



THE UNIVERSITY OF
AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

SCIENCE

LONG COVID IMMUNITY & PATHOLOGY

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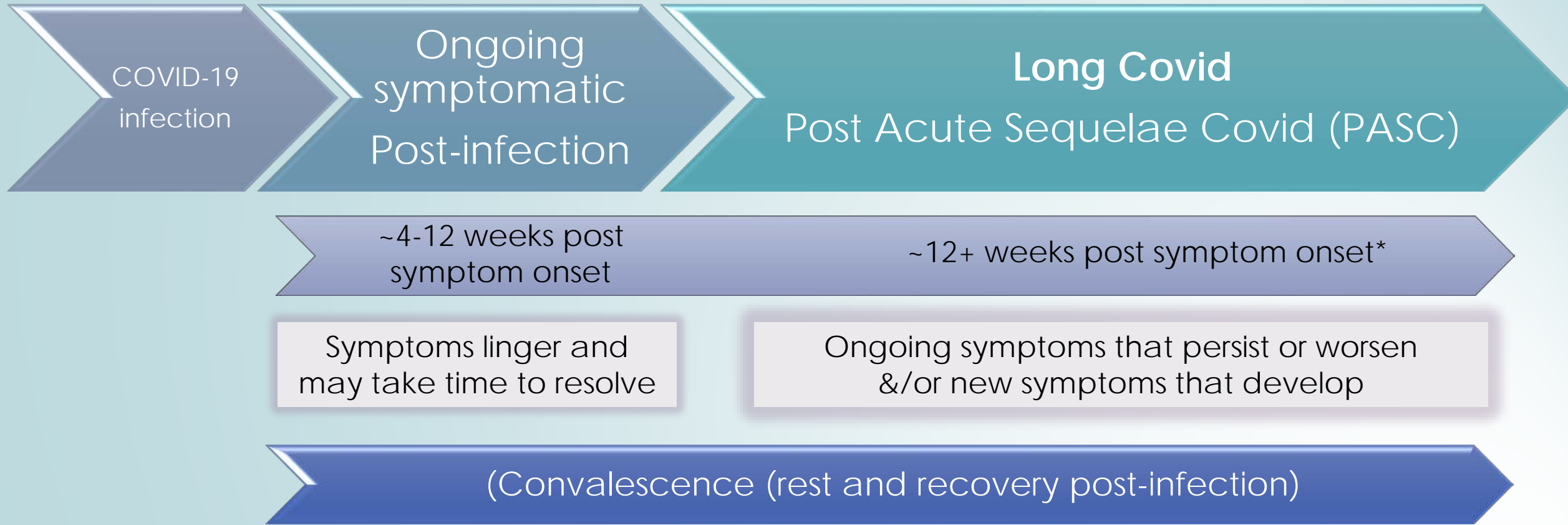
@DrAnnaNZ



