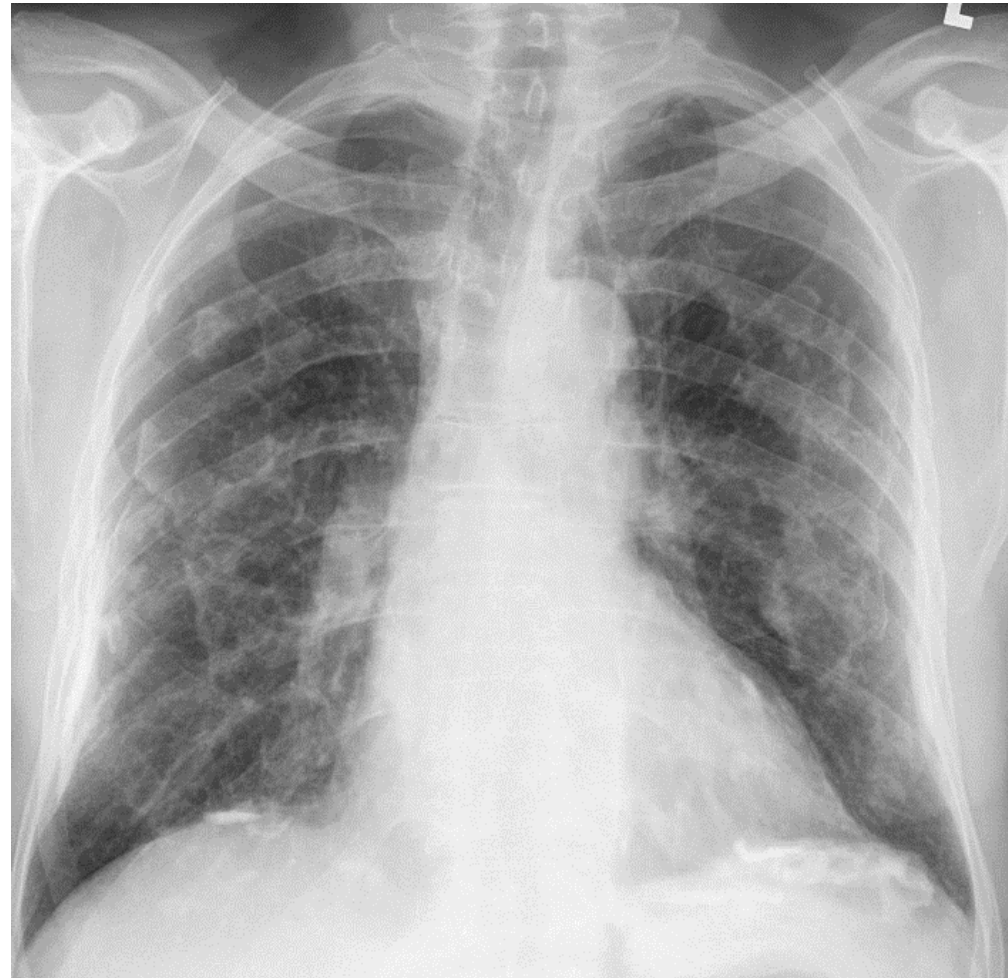
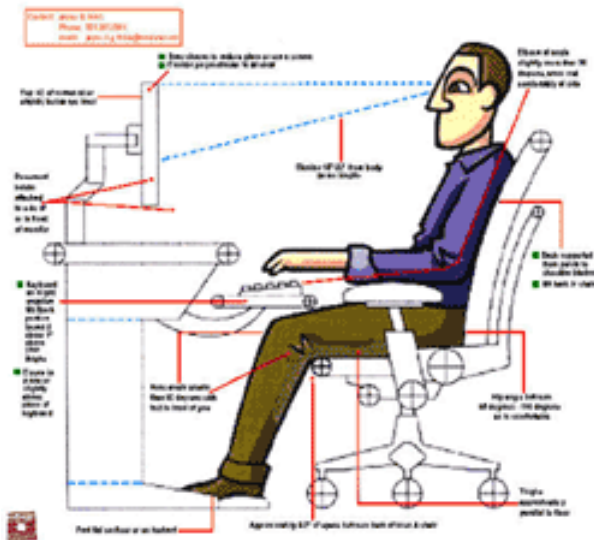


Occupational Health III.



