Respiratory Disorders

Chronic Obstructive Pulmonary Disease (COPD) is a group of disorders which affect breathing function and can lead to death. Each of the respiratory disorders described below affect breathing through different mechanisms, but all of them can be either avoided or managed. For some general information on COPD, visit the Canadian Lung Association (O).

Aside from energy, the body's cells need oxygen in order to function. The human body receives oxygen from the air in the atmosphere into the blood via the lungs. Air travels into the trachea (windpipe), which further divides into two bronchi, which in turn continually divide into the smaller bronchioles. Bronchioles become smaller and smaller until they lead into alveoli. Alveoli are tiny sacs surrounded by a rich supply of capillaries and are the sites where oxygen can directly be delivered into the blood and carbon dioxide removed from the blood. Capillary walls are very thin, thin enough to let oxygen and carbon dioxide exchange. Travel to view the respiratory system structures at the American Lung Association (R). Visit the Merck website to see how gas exchange occurs between alveoli and the blood vessels (R--You can see the two illustrations under the heading "Gas Exchange Between Alveolar Spaces and Capillaries;" viewing the media presentation, "Gas Exchange Between Alveoli and Capillaries," located above the illustrations, is recommended if your computer can support the software used).

Asthma Asthma is a condition occurring when a trigger causes the respiratory system's bronchioles to narrow. When the bronchioles are narrowed, the person with asthma experiences great difficulty exchanging air between the lungs and the atmosphere. Many individuals "outgrow" asthma with age, but travel to the American Lung Association (R) to find out specifically what triggers asthma in adults.

The Buteyeko Asthma Management Program offers an animated diagram of an asthma attack, showing the inflamed airway (R--this is NOT a sensitive photo). DrGreene.com has two illustrations showing the difference between a normal bronchiole and an asthmatic bronchiole (O--this is NOT a sensitive photo). What's Asthma All About is a Flash-requiring video (audio optional) presentation about the condition (O). WebMD offers an illustrated guide to asthma (O--but recommended). 101.health offers an online video (narrated) regarding asthma (O).

Chronic Bronchitis This condition is not due to an acute bacterial infection, but is an inflammation of the bronchioles usually due to smoking. Specific chemicals in smoke cause the destruction of certain cells lining the respiratory tract. These cells normally have hairlike projections, "cilia," which function to "sweep" excess debris and mucous out of air passages. The University of Alberta shows an illustration of such ciliated cells (R). When the cells are damaged, mucous builds up, and the result is the characteristic sputum seen in individuals who have chronic bronchitis. The inflammed bronchioles and subsequent mucus and sputum secretion can cause the heart to work harder to deliver oxygen to the body. Over a long period of time, the heart may enlarge.

Emphysema In emphysema, the lung's alveoli are damaged. This condition is usually caused by smoking, but can also be caused by air pollution. Many alveoli become stiffened and non-functional. Once an alveolus is lost, it no longer can exchange oxygen with carbon dioxide.
Without oxygen, body cells suffer, especially cells like those in the heart. Symptoms associated with emphysema include shortness of breath, coughing, and a barrel-shaped chest, due to the body trying to take in more air. Unfortunately, alveolar damage is irreversible, although comfort can be increased through drinking adequate fluids, getting enough rest, eating appropriately, exercising moderately if advised, and using vaporizers, medication, and oxygen therapy. Visit the Lung Association of Canada to view an illustration of how the alveolus is affected in emphysema. Valley-Homecare.com also features illustrations of normal and emphysematic alveoli. A movie clip is also available at this Lung Association webpage for those with the appropriate software who wish to view "A Journey Down the Collapsing Airway". To see a photo of a lung with emphysema, travel to MedicDirect. Years ago, some physicians theorized if lung tissue were damaged, perhaps a surgical procedure where part of the lungs were removed would help increase breathing efficiency. While the procedure was not popular 50 years ago, modern surgical techniques have improved to the point of reopening the investigation of such a procedure. The National Emphysema Treatment Trial (NETT) is a multicenter clinical trial, examining the safety and efficacy of patients who undergo lung reduction surgery.

McGraw Hill eLearning Center has some exceptional animation files, available if you have RealPlayer software. Upon accessing the website, look for the heading "Components of the Respiratory System in Humans," look in the first column of downloadable information and you will see four links to an "Exploration," an "Activity," an "Animation" and another "Activity." Click on the "Animation" link to see a 2.5 minute presentation on asthma. The presentation also provides an excellent visual of the respiratory tract's anatomy, including the alveoli and ciliated cells lining the bronchi.

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