



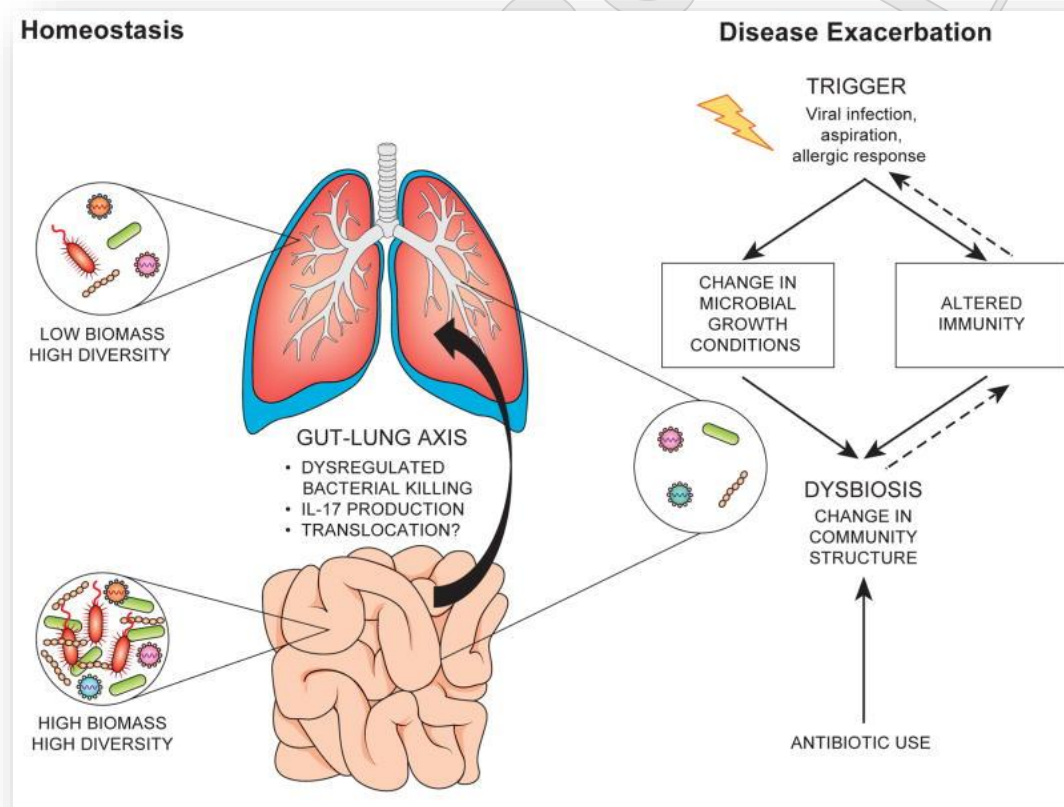
LUNG (PULMONARY) MICROBIOME

The composition of the lung microbiome is determined by elimination, immigration, and relative growth within its communities.

The microbiome of the lung has relatively less bacterial biomass when compared to the lower gastrointestinal tract yet displays considerable diversity.

