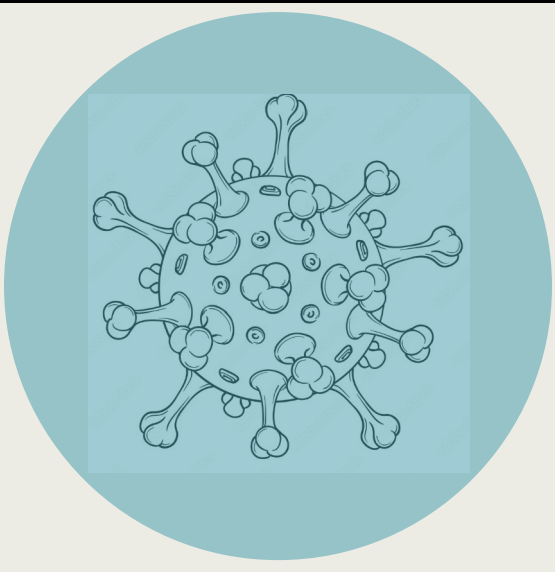
Long Covid Symptoms

There is growing scientific evidence for SARS-CoV-2 viral persistence in many cell types and tissues. Viral persistence is the simplest explanation for the entire range of Long Covid and Long Vax symptoms. It does not rule-out other possible pathologies such as EBV reactivation, autoantibodies, organ damage, etc..



Fatigue, Cognitive fatigue and Post-exertional malaise (PEM)

These common Long Covid symptoms occur in about 90% of those with Long Covid. The Fatigue can range from mild to dehabilitating. Post-exertional malaise (PEM) is characterized by a profound fatigue after exertion. It may occur the next day after a short hike or it may occur soon after sweeping the floor. It may even occur after mental exertion, a social visit, or emotional stress.

Autonomic dysfunction

Probems related to Vagus nerve impairment via SARS-CoV-2 infection, aka Dysautonomia.

1. **Tachycardia**
   A rapid heart rate. > 100 bpm at rest or with minimal exertion
2. **Heart Palpitations**
3. **Unusual sweating or shivering**
   Including night sweats
4. **Hot or Cold hands and feet**
   Also swings in body or skin temp
5. **Shortness of breath**
   Not explained by congestion.
6. **Difficulty swallowing and Heartburn** (Gastroparesis)
7. **Dizziness or Light-headed**
   feeling when standing

Postural orthostatic tachycardia syndrome (POTS) is a condition that causes a number of symptoms when you transition from lying down to standing up, such as a fast heart rate, dizziness and fatigue.

Neurocognitive

Infection of the pericytes and astrocytes near the blood brain barrier has been shown in brain organoid research. Low-level inflammation of the brain likely happens when the immune sytem is fighting a persistent viral infection in parts of the brain.

1. **Brain Fog - Head pressure**
   activation of brain macrophages (microglia) causes inflammation
2. **Difficulty Concentrating**
   Difficulty thinking, slow speech, difficulties while communicating
3. **Slowed information processing**
   Unable to watch TV or drive, sensitivity to light and/or noise
4. **Memory issues**
   Long-term memory gaps or difficulties retrieving information
5. **Insomnia or interrupted sleep**
   This can be mild or quite severe.
6. **Headache**
7. **Dissociation**
   Disconnecting from one's thoughts / feelings / memories / emotions

Inflamation of the brain or brain fog impairs “executive function". This is the foundational set of mental abilities that includes focusing attention, holding information in mind, and blocking out distractions.

Cranial Nerves and Eyes

Infection of the vagus nerve and the glossopharyngeal nerve has been demonstrated in cell culture and in Covid-19 autopsy studies. There are 12 cranial nerves plus the occipital nerve that service the head and neck.