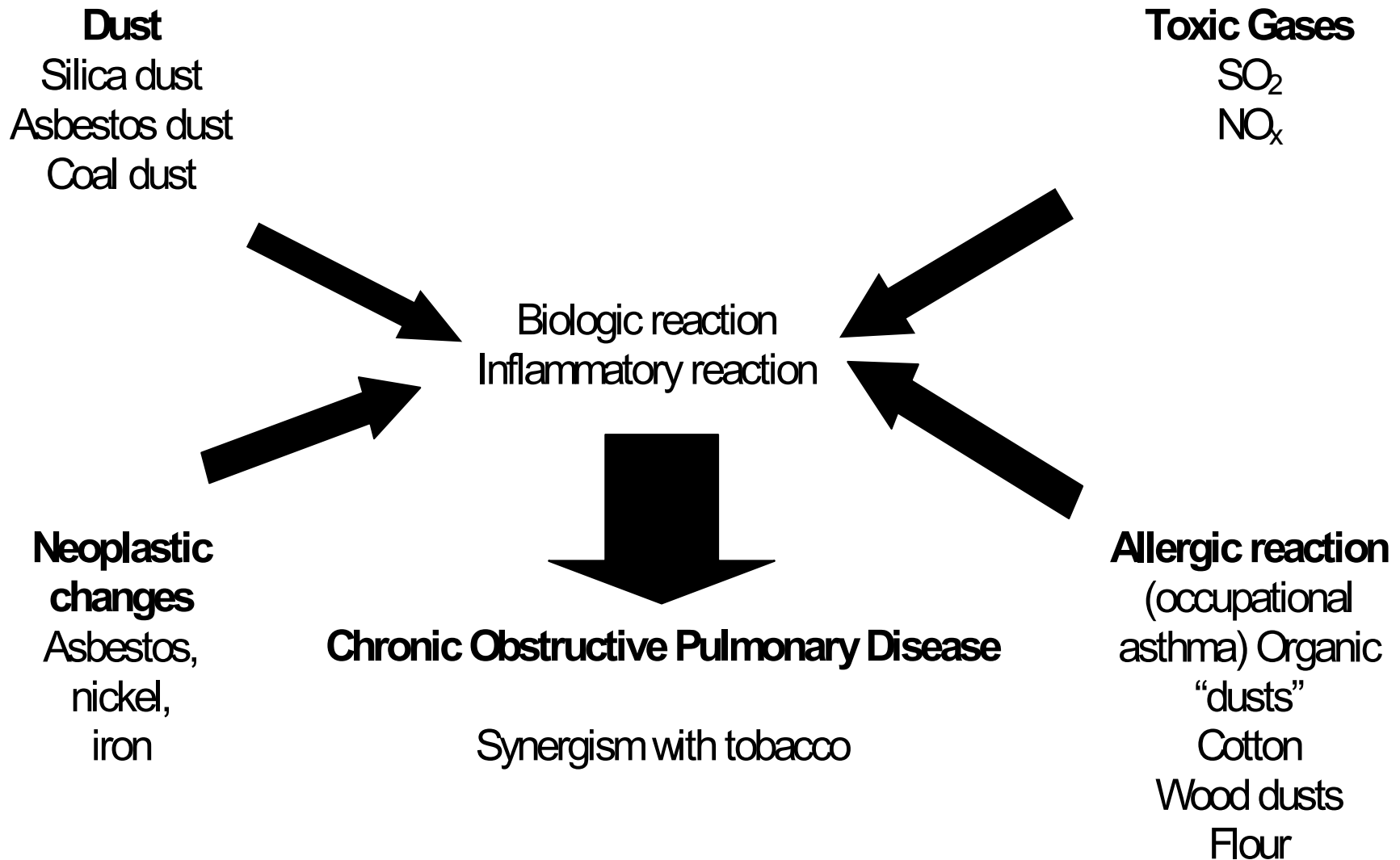
Asbestosis

Ergonomics for the Computer Workstation



SU Department of Public Health

Occupational respiratory diseases



Particulate matter within the range of 1-5 μ m-s penetrate deepest into the lung!

Pneumoconiosis

Pneumoconiosis is an occupational lung disease caused by the inhalation of dust.

Inhalable dust: formed of particles smaller than 5 μ m.

Factors related to the disease:

- **Physical and chemical quality of dust**
- **Concentration**
- **Time of exposition**
- **Personal sensitivity**
- **Status of immune system**



Dry cutting stone...

Silicosis (also known as Grinder's disease and Potter's rot) is a form of occupational lung disease caused by **inhalation of crystalline silica dust.**

This respiratory disease was first recognized in 1705 by Ramazzini who noticed sand-like substances in the lungs of stonecutters.



India, Uttar Pradesh

Silicosis: occupational lung disease caused by inhalation of crystalline silica dust, and is marked by inflammation and scarring in forms of nodular lesions in the upper lobes of the lungs.

Silicosis

Symptoms

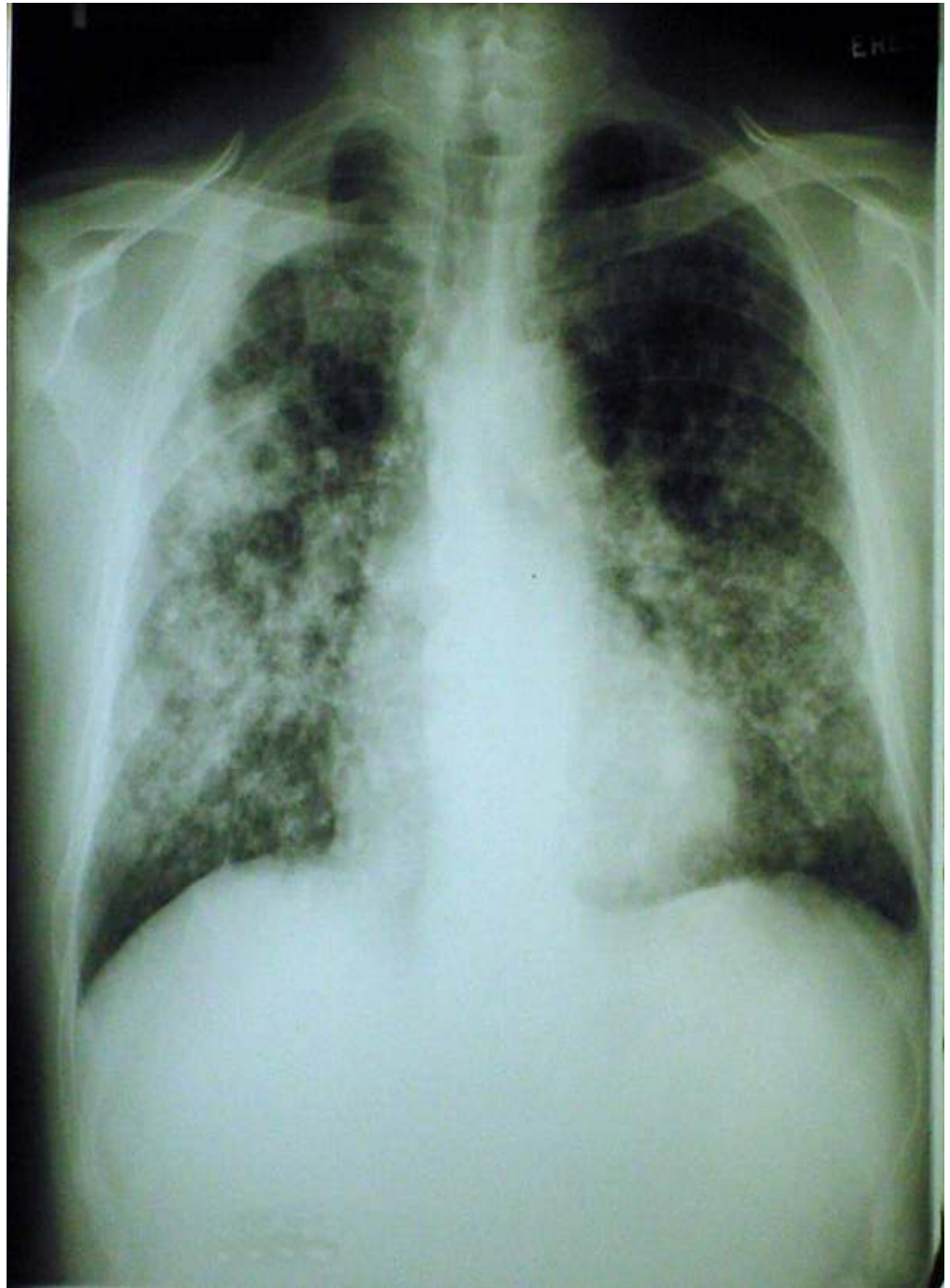
- Dry or severe cough
- Fatigue
- Tachypnea
- Loss of appetite
- Chest pain
- Fever

