Bhumika Patel

B.Sc. Microbiology

K.C. College, Mumbai, India

Topic – **Fibrosis**

Fibrosis

- **Fibrosis** is the formation of excess fibrous **connective tissue** in an organ or tissue in a reparative or reactive process.

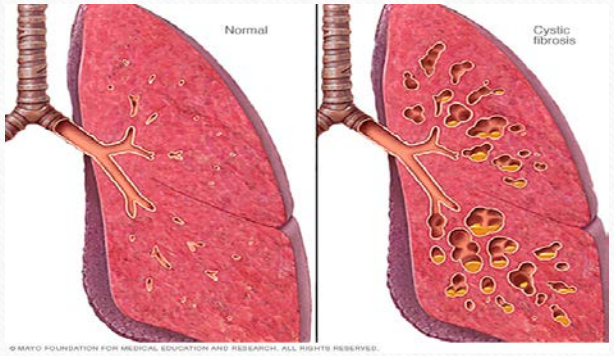
- Physiologically, fibrosis acts to deposit connective tissue, which can interfere with or totally inhibit the normal architecture and function of the underlying organ or tissue.

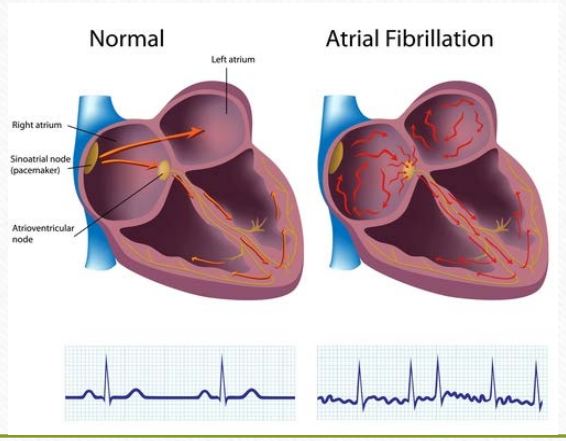
- Defined by the pathological accumulation of **extracellular matrix** (ECM) proteins, fibrosis results in scarring and thickening of the affected tissue, it is in essence an exaggerated wound healing response which interferes with normal organ function.

- Fibrosis is similar to the process of scarring, in that both involve stimulated fibroblasts laying down connective tissue, including **collagen** and **glycosaminoglycans.** The process is initiated when immune cells such as **macrophages** release soluble factors that stimulate fibroblasts.
- The most well characterized pro-fibrotic mediator is **TGF beta**, which is released by macrophages as well as any damaged tissue between surfaces called **interstitium**. Other soluble mediators of fibrosis include **CTGF**, **platelet-derived growth factor** (PDGF), and **interleukin 4** (IL-4).

- Fibrosis can occur in many tissues within the body, typically as a result of inflammation or damage, and examples include:

- **Lungs-cystic fibrosis, Idiopathic pulmonary fibrosis.**
- **Heart-Atrial fibrosis, Endomyocardial fibrosis**





Cystic fibrosis

- Cystic fibrosis (CF) is a genetic condition that affects a protein in the body. People who have cystic fibrosis have a faulty protein that affects the body's cells, tissues, and the glands that make mucus and sweat.

  Mucus is normally slippery and protects the linings of the airways, digestive tract, and other organs and tissues. People who have cystic fibrosis make thick, sticky mucus that can build up and lead to blockages, damage, or infections in the affected organs. Inflammation also causes damage to organs such as the lungs and pancreas.

Idiopathic Pulmonary Fibrosis

- **Idiopathic pulmonary fibrosis** (**IPF**) is a type of chronic lung disease characterized by a progressive and irreversible decline in lung function. Symptoms typically include gradual onset of shortness of breath and a dry cough. Other changes may include feeling tired and nail clubbing. Complications may include pulmonary hypertension, heart failure, pneumonia, or pulmonary embolism.

