



**Stellenbosch**

UNIVERSITY  
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forward together  
sonke siya phambili  
saam vorentoe

**Insights into clotting and platelet pathophysiology in Long COVID/PASC**

**Prof Resia Pretorius**

# Research Collaborators

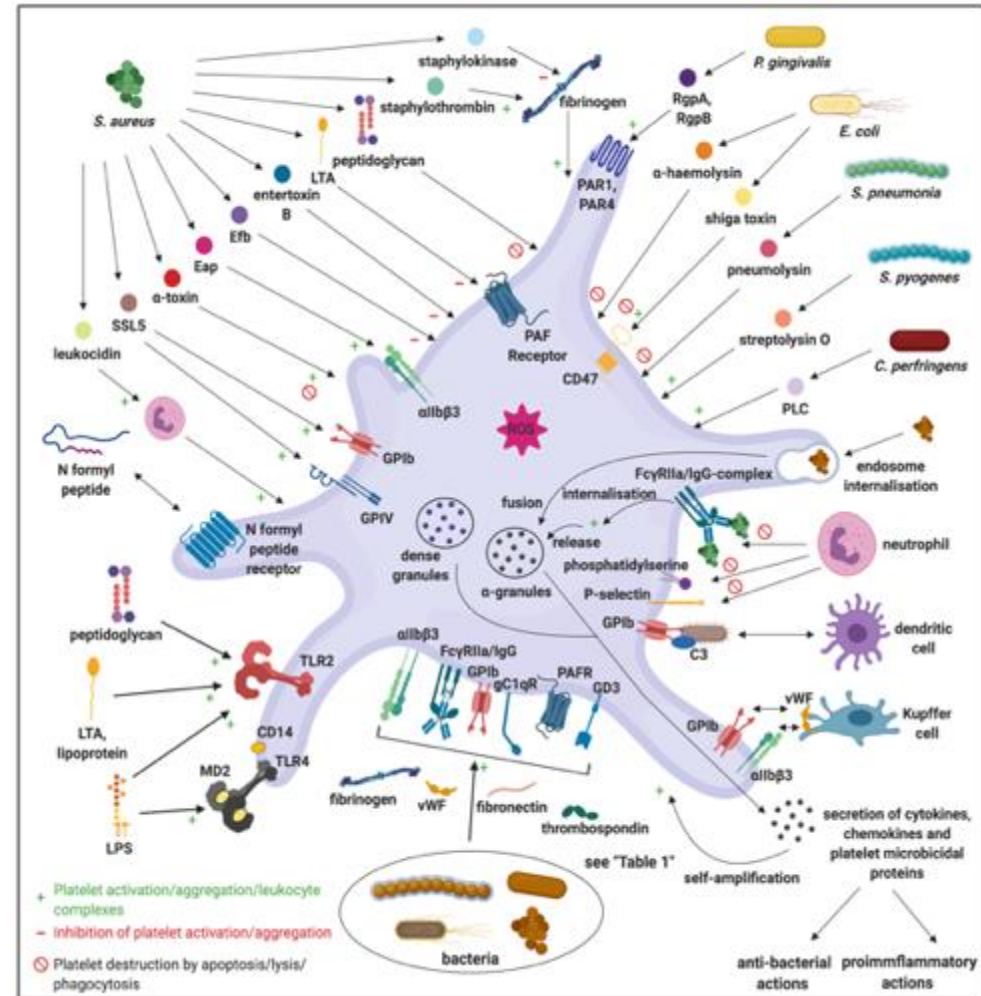
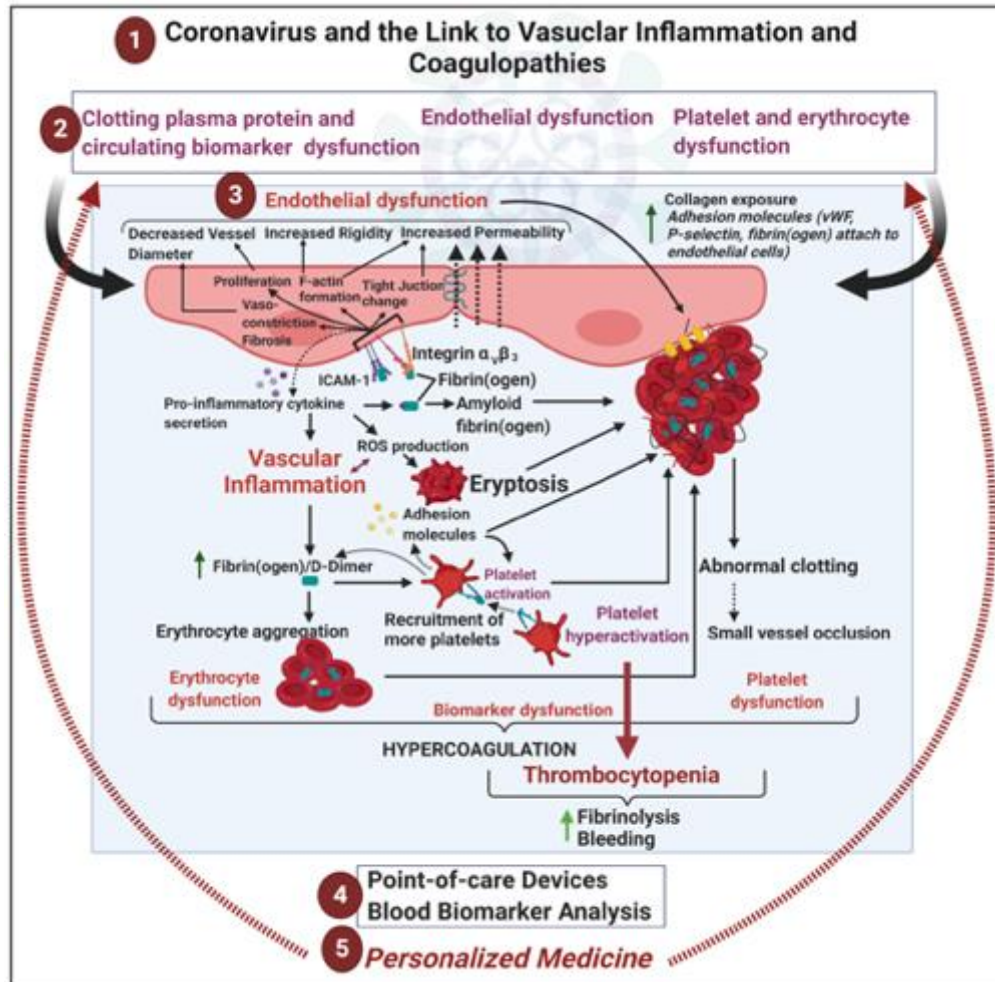
- Prof Douglas B Kell: University of Liverpool (UK): Systems Biologist
- Clinician: Dr Jaco Laubscher: Mediclinic Stellenbosch (MMed: Internal Medicine)
- Haematologist: Dr Janami Steenkamp: Pathcare
- Dr Mare Vlok: Stellenbosch University (SA): Biochemist and Proteomics lab
- Dr Chantelle Venter: Stellenbosch University (SA): Physiologist
- Dr Sunday Oladejo, Liam R. Watson, Prof Kanshu Rajaratnam and Prof Bruce W. Watson: Centre for AI Research, School for Data-Science & Computational Thinking, Stellenbosch University
- *Mediclinic (private hospital group): approved sample collection at their facility*