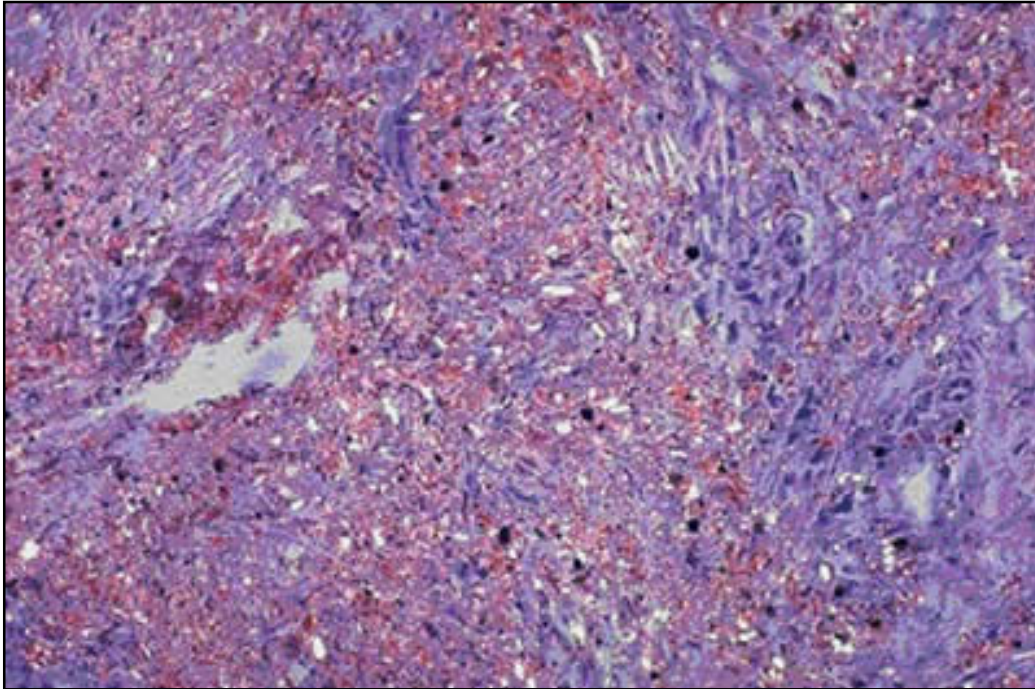
In advanced cases:

- Cyanosis
- Cor pulmonale
- Respiratory insufficiency

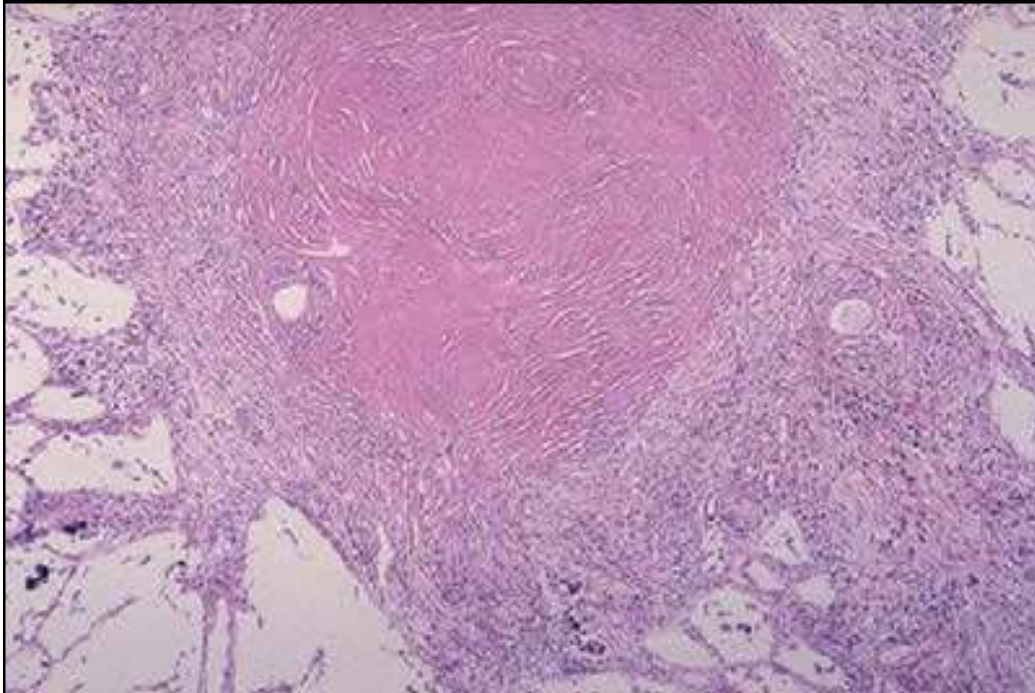


Silicosis





**Lung tissue with
crystalline silica dust**



**Fibrotic nodule formed
of collagen due to
silicosis**



Silicosis - Sandblasting Hoods and Helmets

**A CERTIFIED RESPIRATOR FITTED AND TESTED IS
A MUST.**

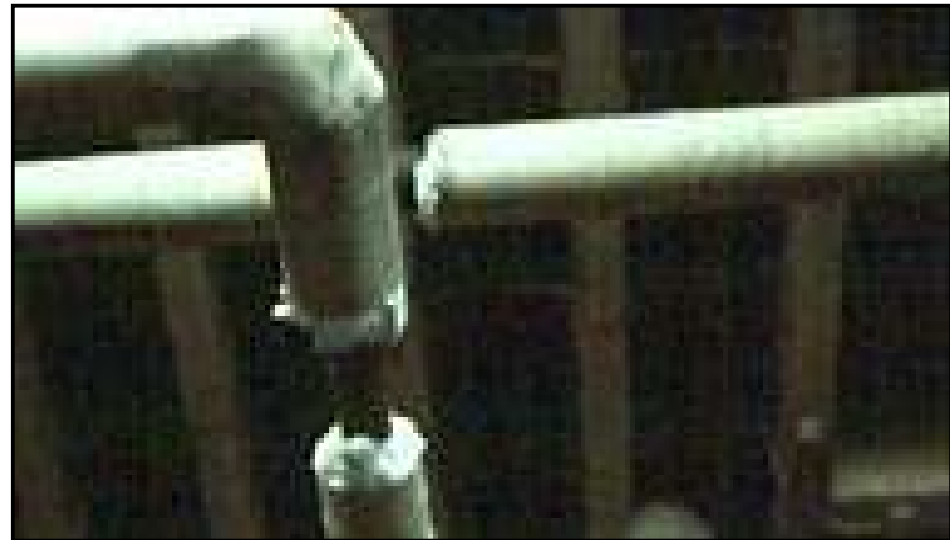
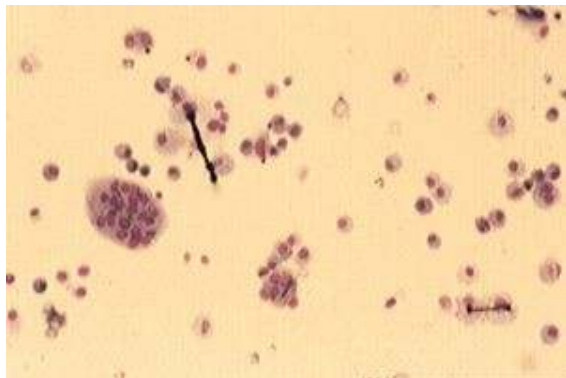
Asbestosis

Asbestos is a group of minerals with long, thin fibrous crystals

Most dangerous: blue asbest (krocidolite) (banned)