@LongCovidNZ

#Longcovid2022

LONG COVID



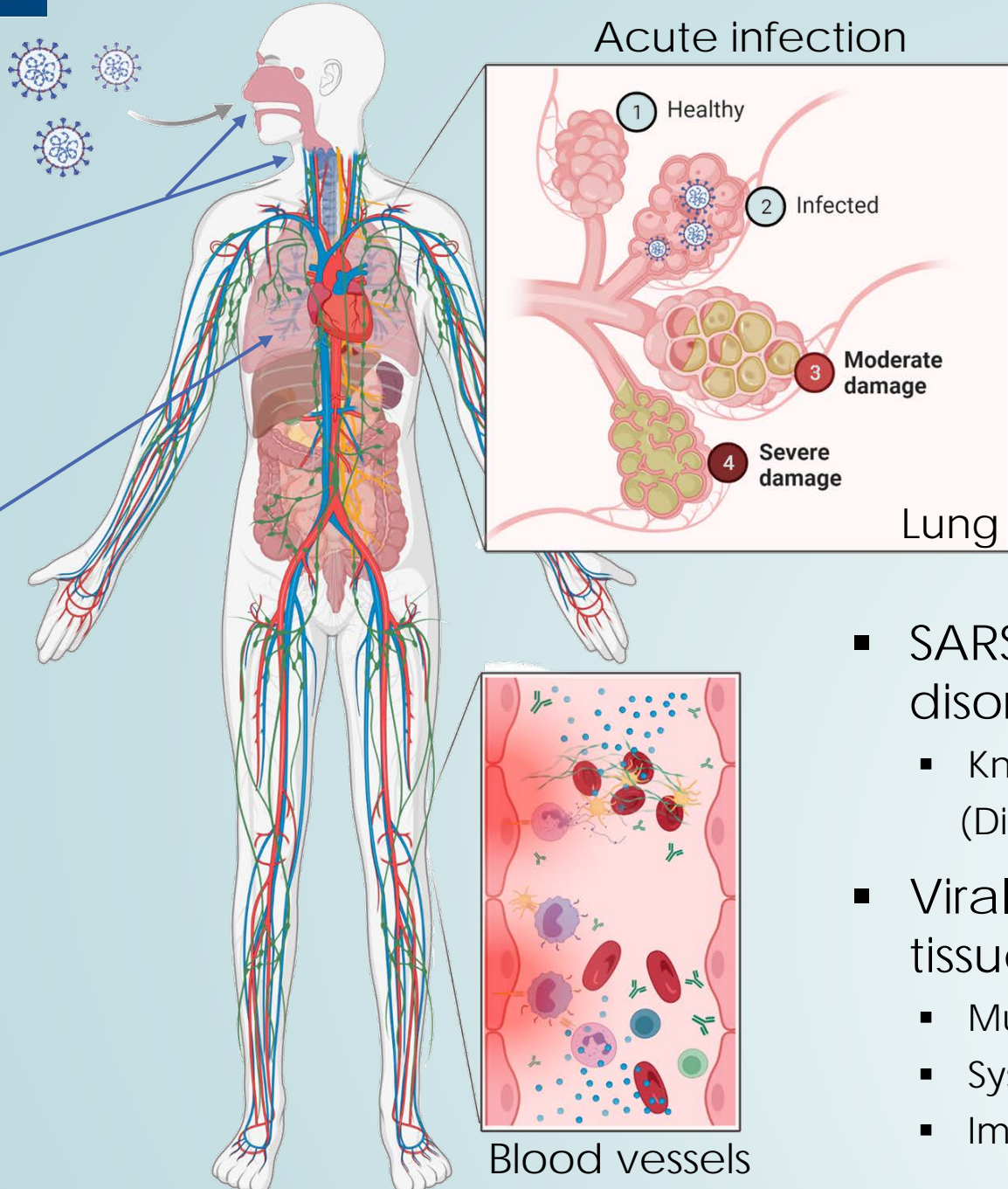
*according to the WHO case definition

SARS-COV-2 PATHOLOGY

Omicron
Upper airways



Original
variants/Delta
Lung

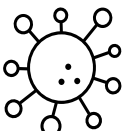


- SARS-CoV-2 not *just* a respiratory disorder
 - Known to cause immunothrombosis/coagulation (Disruption to blood clotting pathways)
- Viral infection can cause widespread tissue damage/inflammation
 - Multisystem disruption
 - Systemic inflammation
 - Immune dysfunction