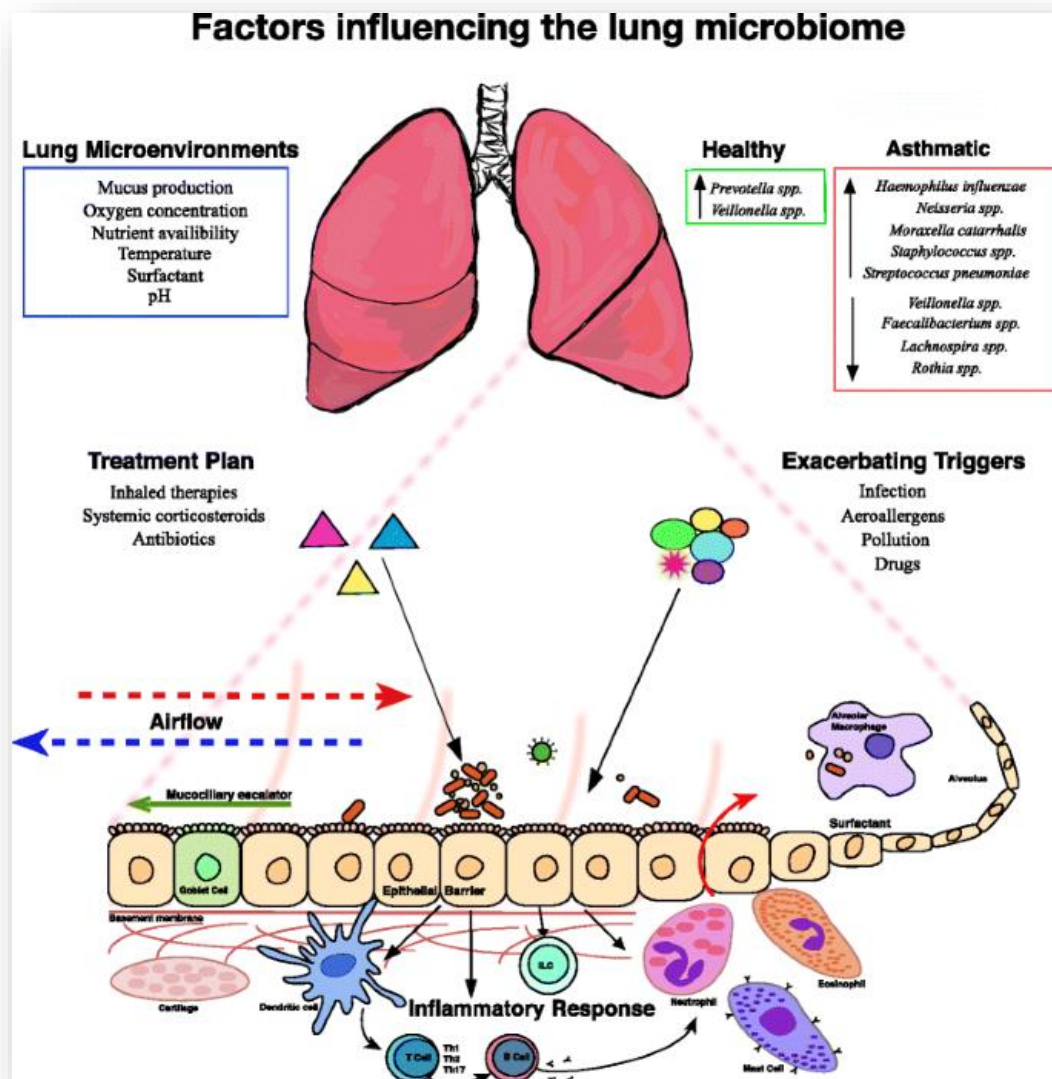
The lung is an organ constantly exposed to microbiota either through inhalation or subclinical micro aspiration from birth.

The lung is not sterile and in fact, harbours an abundance of diverse interacting microbiota. The gut microbiome modulates host mucosal defence; however, there is a paucity of information regarding the potential role of lung microbiota to regulate immunity and homeostasis.



Proposed regulation of disease exacerbation by the gut-lung axis

[The Lung Microbiome, Immunity and the Pathogenesis of Chronic Lung Disease](#)



The Microbiome and the Pathophysiology of Asthma

[Sullivan, A., Hunt, E., MacSharry, J. et al. The Microbiome and the Pathophysiology of Asthma. *Respir Res* 17, 163 \(2016\)](#)



FACTORS THAT INFLUENCE THE LUNG MICROBIOTA DURING ACUTE AND CHRONIC DISEASE

Architectural:

- Airway obliteration (lung transplant, IPF)
- Terminal bronchiole destruction (COPD)
- Honeycombing and fibrosis (IPF)
- Impaired muco-ciliary clearance (COPD, asthma)

Immunologic:

- Innate immune cell impairment
- Altered PRR signaling
- Release of anti-microbial peptides
- Apoptosis/Autophagy
- Inflammation
- Cytokine alterations

Microbiologic:

- Overgrowth of limited bacterial species (IPF, CF)
- Antibiotic use (esp. in CF)
- Lytic viral infection (COPD, asthma)
- Latent viral infection (IPF?)
- Biofilm formation (CF, COPD)

Pathologic:

- Osmotic changes (CF)
- Thickened mucus (CF)
- Damaged cilia (COPD)
- Changes in oxygen tension, ventilation and perfusion (IPF, COPD, CF, asthma)
- Micro aspiration (IPF)

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