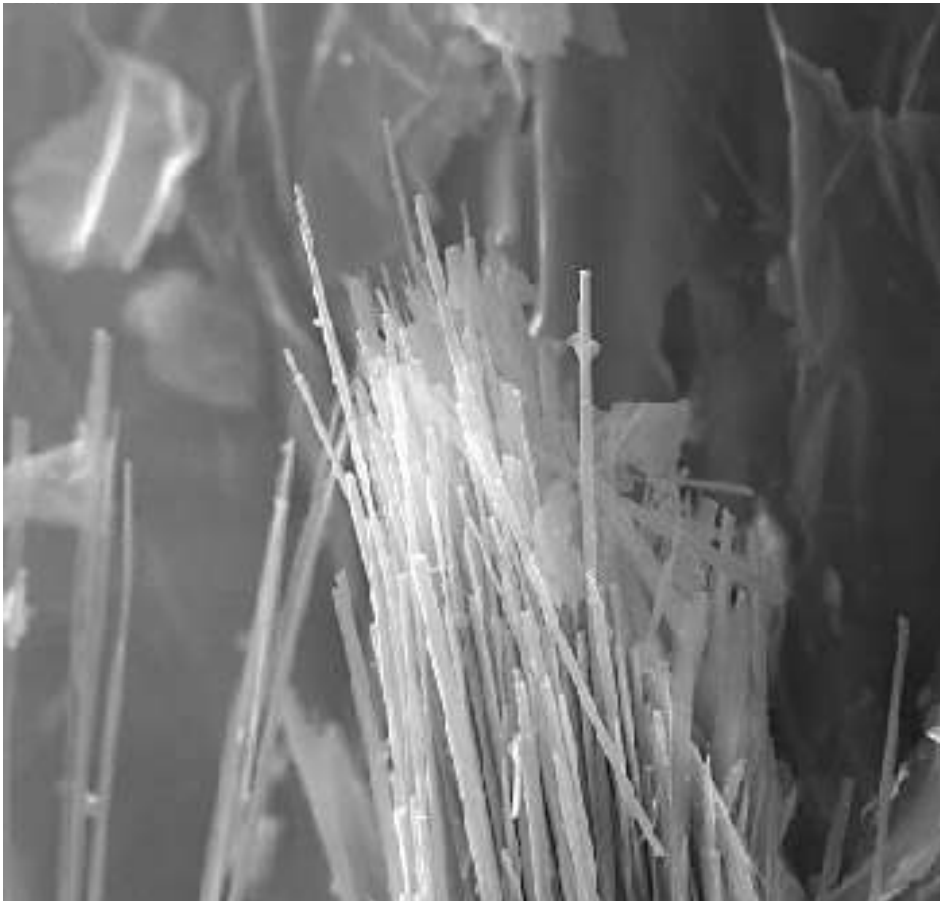
Used for: brake pads, pipe insulation etc.

Induces mesothelioma and lung cancer



There are two types of asbestos fibers:
amphibole (thin and straight) and
serpentine (curved).

The former are primarily responsible for human disease as they are able to penetrate deeply into the lungs.



Scanning electron micrograph
of **asbestiform amphibole** from a
former vermiculite mining site

Asbestosis is the **scarring of lung tissue**
(around terminal bronchioles and alveolar ducts)
resulting from the inhalation of asbestos fibers.

Due to the asbestos fibers' natural resistance to digestion,
the **macrophage dies off**, releasing cytokines and attracting further
lung macrophages and fibroblastic cells to lay down fibrous tissue,
which eventually **forms a fibrous mass**.

The fibrotic scar tissue causes alveolar walls to thicken,
which reduces elasticity and gas diffusion,
reducing oxygen transfer to the blood
as well as the removal of carbon dioxide.

Asbestosis presents as a **restrictive lung disease**.

In the more severe cases, the drastic reduction in lung function due to
the stiffening of the lungs and reduced total lung capacity (TLC) may
induce **right-sided heart failure (cor pulmonale)**.

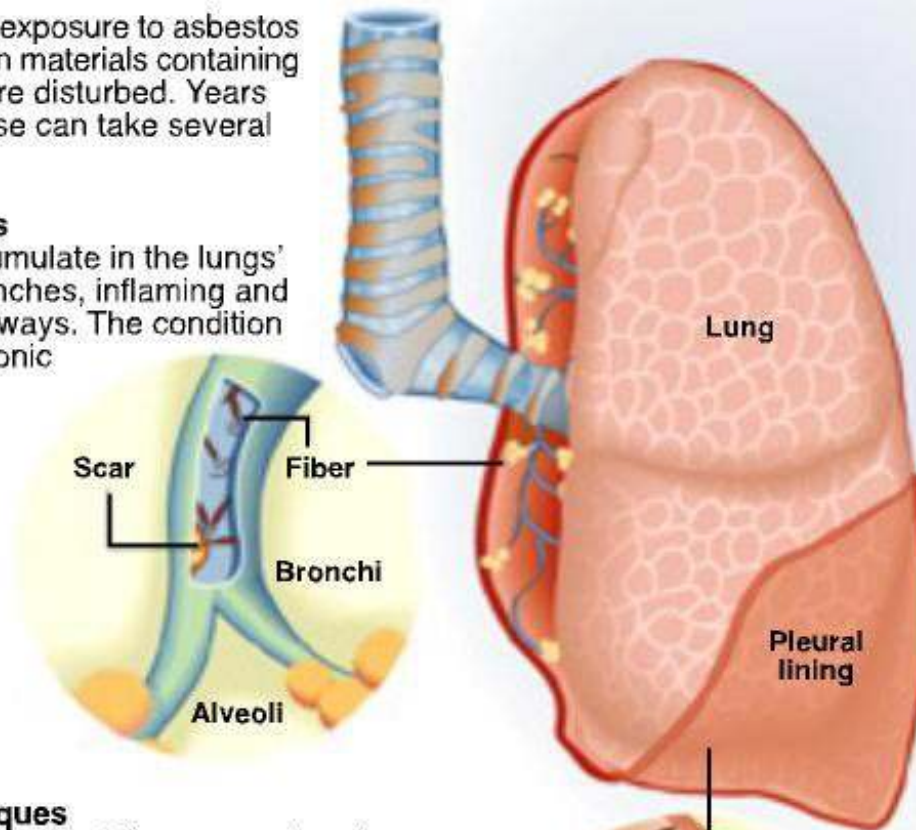
More than 50% of people affected with asbestosis develop plaques
in the parietal pleura.

Over time, asbestos does its damage

Dangerous exposure to asbestos occurs when materials containing the fibers are disturbed. Years later, disease can take several forms.

Asbestosis

Fibers accumulate in the lungs' narrow branches, inflaming and scarring airways. The condition causes chronic cough and chest pain.

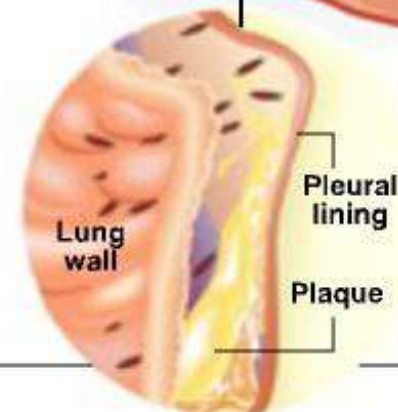


Pleural plaques

The needle-shaped fibers may also migrate into the pleural lining. As the pleura becomes inflamed, plaque builds up and may restrict breathing.

Cancer

Risks of lung cancer or mesothelioma, cancer of the pleural lining, from asbestos is increased significantly by smoking.