1. **Base of skull soreness**
   Pair of Occipital nerves
2. **Throat area and lower jaw soreness**
   Glossopharyngeal and Hypoglossal nerves
3. **Pain or soreness behind an eye**
   Optical nerve
4. **Blurry vision, tracking problems**
   Occular motor / Trochlear nerves
5. **Snowy vision or Dark vision**
   Some cells in the eye retina can be infected in eye organoid studies.
6. **Side of neck soreness**
   Trapezius and Sternocleidomastoid muscles via the Accessory nerves
7. **Loss of smell / altered smell**
   Supporting accessory cells and perhaps the Olfactory nerve can be infected.
8. **Loss of taste / altered taste**
   Certain taste buds in the tongue can be infected and those connect to the Hypoglossal nerve

Cells of the immune system do not want to kill nerve cells. Nerve cells are hard to replace. Thus, over time, nerves may serve as a viral reservoir. Further, the virus may spread directly from one nerve cell to another.

1. ANXIETY
2. IRRITABILITY
3. DEPRESSION
4. DISSOCIATION

Mental health Impacts

These are likely a direct result of viral infection as they often first occur when initial Long Covid symptoms begin. Decreased functioning due to poor health may then further contribute to depression and anxiety.

Ears

Probems related to infection of the sensitive inner ear hair cells and Eustachian tubes. (1)

1. **Tinnitus**
   Mild to severe ringing in one or both ears.
2. **Balance problems**
   "bobble-head" feeling when walking, vertigo
3. **Eustachian tubes**
   Fullness or pressure in the ears

Other Common symptoms

1. **Muscle, Joint and Nerve pain**
2. **Rib and Chest pain**
   Costrochondritis - inflammation of the cartillage
3. **Body tremors and muscle twitches**
   These are separate symptoms
4. **Pins and needles sensation**
   potential small fiber neuropathy
5. **Leg weakness / heaviness**
   Poor muscle control (Ataxia)
   Mechanosensory nerves impaired
6. **Heart issues**
   Heart pain/aches, squeezing, arrythmia and tachycardia

Gut, heart and other tissues

1. **Gut epithelium:** Infection of the gut (2) interferes with normal gut function and viral infection may cause"leaky gut" and systemic inflammation. Bacterial fragments from the gut such as LPS may cause Mast Cell Activation and histamine sensitivity. Diarrhea and Nausea are common.
2. **Blood vessels:** Shedding of viral proteins such as the spike protein or direct infection of the blood vessels impairs blood vessel function and promotes inflammation and "microclots".
3. **Blood brain barrier:** Infection of pericytes interferes with normal blood brain barrier function and may cause a leaky BBB with localized inflammation. (3)
4. **Lung epithelial cells:** A few long-haulers continue to have a cough and thick mucous secretions. Persistent viral infection may reduce lung function and cause inflammation and Shortness of Breath. (4)

Other tissues: The kidney, gall bladder, liver, bile ducts, heart (pericarditis & myocarditis), appendix, thyroid, pancreas, muscles, fat cells, lymph nodes, uterus, testes and skin may also be sites of viral persistence. (5)

Reduce your risk of Long Covid Relapses

Avoid strenuous exercise

Avoid all added sugars and wheat

Avoid reinfection

Pace yourself. Take regular breaks during the day

No smoking

Avoid all alcohol

Long Covid is a Serious health issue

Now is the time to raise awareness around Long Covid. Many have been sick since 2020. Unfortunately, each new Covid-19 infection is another chance to develop Long Covid.

Quantify your symptoms

https://forms.gle/YztoQDSVnwSjrFR8

Thomas Bunker PhD

A comparison of Long Covid and Post Vaccine symptoms

https://recoverfromlongcovid.com/?page_id=413

1. Direct SARS-CoV-2 infection of the human inner ear may underlie COVID-19-associated audiovestibular dysfunction 2021
2. Postacute COVID-19 is Characterized by Gut Viral Antigen Persistence in Inflammatory Bowel Diseases, Gastroenterology 2022
3. In SARS-CoV-2, astrocytes are in it for the long haul PNAS July 2022
4. Persistent alveolar type 2 dysfunction and lung structural derangement in post-acute COVID-19, Preprint Nov 2022, Schwartz et al
5. SARS-CoV-2 infection and persistence in the human body and brain at autopsy, Nature Dec 2022 , Stein et al