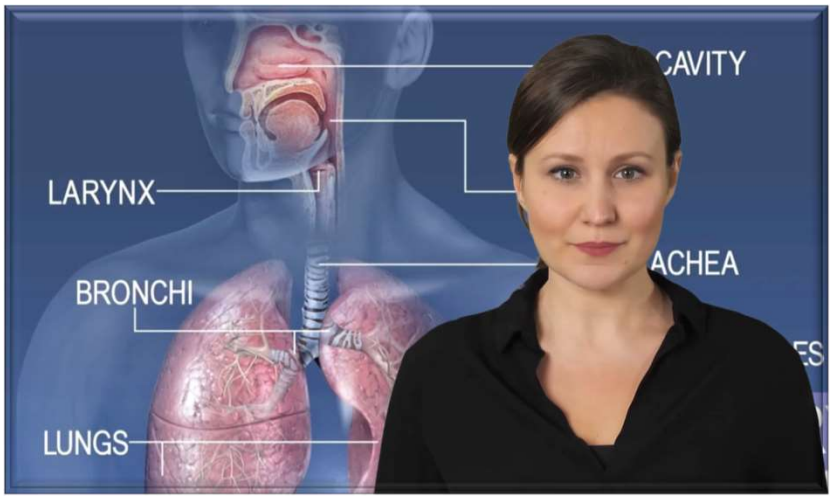
Airway Physiology

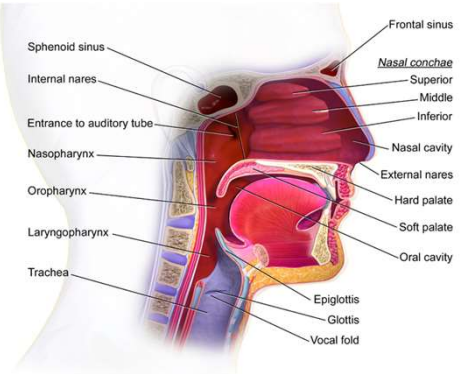


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This topic covers the Physiology of the Upper and Lower Airways. Pay close attention to the anatomical charts so you get a good understanding of the relevant anatomy.

Airway Physiology | Upper Airway

- Begins at mouth and nose
  - ✓ Air is warmed and humidified in nasal turbinates
- Pharynx
  - ✓ Oropharynx, nasopharynx, and laryngopharynx
- Ends at glottic opening



The Upper Respiratory System

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The upper airway begins at the mouth and nose. The air is warmed and humidified in the nasal turbinates. Nasal Turbinates are long, narrow passageways that help to warm and moisten the air that flows in through the nose. If the turbinates are too large, they can actually block airflow. This condition can cause breathing problems, frequent infections, and nosebleeds.

The Pharynx or throat, is a hollow, primarily muscular tube with moist, mucus-rich walls. It rests behind the mouth and the nasal cavity, between the larynx and the esophagus. It measures about 5 inches long.

The Oropharynx is The part of the throat that is at the back of the mouth.

The Nasopharynx is the part of the throat that is behind the nose.

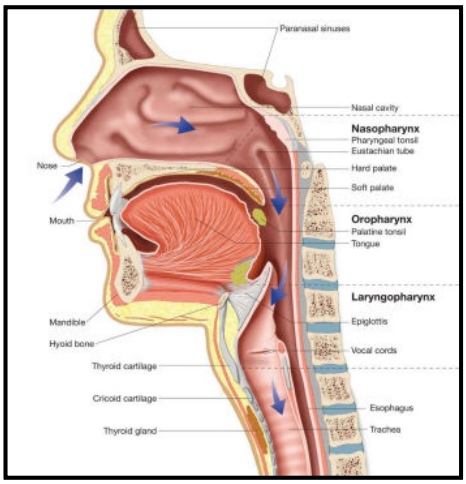
And the laryngopharynx is where both food and air pass. It helps guide food and air where to go. It is a part of the pharynx.

The upper airway ends at the glottis which is the opening between the vocal chords.

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AIRWAY PHYSIOLOGY

- Pathophysiology of the upper airway
- Four major factors:
  - ✓ Anatomic narrowing
  - ✓ Abnormal mechanical linkage between the airway dilating muscles and the airway walls
  - ✓ Muscle weakness
  - ✓ Abnormal neural regulation



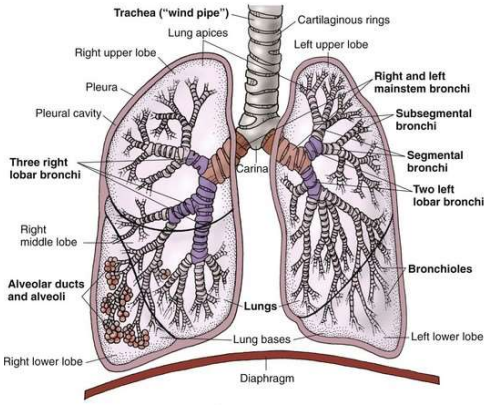
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And here is some more information about the Upper Airway with regards to the pathophysiology. The ability to maintain upper airway patency during the normal respiratory cycle is the result of a delicate equilibrium between the forces that promote airway closure and dilation.

There are 4 major predisposing factors for upper airway obstruction:
First, Anatomic narrowing.
Next, the abnormal mechanical linkage between the airway dilating muscles and the airway walls.
Third: Muscle weakness.
And fourth, abnormal neural regulation.