Asbestos was used for...

Asbestos has been in use since the late 1800s but its use increased greatly during World War II. For example, the building industry used asbestos for **strengthening cement and plastics**, as well as for **insulation, fireproofing and sound absorption**.

The shipbuilding industry has used asbestos to insulate boilers, steam pipes, hot water pipes and nuclear reactors in ships.

The car manufacturing industry has used **asbestos in vehicle brake shoes and clutch pads**.

Possible asbest exposure



Other pneumoconiosis

Fibrosis-like pneumoconiosis: personal sensitivity

Eg.: **siderosis** (iron), **stannosis** (tin), **baritosis** (barium),
cementosis

**Mild fibrosis may appear without progression: stannosis,
bauxite**

**No reactive inflammation: inert dust (grafit,
coal – coalworker's lung)**



Siderosis

Siderosis

Arc-welders' pneumoconiosis is caused by the deposition of iron oxide, Fe₂O₃.



Anthracosis



Coal miners often suffer from lung disease due to the coal dust they inhale as they work.

Diseases from organic dust

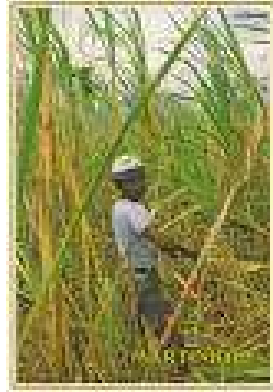
- Acute inflammation
- Inflammatory bronchoconstriction
- Chronic bronchitis
- Extrinsic allergic alveolitis



Eg.: bagassosis (molasses), byssinosis (cotton dust), farmer's lung



Bagassosis



Sugar cane

Byssinosis



Cotton

Farmers' lung

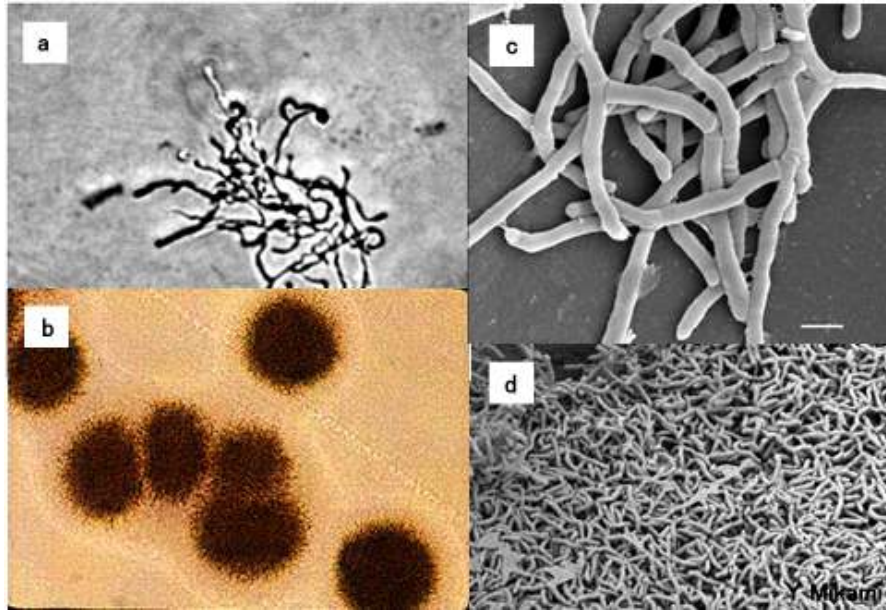


Hay

Farmer's Lung is an allergic disease usually caused by **breathing in the dust from moldy hay** (dust from any moldy crop).

The technical name for Farmer's Lung is „extrinsic allergic alveolitis“, "hypersensitivity alveolitis" or more generally "hypersensitivity pneumonitis".

People can get Farmer's Lung by breathing in **dust containing the spores of special, heat-tolerating bacteria or moulds often found on moldy crops.**

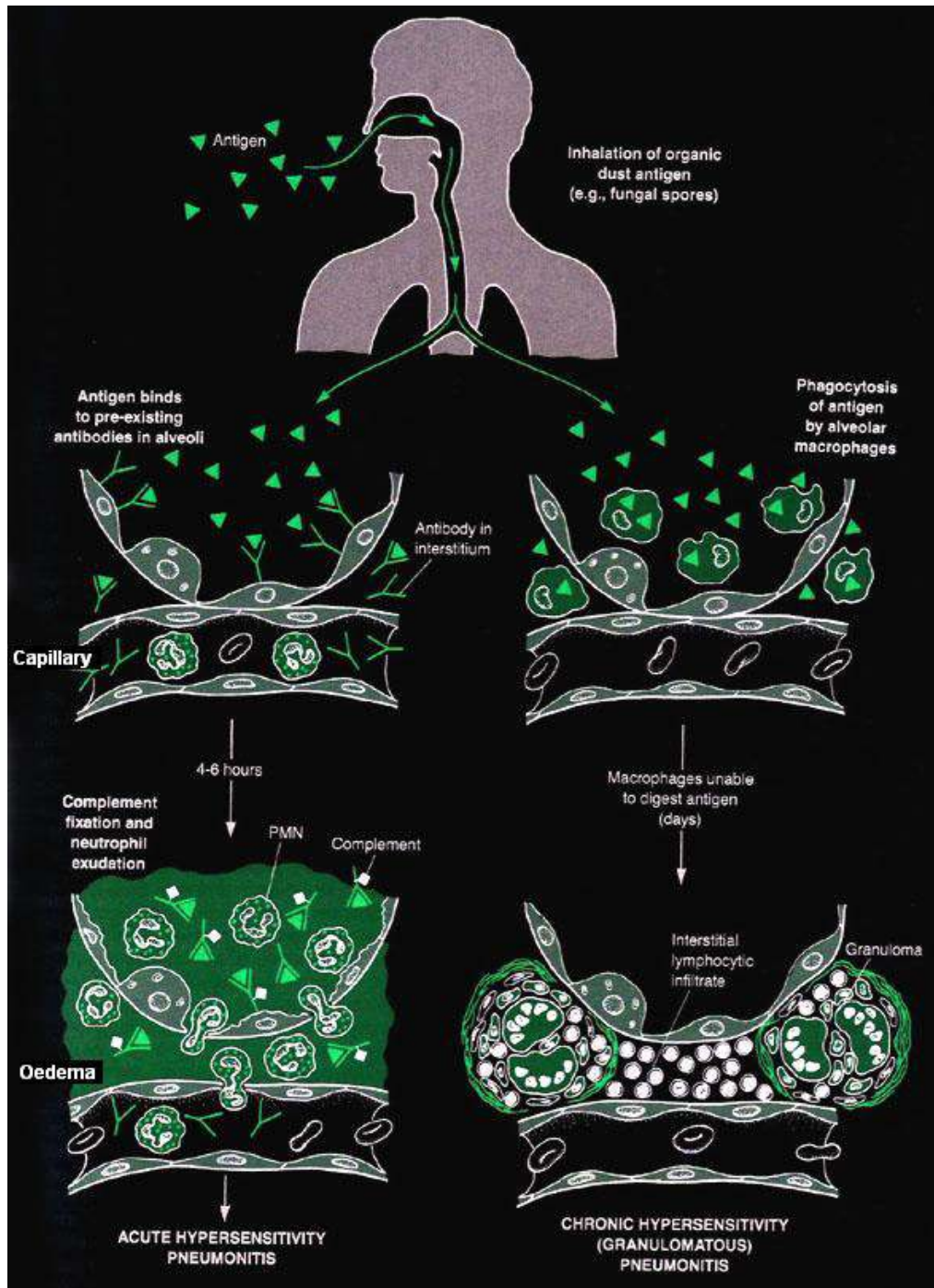


Actinomyces israelii

"Actinomyces" is a genus of the actinobacteria class of bacteria. They are all Gram-positive and can be either anaerobic or facultatively anaerobic.

