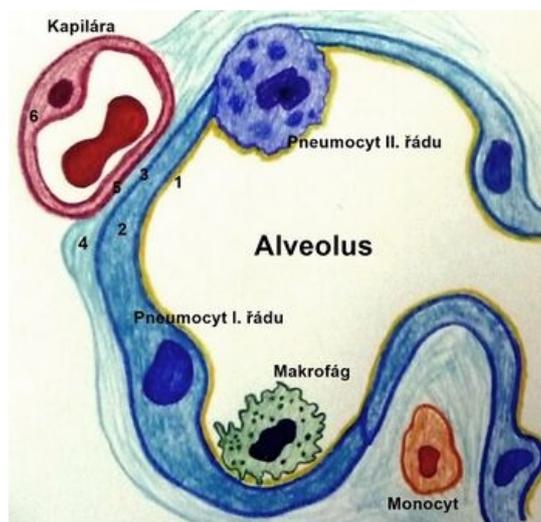
They are spherical in shape and rest on the basement membrane. Their important function is to form a surfactant. They have a free surface with microvilli. They are also known as pneumocytes II. type.

Brush cells

They have a free surface with dense microvilli, and their epithelium contains a surfactant that helps reduce surface tension (so that the alveoli do not collapse).

In the lumen of **dust cells = coniphages (macrophages)**:

- numerous pseudopodia,
- rich lysosomal apparatus,
- vacuoles with phagocytosed material (mostly anthracotic pigment),
- to nodes in the mediastinum => anthracotic nodes.



Alveolo-capillary membrane

Blood-air barrier This barrier has 3 layers:

- respiratory epithelium with basement membrane,
- ligament,
- basement membrane and endothelium of non-fenestrated capillaries.

Its dimensions are 0.3–0.7 μm .

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- KONRÁDOVÁ, Václava – UHLÍK, Jiří – VAJNER, Luděk. *Functional histology*. 2. edition. Jinočany : H & H, 2000. 291 pp. ISBN 80-86022-80-3.
- LÜLLMANN-RAUCH, Renate. *Histology*. 1. edition. Prague : Grada, 2012. 576 pp. ISBN 978-80-247-3729-4.