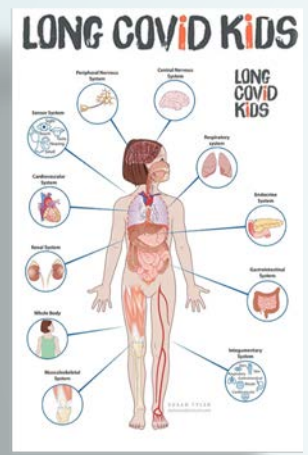
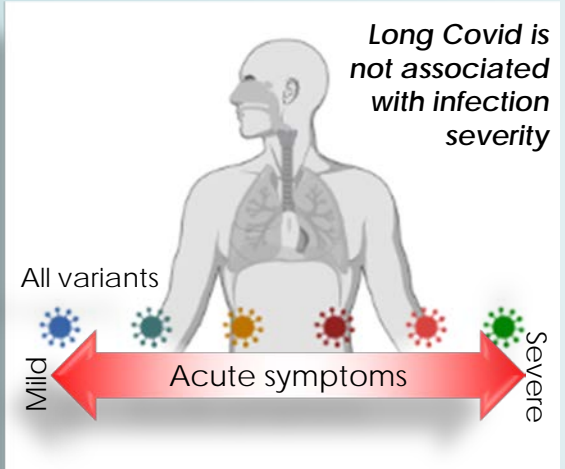
LONG COVID: WHAT DO WE KNOW?

- Post viral illnesses are not new or unexpected
- Known viruses cause post-infection illnesses
 - Myalgic encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS)
 - 20,000 - 40,000 people in NZ with ME/CFS
 - Biological mechanisms poorly understood
- Impacts all ages - lower prevalence in children
- Not associated with infection severity
- There are no diagnostic tests or treatments
- Prevalence: ~10-30%
 - Urgent call to track prevalence in Aotearoa NZ

Viruses associated with post-viral illnesses/ME/CFS




- SARS
- MERS
- SARS-CoV-2
- Epstein Barr virus (EBV)
- Enteroviruses
- Rubella
- West Nile virus
- Ross River virus
- Influenza
- Human herpes viruses (HHV6, HHV7)

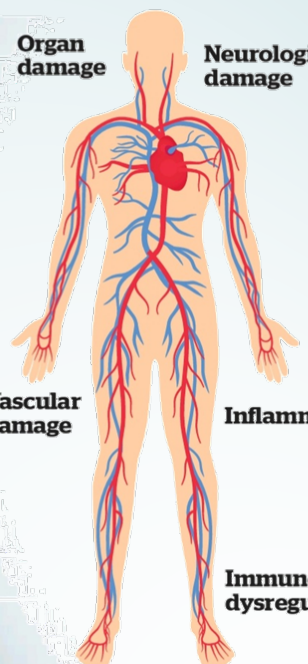


More details about LCK: longcovidkids.org/

LONG COVID
 Post Covid-19 condition



All age groups at risk (including healthy/fit)

