

Plane of the sternal angle

The trachea connects the upper respiratory tract to the lower respiratory tract. It is about 9-15 cm in length. It is located in front of the esophagus and behind the thyroid gland in the neck. It is considered to be in the superior and middle mediastinum. It is made up of 16-20 incomplete hyaline cartilaginous rings that are open posteriorly. The trachea bifurcates into the right and left main stem bronchus at a location called the **carina**, which is located at the level of the **sternal angle** (T4-T5). A series of C-shaped rings of **hyaline cartilage** strengthen the trachea and prevent it from collapsing during inspiration. The trachea is lined with **ciliated pseudostratified columnar epithelium** and **mucous-secreting goblet cells**, which trap inhaled debris. Ciliary action moves debris toward the pharynx for removal by coughing.

The trachea branches off into two main bronchi, the left and right primary bronchi, which lead to the left and right lung respectively. **The right lung is larger and heavier than the left, but it is shorter and wider because the right dome of the diaphragm is higher and the heart and pericardium bulge more to the left. The right and left mainstem bronchi branch from the trachea at different angles, the right more vertical and more directly in line with the trachea, thus the right bronchus is more likely to receive aspirated material.** At this point in breathing, the air has been moistened, purified and warmed. Each bronchi enters its lung and begins on a series of branches, called the **bronchial** or **respiratory tree**. The first of these branches is the lobar (**secondary**) branch. On the left, there are two lobar branches, while on the right, there are three. Each lobar branches into one lobe. The next branch is called the segmental (**tertiary**) branch. Each branch continues to branch into smaller and smaller bronchioles. The final branch is called the **terminal bronchioles**. These bronchioles are smaller than 0.5 mm in diameter. Each of these terminal bronchioles gives rise to several **respiratory bronchioles**. **Note:** The first few levels of bronchi are supported by rings of cartilage. Branches after that are supported by irregularly shaped discs of cartilage, while the latest levels of the tree have no support whatsoever.

Note: The right main bronchus divides into three lobar bronchi, and the left main bronchus divides into two lobar bronchi. Each secondary or lobar bronchus serves one of the five lobes of the two lungs.

Each respiratory bronchiole subdivides into several **alveolar ducts**, which end in clusters of small, thin-walled air spaces called **alveoli**. These clusters of alveoli are called **alveolar sacs** and form the functional unit of the lung.