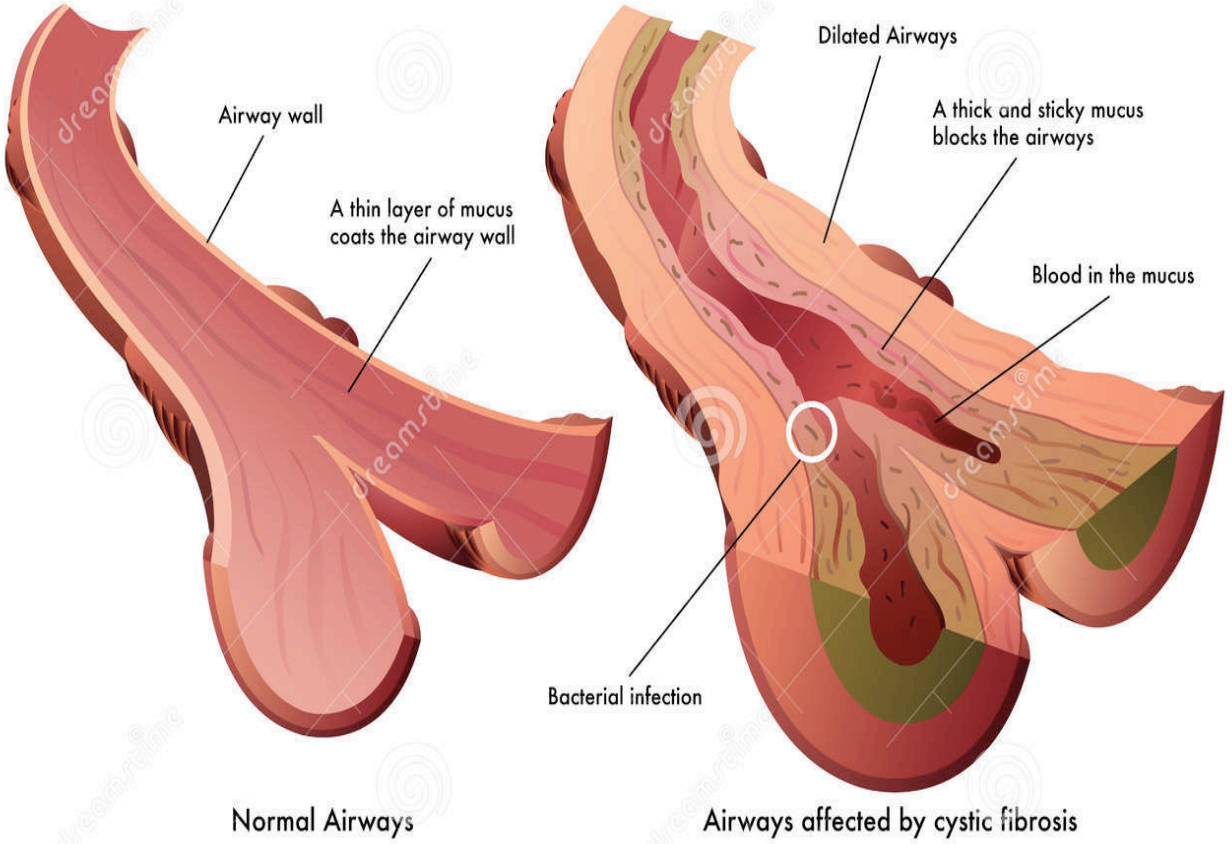
Atrial Fibrosis

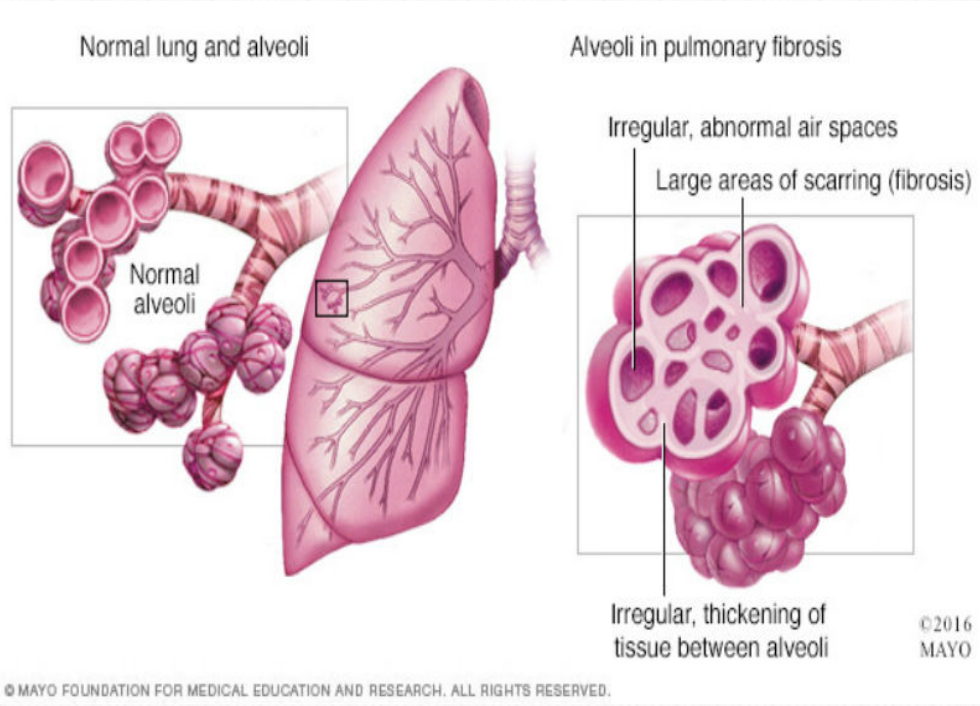
- **Atrial fibrillation** (**AF** or **A-fib**) is an abnormal heart rhythm characterized by rapid and irregular beating of the atria. Often it starts as brief periods of abnormal beating which become longer and possibly constant over time.
- Occasionally there may be heart palpitations, fainting, lightheadedness, shortness of breath, or chest pain. The disease is associated with an increased risk of heart failure, dementia, and stroke. It is a type of supraventricular tachycardia.