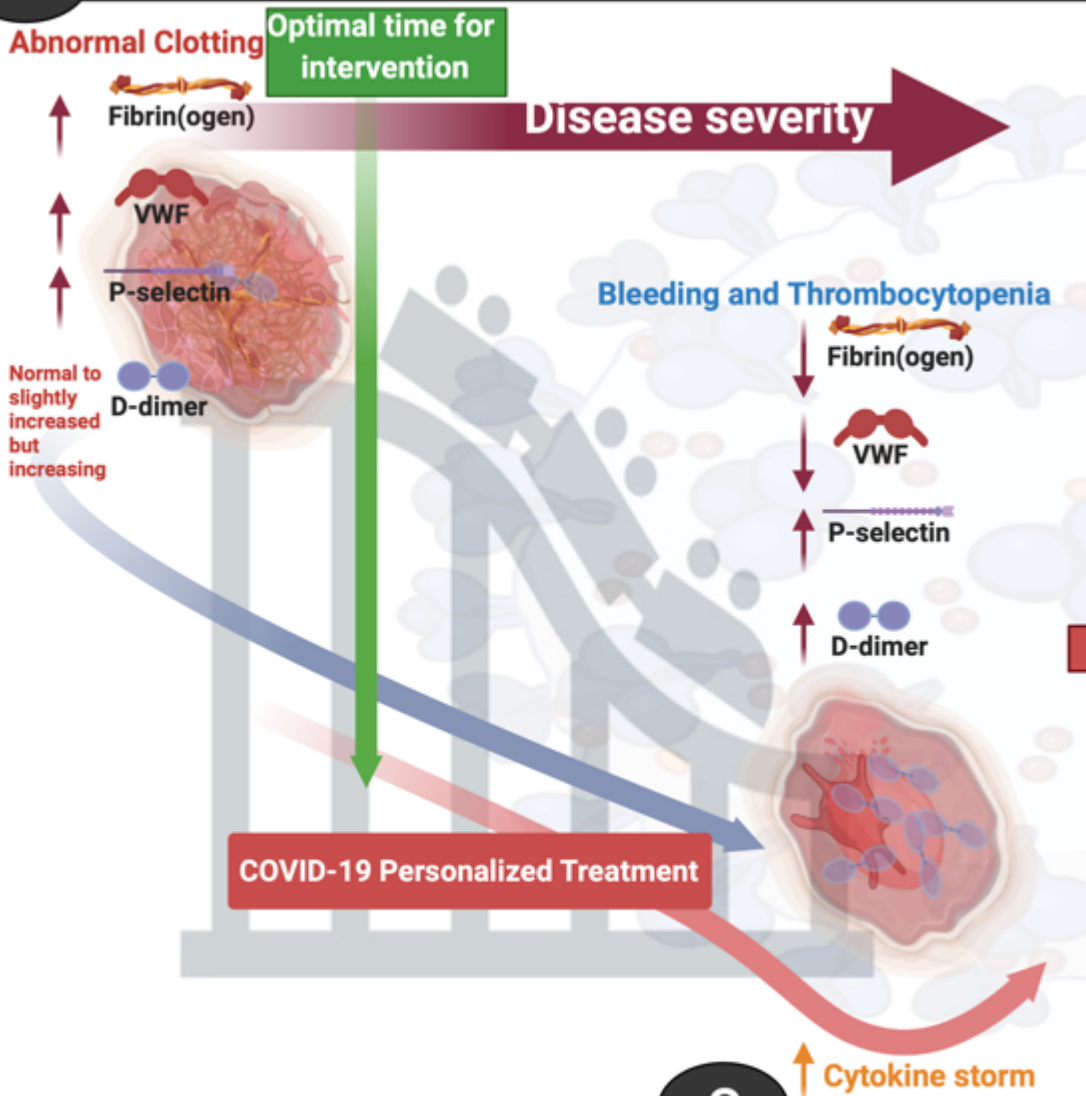
# Research Focus

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- **Inflammatory molecules that may cause pathological clotting, including both viral and bacterial inflammagens**
- **Effects of circulating inflammatory molecules on platelets, RBCs and fibrin(ogen) **the main clotting protein****

# COVID-19 and the link to abnormal clotting



**A****Acute COVID-19****B****Long COVID/PASC**

10-30% of patients remain with persistent debilitating symptoms

**Brainfog and concentration issues**  
**Shortness of breath**  
**Drop in oxygen levels**  
**Muscle weakness**  
**Heart palpitations**  
**Recurring chest pain**  
**Severe fatigue**  
**Underlying genetic predisposition**