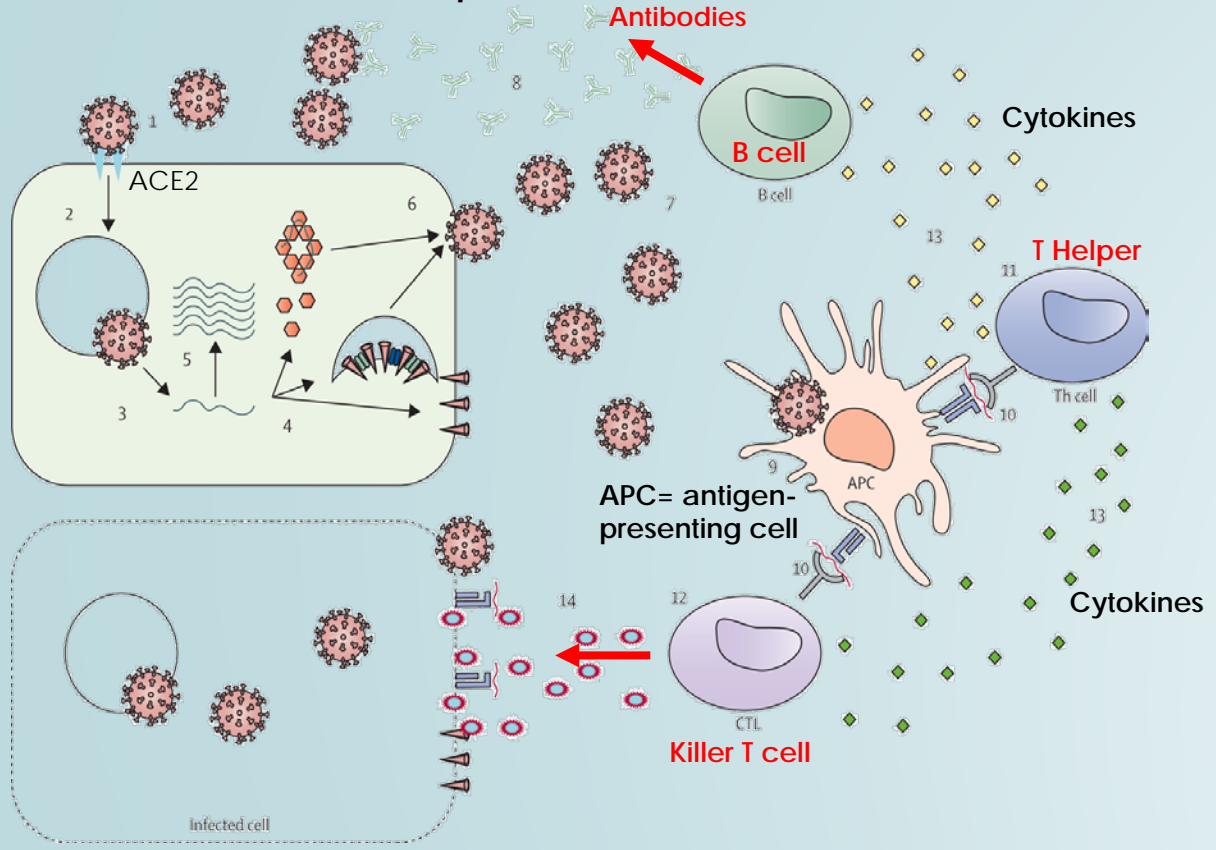


- Headaches
- Heart palpitations
- Nervous system dysregulation (dysautonomia)
- Chest pain
- Allergies
- Joint pain
- Brain fog
- Cognitive dysfunction
- Fatigue
- Shortness of breath
- Digestive issues
- Post exertional malaise

Wide variation in duration, severity and range of symptoms

WHAT ROLE DOES THE IMMUNE SYSTEM PLAY?

Coordinated immune response



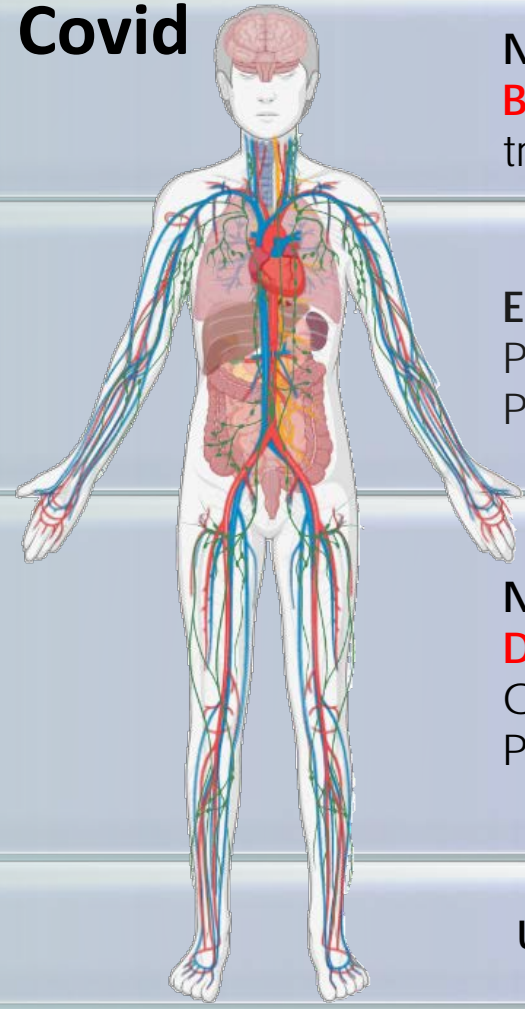
- Immune dysfunction research is ongoing
 - Impaired or insufficient immune response?
 - Inappropriate or misfired immune response?
 - Incomplete viral clearance?
- Does vaccine protection ↓ risk?
 - Long Covid prevalence: ~10% for fully vaccinated (boosted) from Omicron (BA.2)
 - Variants that can evade immune defences may increase risk
- Reinfections will likely ↑ risk of Long Covid and/or other health impacts

