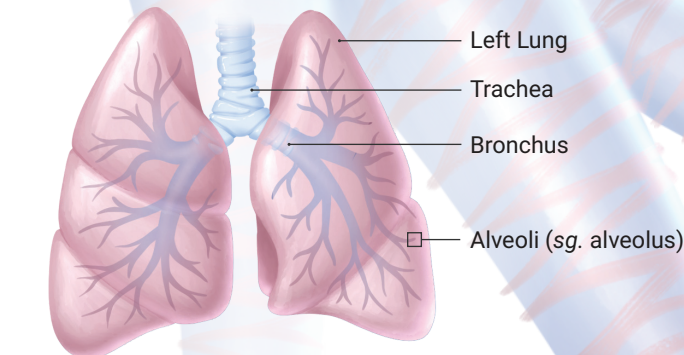


COVID-19

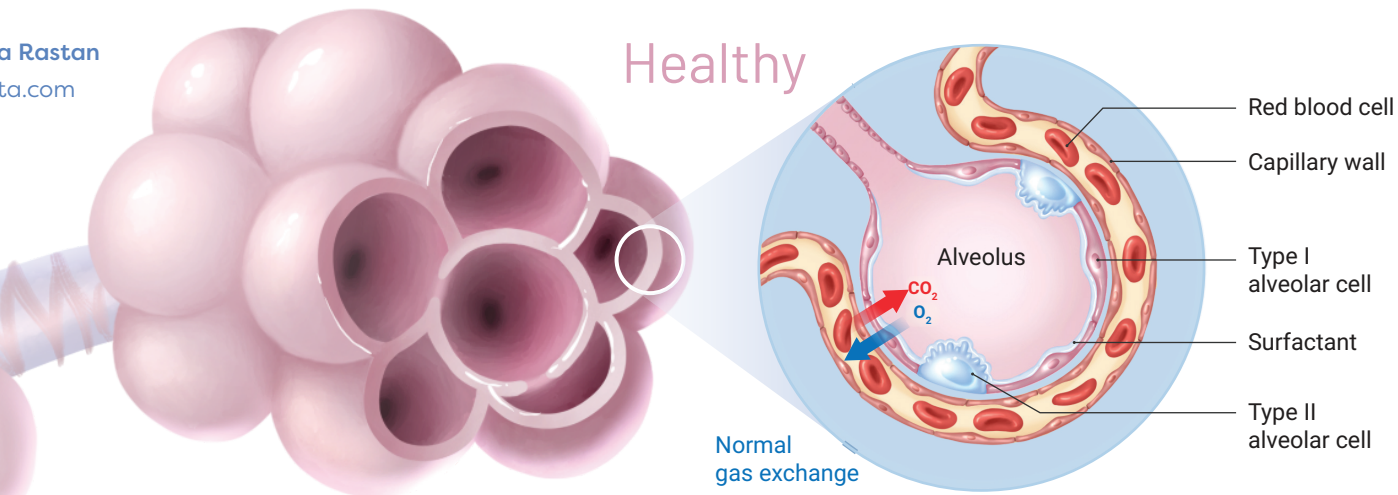
HOW DOES IT AFFECT YOU?

Coronavirus Disease 2019 (COVID-19) is a pandemic caused by Severe Acute Respiratory Syndrome Coronavirus 2, also called SARS-CoV-2. Despite the widespread awareness regarding COVID-19, many are still unaware about how it affects the human body.



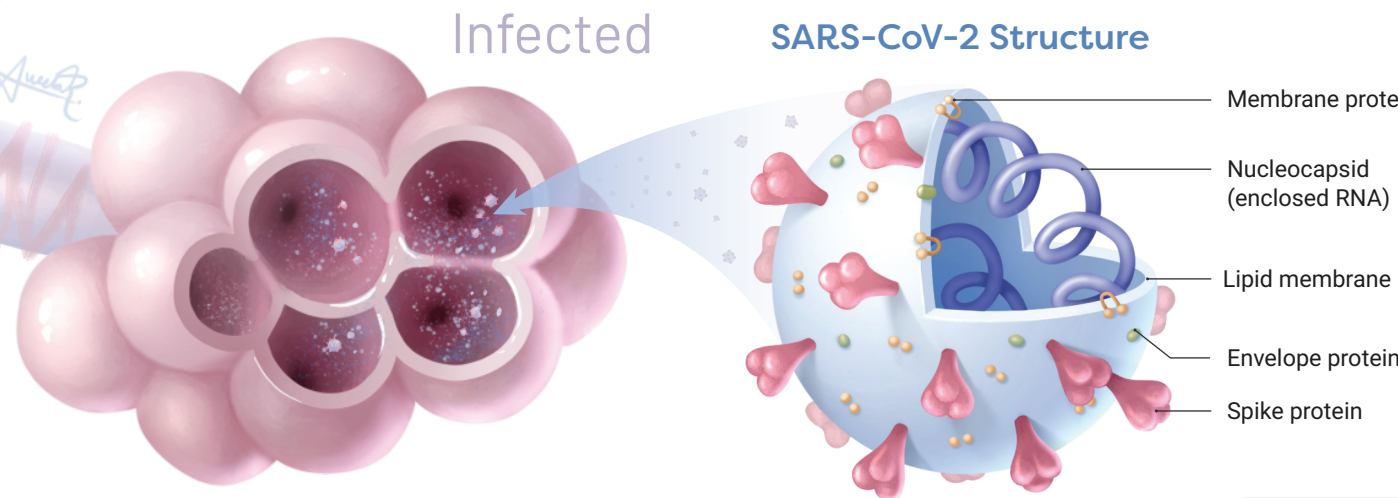
SARS-CoV-2 starts its journey in the nose, mouth, or eyes and travels down to the alveoli in the lungs. Alveoli are tiny sacs of air where gas exchange occurs.