**Our findings: persistent microclots and platelet hyperactivation**

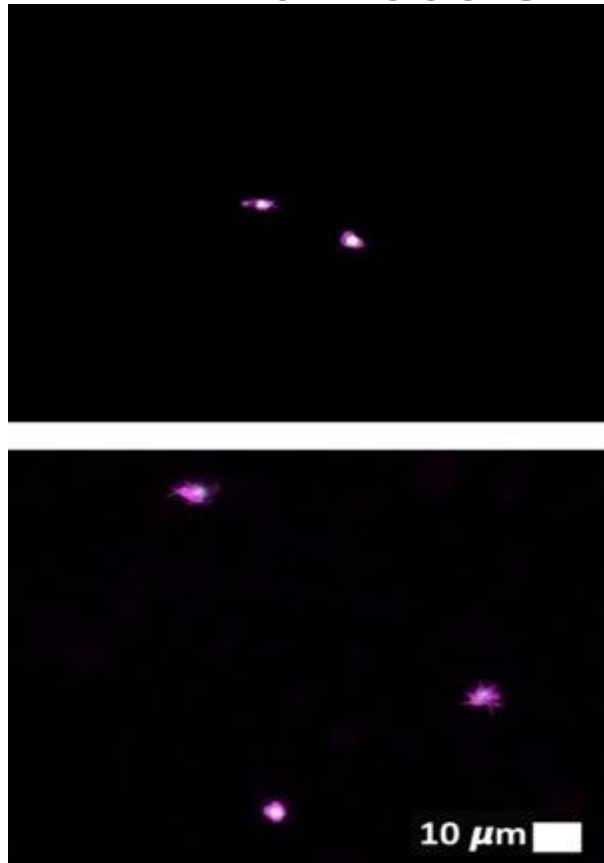
**LARGE-SCALE ENDOTHELIUM DYSFUNCTION AND TISSUE HYPOXIA**

**C**

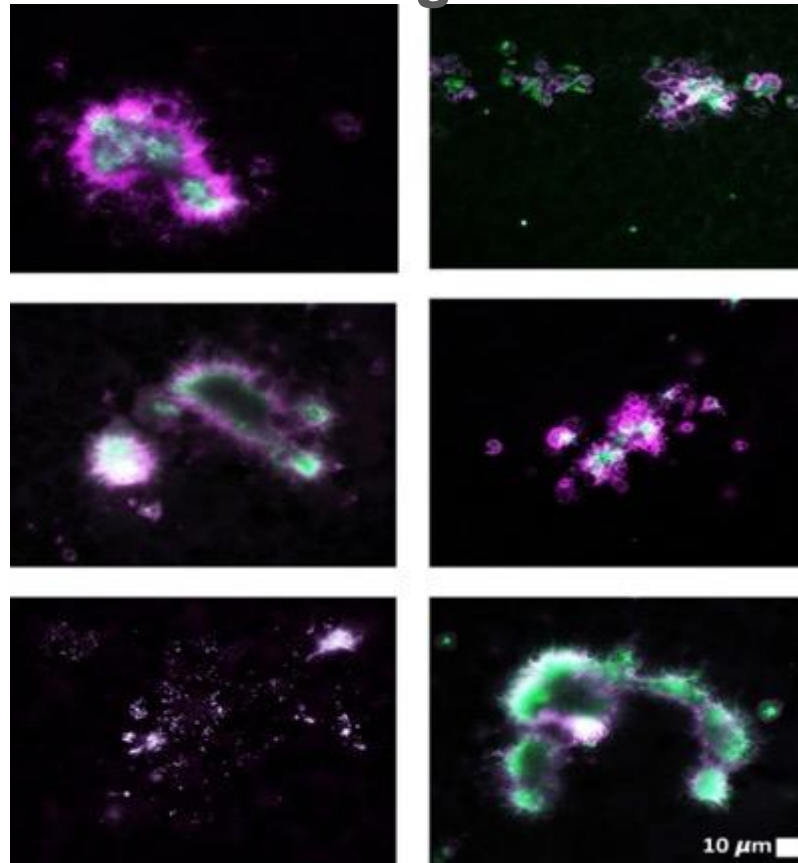
**No current laboratory test to accurately diagnose Long COVID/PASC**