Airway Physiology | Lower Airway

- Begins below the larynx
- Composed of:
  - ✓ Trachea
  - ✓ Bronchial passages
  - ✓ Alveoli



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The lower airway Begins below the larynx. It is composed of the Trachea, Bronchial passages, and Alveoli.

The upper airway and lower airway are divided at the glottic opening.

Note that cartilage plays an important role in the lower airway.

The trachea, is a cartilaginous tube that connects the larynx to the bronchi of the lungs, allowing the passage of air. The trachea extends from the larynx and branches into the two primary bronchi. At the top of the trachea, the cricoid cartilage attaches it to the larynx.

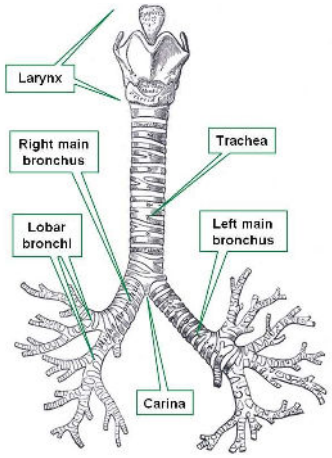
The hyaline cartilage C-rings found in the trachea allow for the expansion of the underlying esophagus when food or liquids pass through.

The epiglottis closes the opening to the larynx during swallowing.

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AIRWAY PHYSIOLOGY

- Larynx - Contains vocal cords
- Trachea - Conveys air from and to the lungs
- Bronchi – Main passageway into the lungs
- Bronchioles – The bronchi branch into bronchioles
- Alveoli – Air sacs



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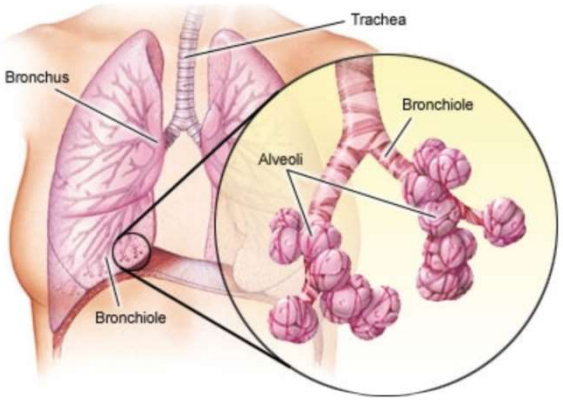
The image on this slide shows the important structures of the bronchial tree.

Beginning with the Larynx: A tube-shaped organ in the neck that contains the vocal cords.
Next is the trachea - a large membranous tube reinforced by rings of cartilage while extending from the larynx to the bronchial tubes, also called the windpipe, it conveys air to and from the lungs.
Bronchi are the main passageway into the lungs. When someone takes a breath through their nose or mouth, the air travels into the larynx. The next step is through the trachea, which carries the air to the left and right bronchus. The bronchi become smaller the closer they get to the lung tissue and are then considered bronchioles.

These passageways then evolve into tiny air sacs called alveoli, which is the site of oxygen and carbon dioxide exchange in the respiratory system. Primary bronchi are located in the upper portion of the lungs, with secondary bronchi near the center of the lungs. Tertiary bronchi are located near the bottom of these organs, just above the bronchioles.

Airway Physiology (Cont.)

- Alveoli
  - ✓ Tiny sacs in grapelike bunches at the end of the airway
  - ✓ Surrounded by pulmonary capillaries
  - ✓ Oxygen and carbon dioxide diffuse through pulmonary capillary membranes

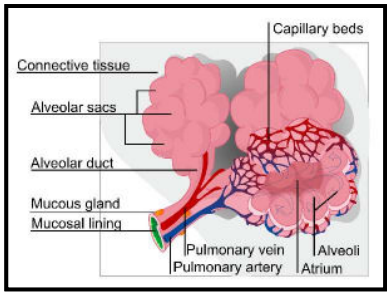


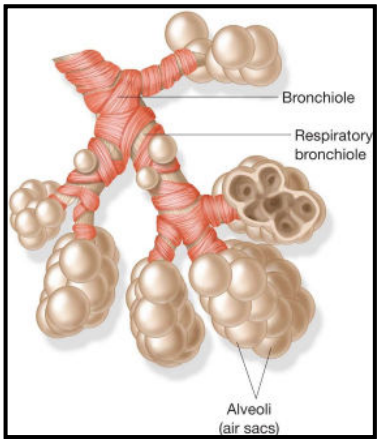
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Alveoli are the tiny sacs in grapelike bunches at the end of the airway.
They are surrounded by pulmonary capillaries. Oxygen and carbon dioxide diffuse through pulmonary capillary membranes.
Be sure you can describe the path that air takes as it moves from the mouth and nose to the alveoli. Also, think about Which structures are most vulnerable to outside trauma, and why.

Airway Physiology (Cont.)

- The lower airway
- The alveolar sacs
  - ✓ Clusters of individual alveoli





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The image on the right, depicts the alveolar sacs, which are clusters of individual alveoli. There are many alveolar sacs, and many alveolar ducts. It is estimated that around 2 million alveolar ducts are located in the lungs! The alveolar ducts assist the alveoli in their function.