From: SARS-CoV-2 immunity: review and applications to phase 3 vaccine candidates

DOI: [https://doi.org/10.1016/S0140-6736\(20\)32137-1](https://doi.org/10.1016/S0140-6736(20)32137-1)

We are recruiting - Search "Long Covid Research Project" or find more information on how to participate in our "Long COVID, COVID-19 vaccination and ME/CFS research" at UoA <https://www.auckland.ac.nz>

Long COVID & ME/CFS



Brain Fog
 Impaired speech
 Impaired memory

Long Covid

Neurological/neurocognitive sensory impairment
Brain fog, impaired concentration or memory,
 trouble finding words

ME/CFS

Core symptoms

Fatigue
 PEM/PESE

Exertion intolerance & profound fatigue
 Post-exertional malaise (PEM),
 Post-exertional symptom exacerbation (PESE)

PEM/PESE:
 Worsening of symptoms following even minor physical or mental exertion, typically 12 - 48 hours after activity and lasting for days/weeks

Chest pain/tightness
Shortness of breath
 Blurred vision
 Tachycardia
Headaches
 Dizziness

Nervous system dysregulation
Dysautonomia or "autopilot disruption"
 OI : Orthostatic intolerance
 POTS: Postural tachycardia syndrome

Orthostatic/postural:
 Symptoms that come on when standing up from a reclining position, and that may be relieved by sitting or lying back down
 ie effects blood flow, heart rate, and blood pressure

