



OCCUPATIONAL LUNG INJURIES



Lung Anatomy

The lungs act a bit like a foam air mattress. As they expand, they draw air into about 700 million tiny air pockets called *alveoli*. The alveoli are clustered in small bunches, like grapes, and each bunch is connected to a system of branches like an enormous grape vine. The trunk of the vine is the *trachea* which splits into the right and left *bronchi*.

The primary bronchi is about 12 mm in diameter. The respiratory tract narrows down to about 0.5 mm (or 500 microns) for the smallest branch or *bronchioli*, and then to the alveolar ducts which are even narrower. The narrow passages and other structures in the airways effectively prevent particles above 10 microns from being inhaled into the deep recesses of the lung.

Non-Cancerous Injuries

A number of substances encountered in the workplace have the capacity to produce cancer, but they can also produce a variety of non-cancerous injuries. For example, asbestos dust can produce the rare cancer known as *mesothelioma*, but it can also cause a scarring of the lung known as *asbestosis*. The susceptibility among individual workers to certain types of cancer is hard to predict. Most people exposed to carcinogens do not develop cancer. The same cannot be said for non-cancerous injuries. If you expose a group of workers to enough harmful dust over a long enough period of time, almost all will develop a dust disease.

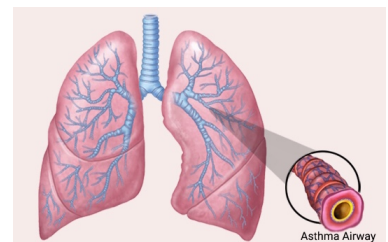
An inhaled substance that causes lung injury can produce one of two effects upon the lung. Some produce both effects. Imagine a balloon attached to a straw. An *obstructive* effect is one that causes a narrowing of the straw. If the straw (i.e. the bronchi) is blocked, the balloon cannot get sufficient air. A *restrictive* effect occurs when the balloon itself (i.e. the alveoli) is damaged and loses its ability to expand and contract, usually as the result of scarring that has occurred inside the balloon.

Obstructive Lung Effects:

An inhaled substance may cause the smooth muscle around the bronchi to excessively contract or cause the lining of the bronchi to become inflamed, swell and produce excess mucous.

Chemically Induced Asthma

About 15% of asthma cases are reportedly linked to workplace exposures. Some chemicals produce an acute response that will resolve over time. Others can produce a permanent sensitivity reaction that can later be triggered by



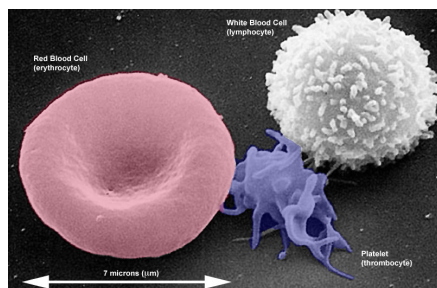
Lung Mechanics

The lungs have a *total lung capacity* (TLC) of about 6 liters of air. During breathing, only a portion of that lung capacity is used. The average breath or *tidal volume* (TV) is only about 1/2 liter. A person performing moderately stressful work, like a car mechanic, inhales about 20 liters of air per minute.

When a worker breathes air that is contaminated with dust or chemical fumes, they inhale a given amount of the contaminant, based on its concentration. When they exhale, most of the contaminant is expelled, but some remains.

Dangerous Particles

The hazardous dust particles that enter and remain in the recesses of the lung to cause injury are extremely small, usually below a few microns. To provide a point of reference, the diameter of an average human hair is about 70 microns and a red blood cell is 7 microns! People can't see things below about 45 microns.



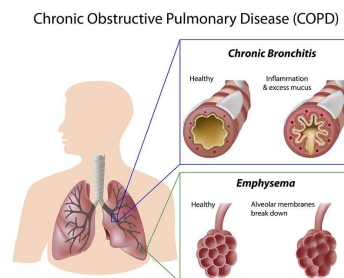
Heubeck Law, P.C.

John C. Heubeck, Esq.
400 Continental Blvd., 6th Floor
El Segundo, CA 90245
john@HeubeckLaw.com
(424) 218-5424

exposures to low concentrations of the offending chemical.

Occupational COPD

Exposure to certain fumes and dusts can produce Chronic Obstructive Airways Disease (COPD) - an obstruction in the airways that is not fully reversible - and that includes the destruction of the walls separating the alveoli (*emphysema*). Cigarette smoke is the cause of most COPD, but it has been estimated that 10-20% of cases are due to workplace exposures to chemicals and dusts.



Restrictive Lung Effects:

If dust particles in the air are below 10 microns, they are capable of being inhaled and entering the alveoli spaces. Particles below 2 microns can be trapped in the alveoli and cause collagen to form around the particles, producing irreversible scarring.

Pneumoconiosis

Many workers have exposure to airborne dusts during the course of their career. The injuries vary a bit according to the nature of the dust, but they all result in a *restriction* in the lung's ability to



expand. The general term *pneumoconiosis* describes a variety of conditions that produce permanent scarring or *fibrosis* in the lungs. Asbestos dust will produce *Asbestosis*, cotton dust exposure results in *Byssinosis*. Coal dust will produce black lung disease. Exposure to the metal dust Beryllium will produce *Berylliosis*.

Knowledge and Experience

Lung injury cases begin with a thorough investigation into the specific chemical(s) that contaminated the worker's environment. Over the past 30 plus years, John C. Heubeck, Esq., has greatly relied upon his chemistry and OSHA background to identify the cause of each client's lung injuries and to build a strong case against the responsible parties.

Contact us for a free evaluation of your case.