# Long COVID and platelet dysfunction

**Platelets from Healthy Individuals**

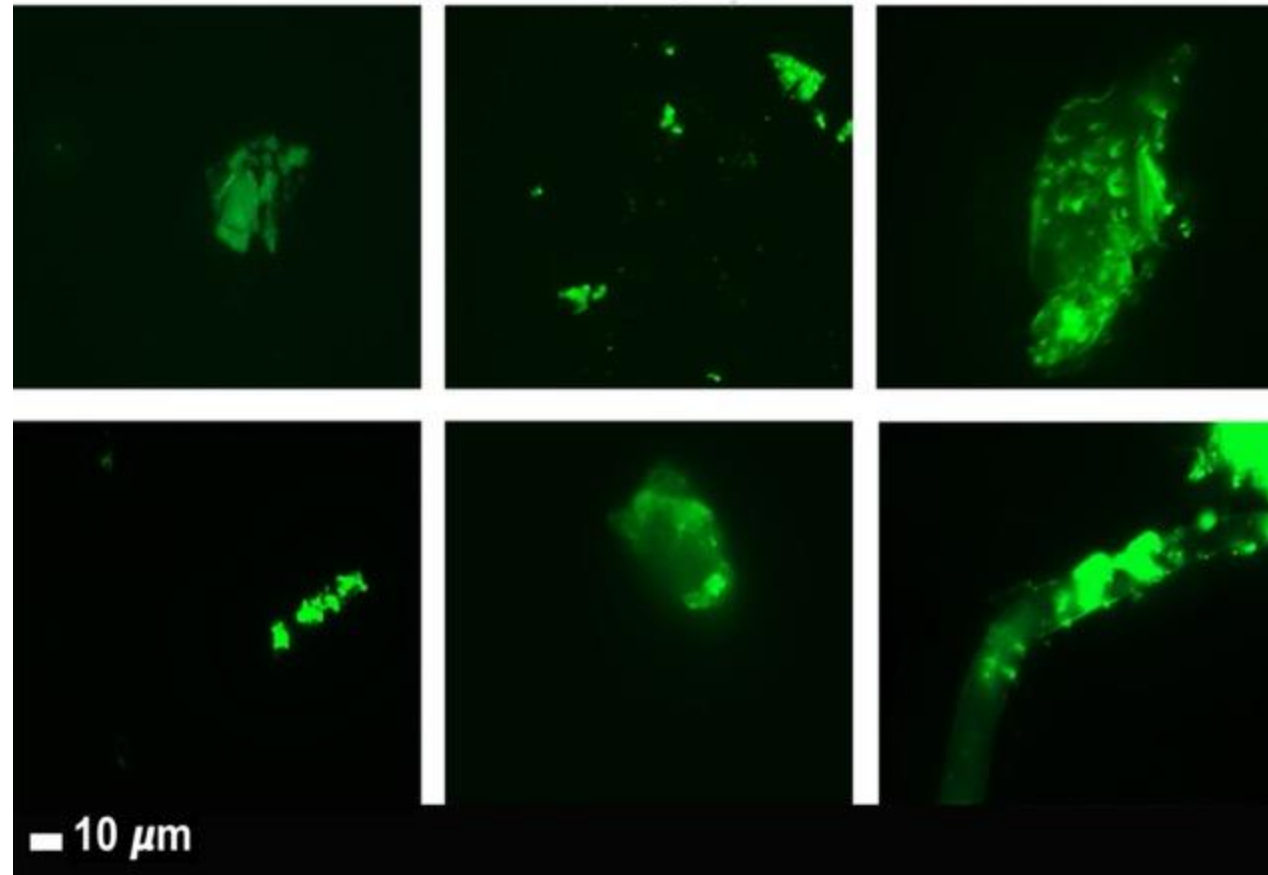