Sleep disturbances

Unrefreshing sleep

Changes in taste and smell

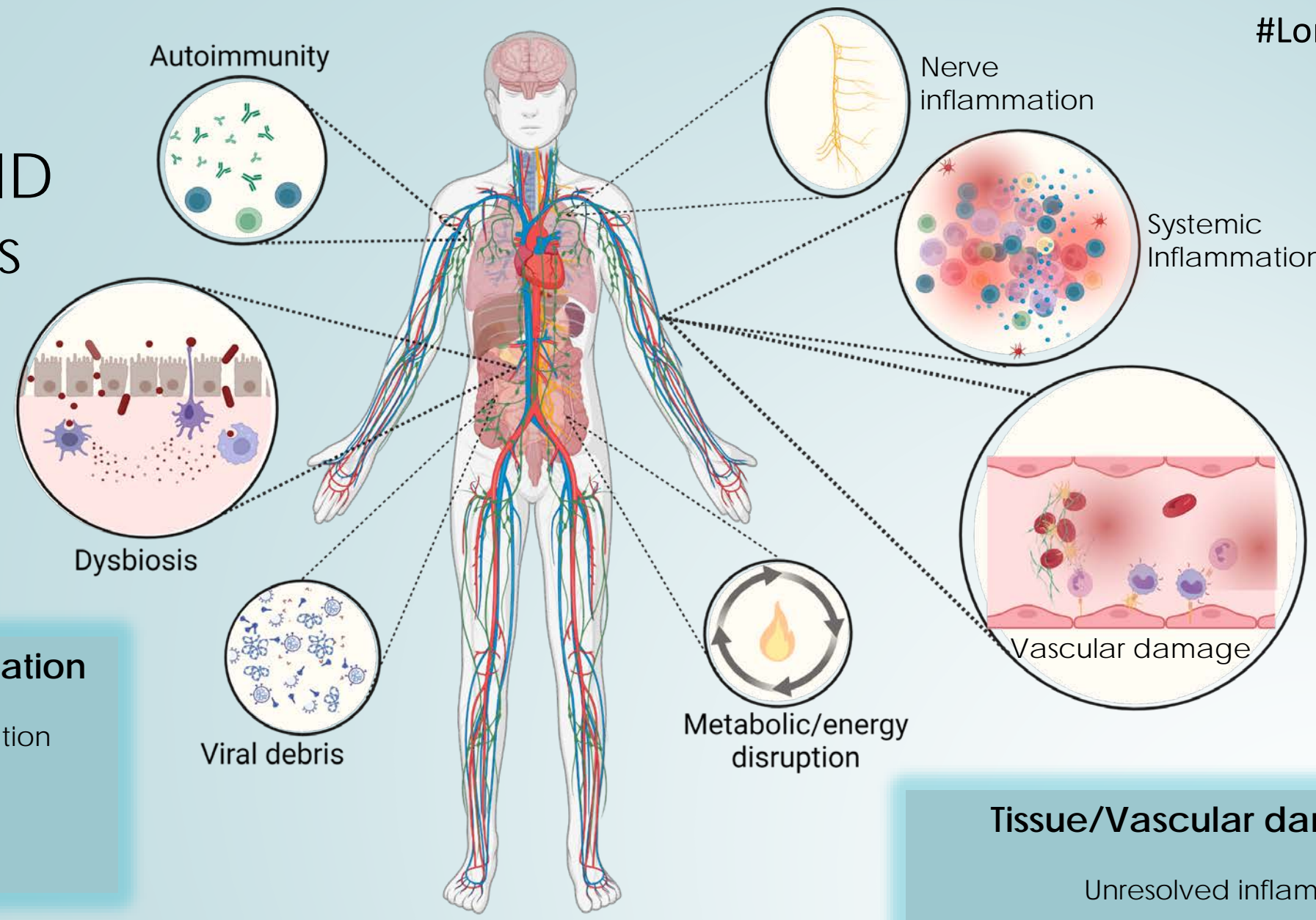
Loss of appetite

Peripheral neuropathy (pain/numbness)

Chronic or recurrent joint pain

Tissue damage?
 Inflammation?

Long COVID hypotheses



Immune dysregulation

- Dysbiosis/viral reactivation
- Residual viral debris
- Autoimmunity

Tissue/Vascular damage

- Unresolved inflammation
- Dysregulated clotting pathways (Hypercoagulation)

An abstract, colorful background featuring a profile of a human head facing right. The colors are vibrant and layered, including shades of blue, green, yellow, orange, and red, creating a textured, almost marbled effect. The word 'SUMMARY' is written in large, white, sans-serif capital letters across the top left of the image.

SUMMARY

We are recruiting: Search “Long Covid Research Project” or find more information on how to participate in our “Long COVID, COVID-19 vaccination and ME/CFS research” at UoA <https://www.auckland.ac.nz>

Post viral illnesses are not new: More research needed

- Long Covid will likely be defined into subcategories
 - Not all Long Covid = ME/CFS
- Learn from ME/CFS
 - Need to build on previous biomedical research, patient lived experience & experienced ME/CFS clinicians

Post-viral illnesses ARE physiological

- Decades of medical/research neglect needs to be corrected
- Normal clinical tests do not mean nothing physical is wrong, we just don't have the right tests
- Urgent need for research to develop diagnostics to improve clinical management

Symptom management can improve quality of life

- GPs can refer to HealthPathways for ME/CFS and Long Covid
- Allow time for healing/rest (convalescence)

#Longcovid2022