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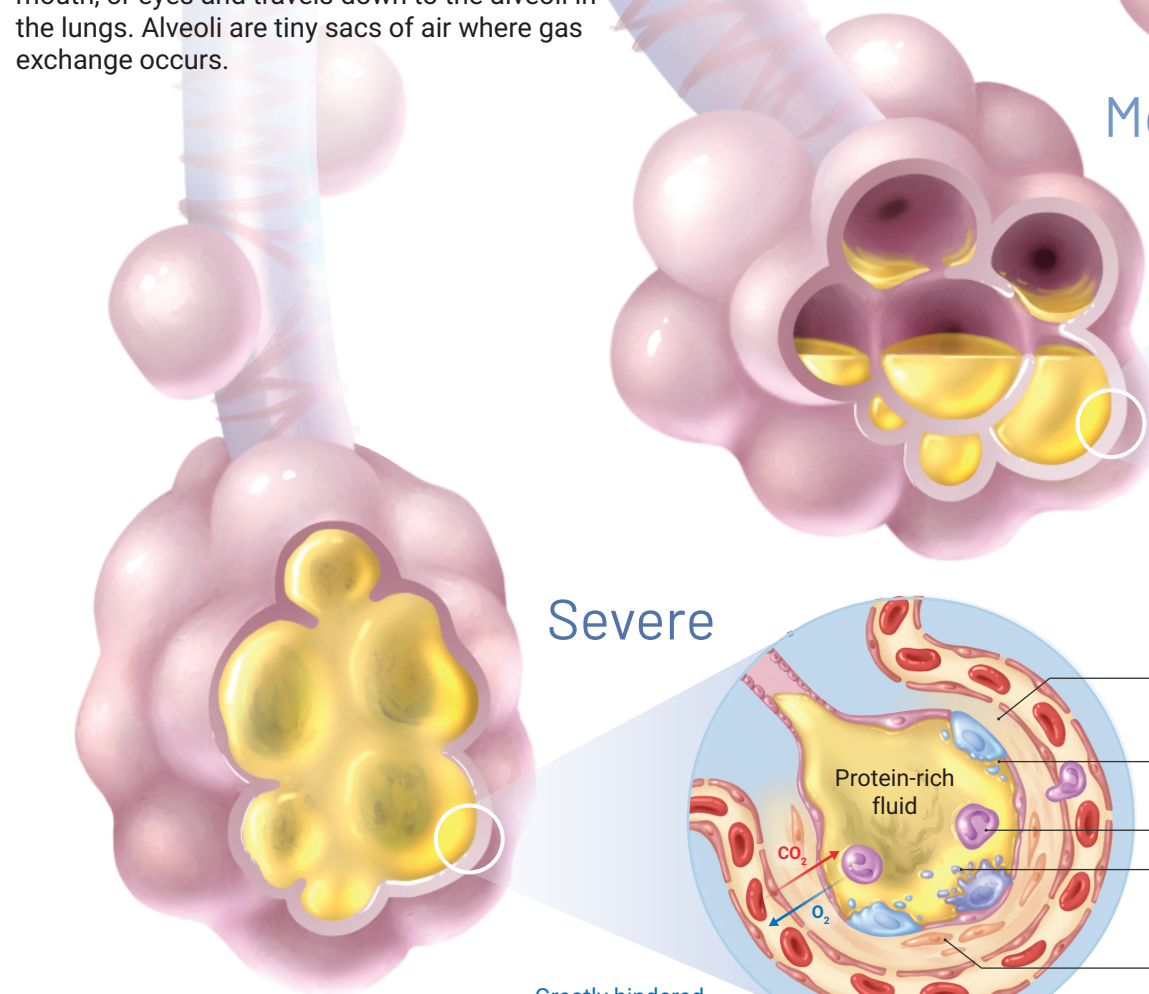
Gas Exchange

Each sac of air, or alveolus, is wrapped with capillaries where red blood cells release **carbon dioxide** (CO₂) and pick up **oxygen** (O₂). Two alveolar cells facilitate gas exchange; **Type I** cells are thin enough that the oxygen passes right through, and **Type II** cells secrete **surfactant** – a substance that lines the alveolus and prevents it from collapsing.