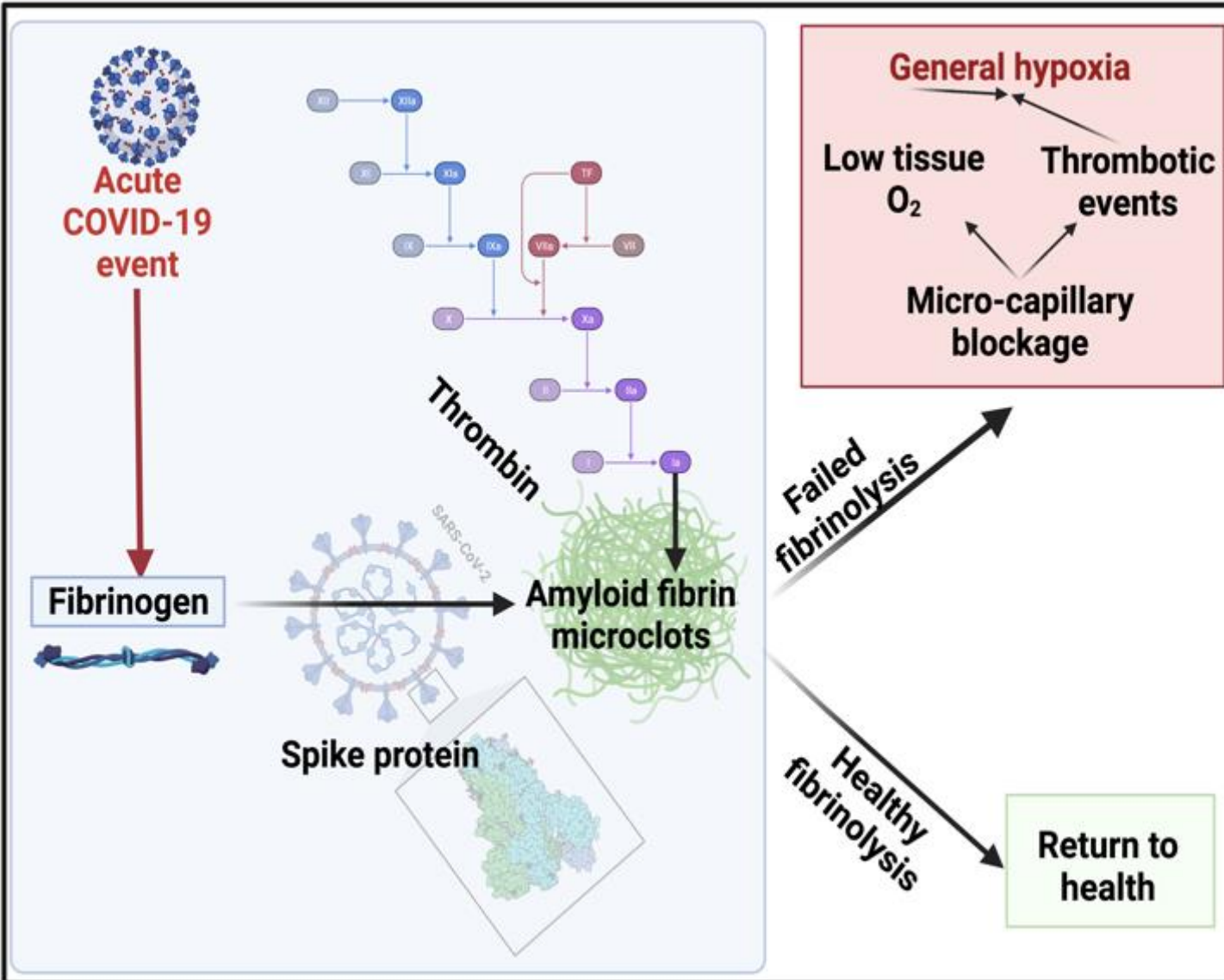
**Platelets from Individuals with Long COVID**