They produce a number of enzymes that help degrade organic plant material, lignin and chitin.

Actinomyces, a thermophilic bacteria, is usually the causative agent of farmer's lung, and bagassosis.



Farmer's Lung. Caused by the molds Thermophilic actinomycetes, *Saccharopolyspora rectivirgula*.

Exposure is generally from moldy hay but may be found elsewhere.

In extrinsic allergic alveolitis, an antigen-antibody reaction occurs in the acute phase and leads to **acute hypersensitivity pneumonitis**.

If exposure continued, this is followed by a subacute phase, with the formation of granulomas and **chronic interstitial pneumonitis**.

Bagassosis /exposure is from moldy bagasse (pressed sugar cane)/.



Sugar cane workers (Nicaragua)

Bird-breeder's lung

This disease is caused by the exposure to **avian proteins** present in the **dry dust of the droppings** and sometimes in the feathers of a variety of birds. It is mainly present in bird droppings.

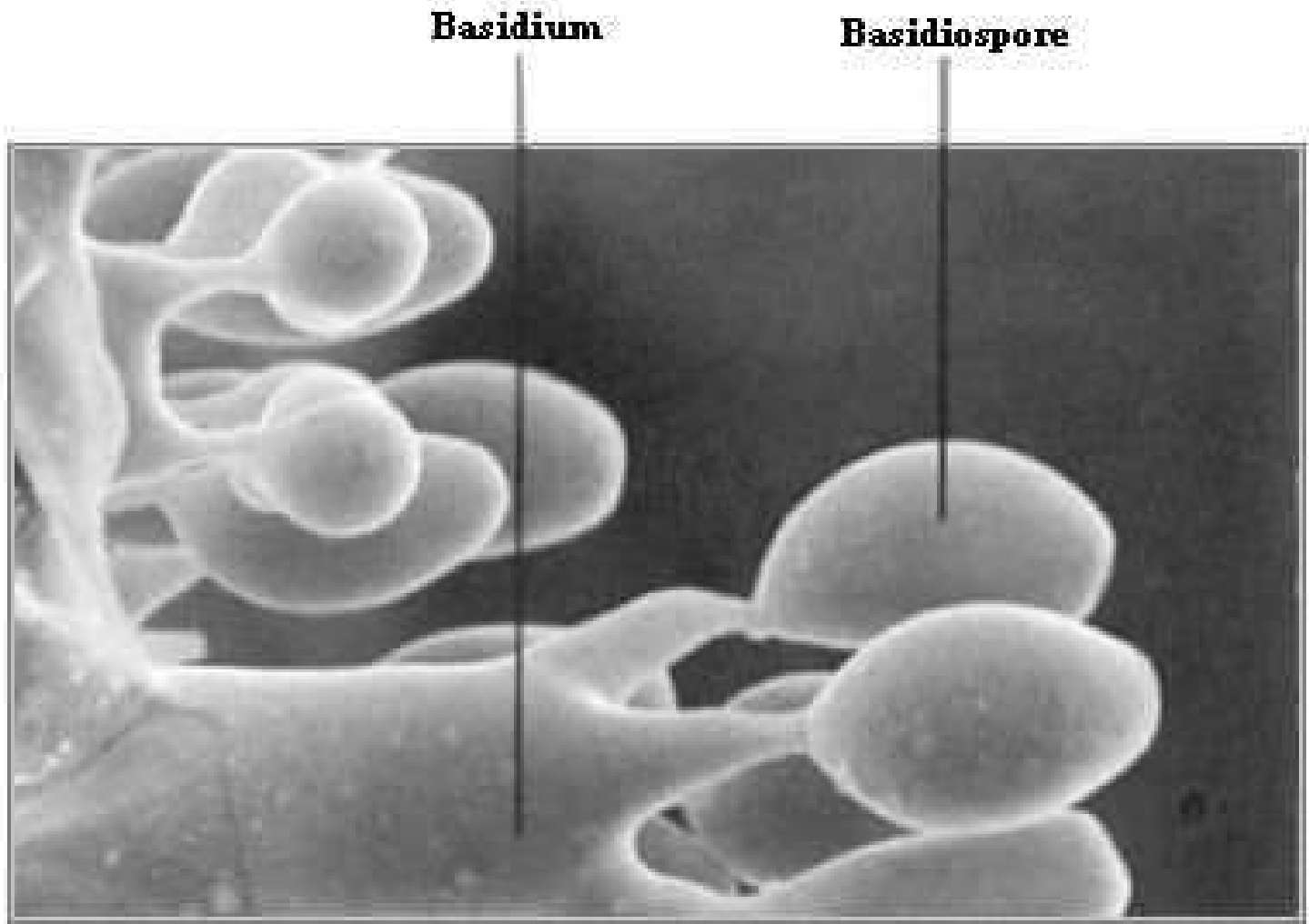




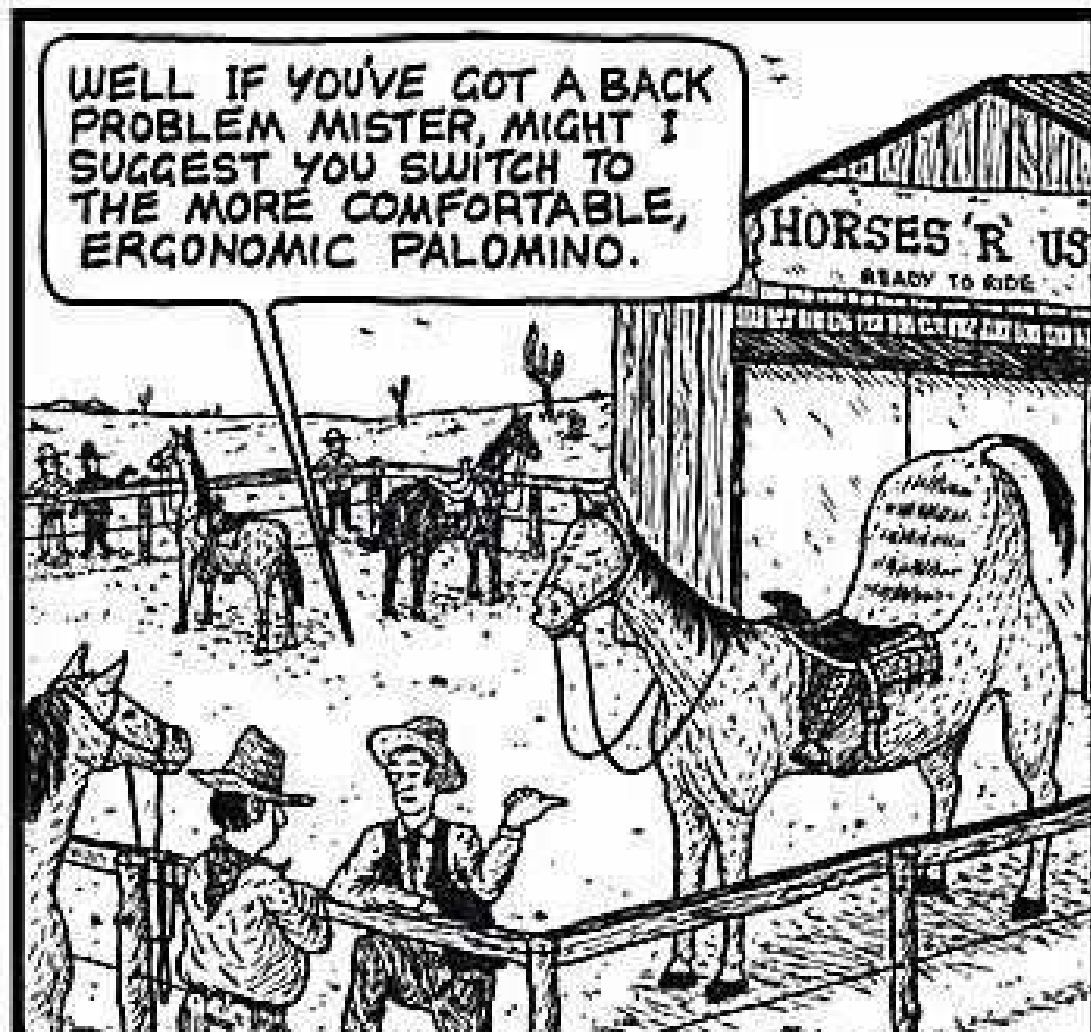
The best way to reduce the amount of allergens in the air and possibly prevent problems in the future, is to use a **high quality air purifier**. HEPA (which stands for High Efficiency Particle Arresting) removes 99.97% of particles greater than .3 microns in size.