Endomyocardial Fibrosis

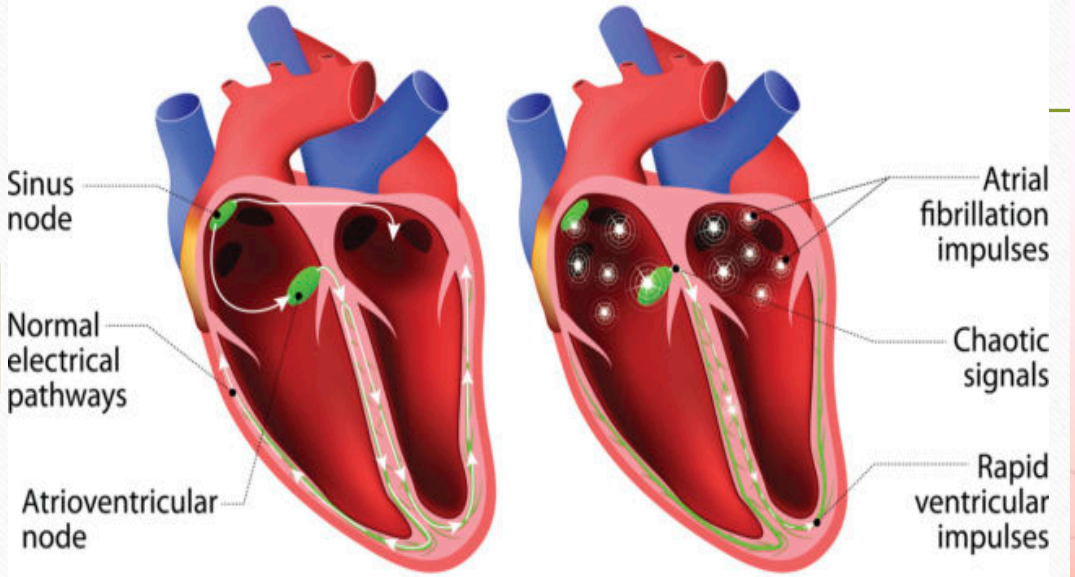
- Endomyocardial fibrosis (EMF) is a rare disease in North America but common in the tropical and subtropical regions of the developing world. It is characterized by fibrosis of the left ventricular and right ventricular endocardium which cause restrictive cardiomyopathy.
- However, its pathology resembles conditions such as eosinophilic cardiomyopathy and hypereosinophilic syndrome. As a result, EMF is sometimes considered part of a single disease process that also includes Loffler endocarditis (eosinophilic endomyocardial fibrosis).