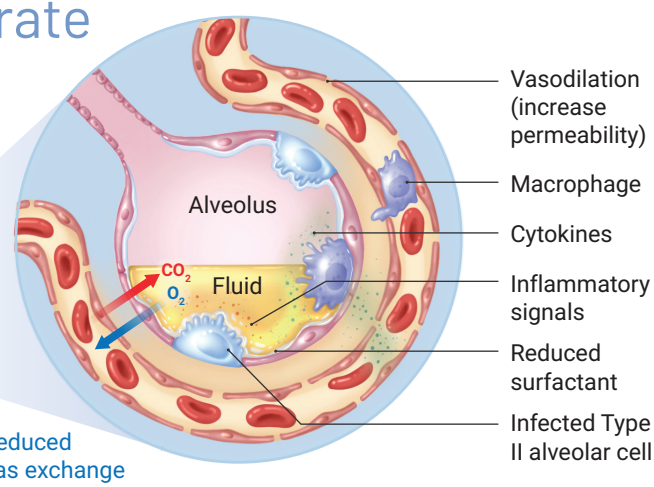


Viral Infection

The spike proteins covering the coronavirus bind ACE2 receptors on type II alveolar cells, allowing the virus to enter the cell via endosome or membrane fusion and release its RNA. The RNA "hijacks" the cell, telling it to assemble many more copies of the virus and release them into the alveolus. The host cell is destroyed in this process and the new coronaviruses infect neighbouring cells.



Moderate



Impaired Gas Exchange

When the immune system attacks the area of infection it also kills healthy alveolar cells. This results in three things that hinder gas exchange:

- 1) Alveolar collapse due to loss of surfactant from Type II cells
- 2) Less oxygen enters the bloodstream due to lack of Type I cells
- 3) More fluid enters the alveolus

Stay Home

Symptoms may start to show (e.g. dry cough, fever, etc.)

Pneumonia develops

Shortness of breath

Hospitalization

Dangerous for high-risk individuals; secondary infections may occur

Intensive Care (ICU)

Patients may require ventilators and life-support

Complications unrelated to COVID-19 may occur

With proper care, patients may recover at any point during this process

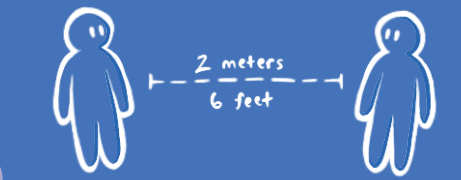
Immune Response

- 1 After infection, type II cells release **inflammatory signals** that recruit **macrophages** (immune cells).
- 2 Macrophages release **cytokines** that cause vasodilation, which allows more immune cells to come to the site of injury and exit the capillary.
- 3 Fluid accumulates inside the alveolus.
- 4 The fluid dilutes the surfactant which triggers the onset of alveolar collapse, decreasing gas exchange and increasing the work of breathing.
- 5 **Neutrophils** are recruited to the site of infection and release Reactive Oxygen Species (ROS) to destroy infected cells.
- 6 Type I and II cells are destroyed, leading to the collapse of the alveolus and causing **Acute Respiratory Distress Syndrome (ARDS)**.
- 7 If inflammation becomes severe, the protein-rich fluid can enter the bloodstream and travel elsewhere in the body, causing **Systemic Inflammatory Response Syndrome (SIRS)**.
- 8 SIRS may lead to **septic shock** and **multi-organ failure**, which can have fatal consequences.

WHAT CAN YOU DO?

1 Preventative Actions

- There is currently no proven treatment for COVID-19, so adopting the best practices for preventing infection is crucial. These include:
- **Physical distancing** – keep a distance of at least 2 meters between you and others outside of your home
 - **Proper hand-washing** – wash your hands for at least 20 seconds
 - Cough or sneeze into your elbow or a tissue and immediately wash your hands after



2 Stay Healthy

Make a routine of eating a well-balanced diet, drinking plenty of water, getting enough sleep, exercising, and monitoring your mental health. Reach out to family and friends for support.



3 Stay Informed

With a situation that changes daily, it is crucial to stay informed so you know if any changes have occurred both globally and in your community. Make sure to look for evidence-based sources to avoid misinformation.



4 Donate

Consider donating to local businesses or online funding campaigns if you have financial flexibility. If you have spare time, consider volunteering for community initiatives, such as helping deliver food to those in need.