Bird dust and dog and cat dander are large enough to be trapped in the HEPA material.

This mold can act as an allergen. Some people may experience hay fever, asthma, hypersensitivity pneumonitis: cheese washer's lung, woodman's lung, moldy wall hypersensitivity.

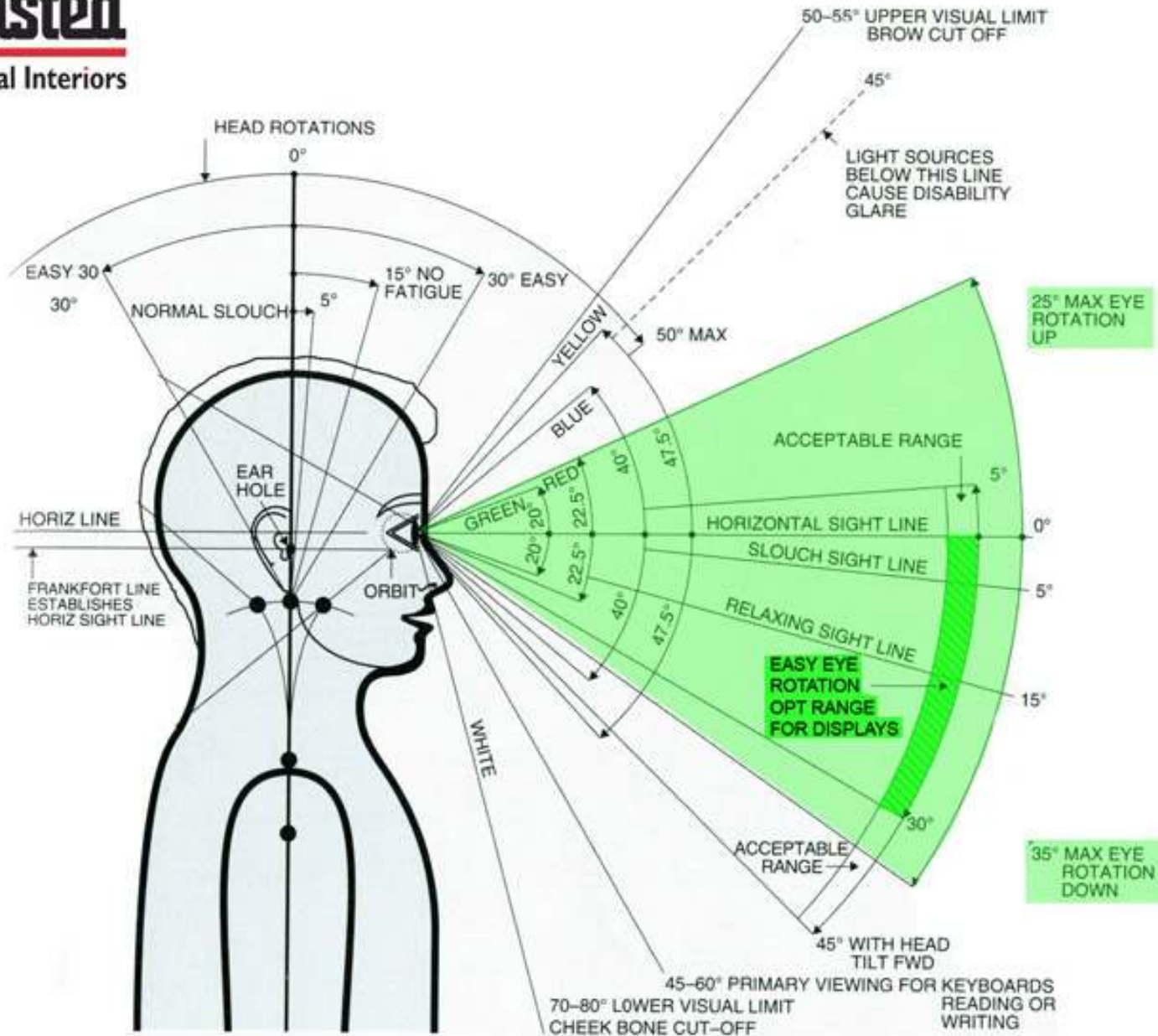


Ergonomics: aims to establish an **anthropocentric harmony** within the the **human-tool-environment** system.



The International Ergonomics Association (IEA) divides **ergonomics broadly into three domains:**

- 1.) **Physical ergonomics**: is concerned with human anatomical, and some of the anthropometric, physiological and biomechanical characteristics as they relate to physical activity.
- 2.) **Cognitive ergonomics**: is concerned with mental processes, such as perception, memory, reasoning, and motor response, as they affect interactions among humans and other elements of a system.
- 3.) **Organizational ergonomics**: is concerned with the optimization of socio technical systems, including their organizational structures, policies, and processes.