Cystic Fibrosis



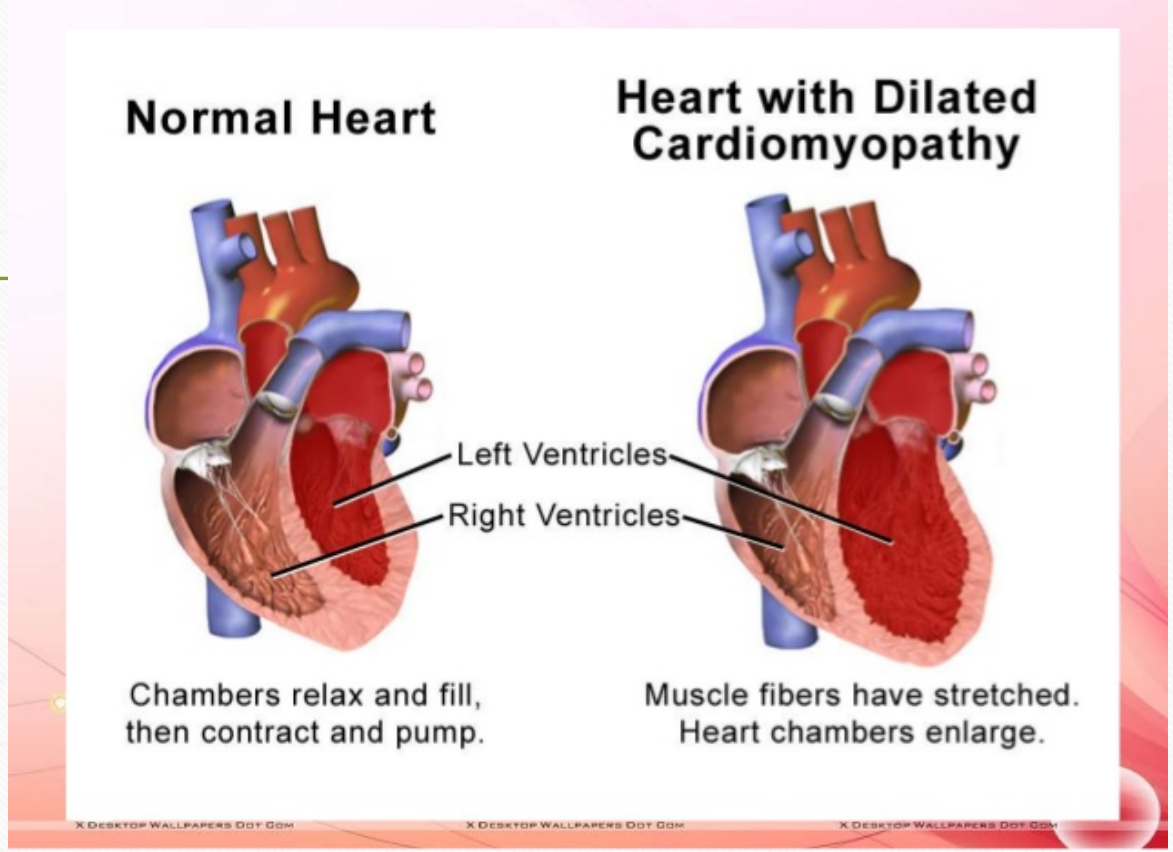


Cardiac arrhythmia



Normal heart

Atrial Fibrillation



References

- https://www.nhlbi.nih.gov/health-topics/cystic-fibrosis
- https://en.wikipedia.org/wiki/Fibrosis
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4591063/
- https://www.nature.com/articles/emm2017223.pdf?origin=ppub
- https://en.wikipedia.org/wiki/Atrial_fibrillation
- https://www.mayoclinic.org/diseases-conditions/pulmonary-edema/symptoms-causes/syc-20377009
- https://www.ncbi.nlm.nih.gov/books/NBK513293/

Thank you