Alveolus Encyclopedia Article

Alveolus

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Alveolus

An alveolus (alveoli is plural) is a tiny air sac located within the lungs. The exchange of oxygen and carbon dioxide takes place within these sacs.

The basic structure of the respiratory system can be envisioned as an upside-down tree. Air is breathed into the trachea, which is the tree trunk, and thus the broadest part of the respiratory tree. The trachea divides into two major tree limbs, the right and left bronchi, each of which branches off into multiple smaller bronchi, which course through the tissue of the lung. Just as a tree's limbs branch off into ever smaller branches and twigs, so each bronchus divides into tubes of smaller and smaller diameter, finally ending in the terminal bronchioles. The air sacs of the lung, in which oxygen-carbon dioxide exchange actually takes place, are clustered at the ends of the bronchioles like the leaves of a tree at the ends of the smallest twig-like branches, and are called alveoli.

The alveoli are surrounded by tiny blood vessels, called capillaries. When air is inhaled (breathed into the lungs), it ultimately enters the alveoli. Because the alveoli are composed of only a single, thin layer of tissue, oxygen in the inhaled air can cross out of the alveoli and into the capillaries, where it binds with the hemoglobin found in red blood cells. Blood containing oxygen is then carried throughout the body, for delivery to every type of tissue and organ system.

Carbon dioxide is one of the body's waste products. Carbon dioxide circulates through the body in the blood, until it reaches the alveolar capillaries. Carbon dioxide crosses out of the capillaries into the alveoli at the same time that oxygen is crossing out of the alveoli and into the capillaries. The carbon dioxide is then breathed out during exhalation.

It is interesting to note that, when comparing the alveoli of various species, the alveoli change in terms of both size and quantity. They are smallest but most numerous in mammals, intermediate in size and number in reptiles, and largest in size but smallest in quantity in amphibians. Humans continue to develop alveoli up until about the age of eight, when the human lung contains the adult number of approximately 300 million alveoli.