* Chart from *The measure of man & woman* by Henry Dreyfuss Associates



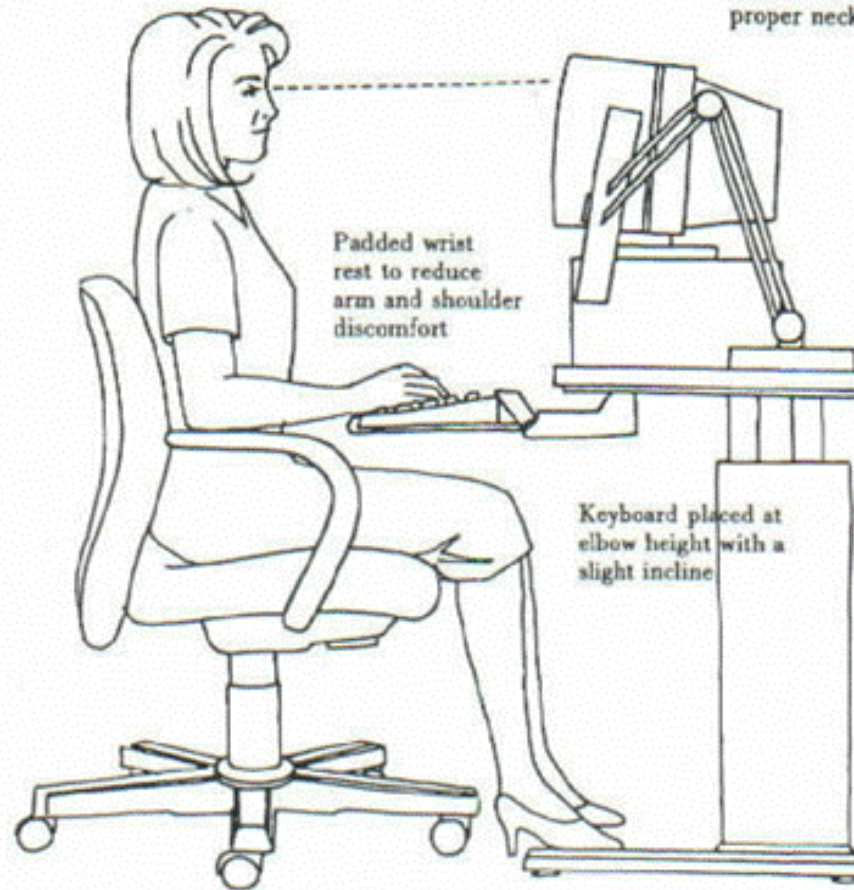


Fundamentals for the Flexible Workplace Variability and compatibility with desk components, that **flex from individual work activities to team settings.** Workstations provide supportive ergonomics for task-intensive environments.↓

Top of monitor placed at eye level to allow proper head and neck position

Copy holder placed at eye level, close to monitor, reduces eye motions and discomfort-allows proper neck posture

placed close reduces and lowers posture



Padded wrist rest to reduce arm and shoulder discomfort

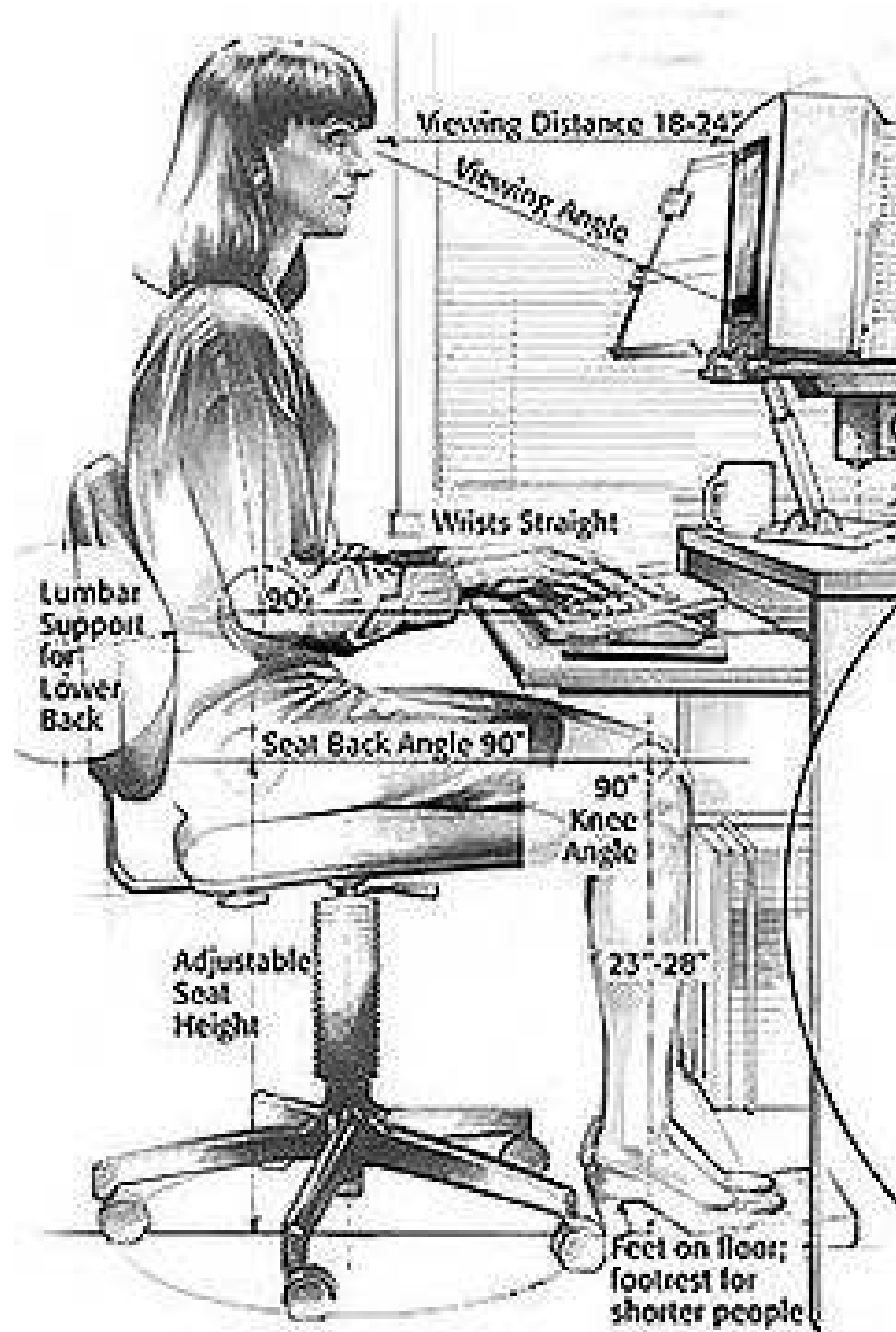
Keyboard placed at elbow height with a slight incline

A good chair with proper lumbar support

Easily adjustable furniture

able





Ergonomics: the science of designing the job, equipment, and workplace to fit the worker







An ergonomic redesign of the spade.









1

2

3

4





Special work carpets