# Long COVID and microclot formation

Various micrographs of PPP after trypsin digestion from LongCOVID individuals





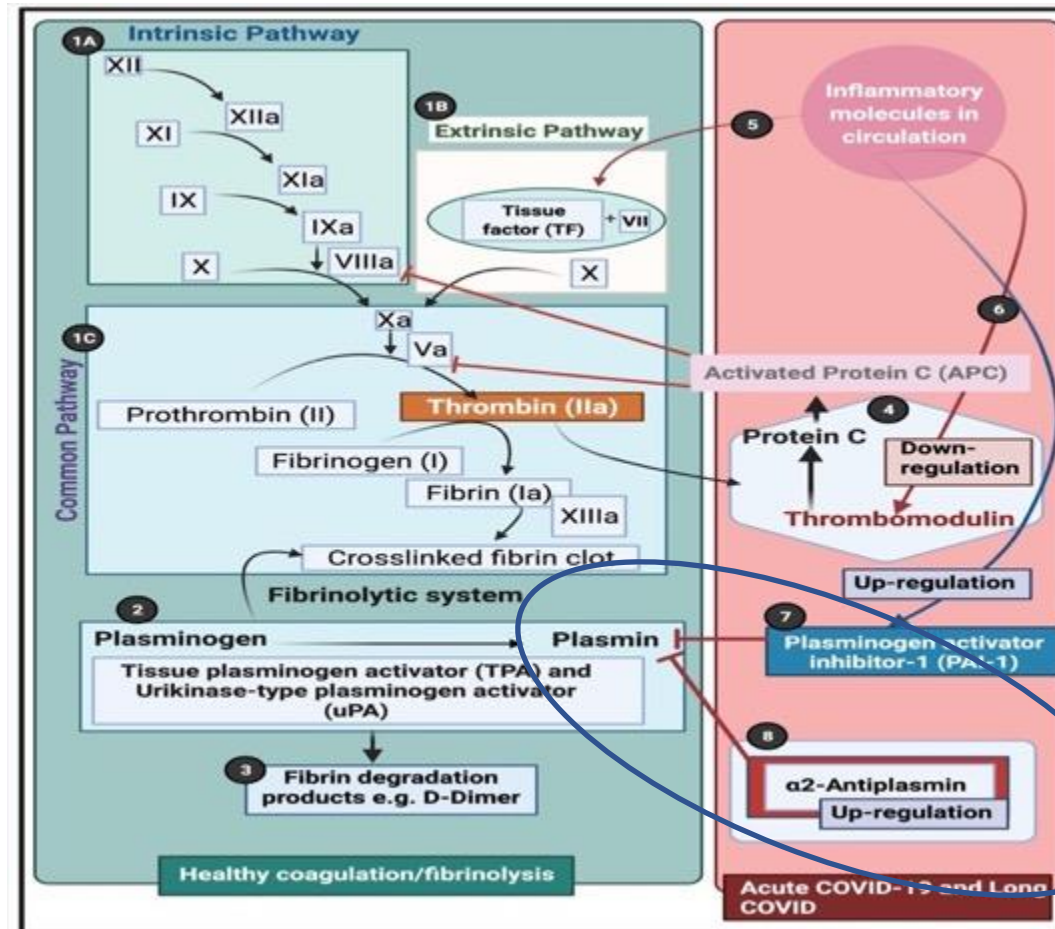
## A simplified diagram to explain microclot formation

- Microclot formation might either be resolved via the usual **fibrinolytic processes** after acute COVID-19 or, in Long COVID patients, result in a failed fibrinolytic process



# Long COVID and trapped inflammatory molecules

$\alpha$ 2-antiplasmin ( $\alpha$ 2AP) inhibit plasmin and ultimately will prevent sufficient fibrinolysis to happen

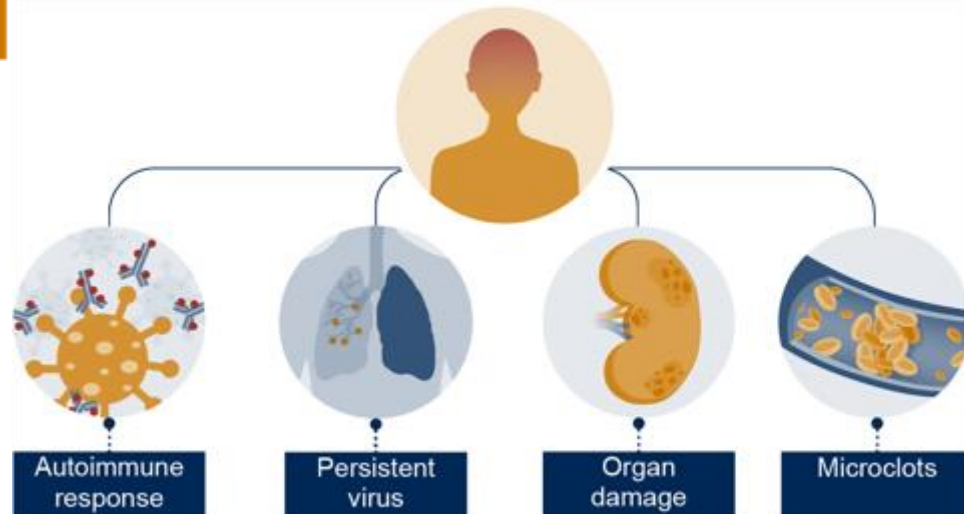


# US GAO just released



Science, Technology Assessment,  
and Analytics

SCIENCE & TECH SPOTLIGHT:  
**LONG COVID**



Source: GAO analysis of medical literature. | GAO-22-105866

**MARCH 2022**

**WHY THIS MATTERS**

Long COVID has potentially affected up to 23 million Americans, pushing an estimated 1 million people out of work. The full magnitude of health and economic effects is unknown but is expected to be significant. The causes of long COVID are not fully understood, complicating diagnosis and treatment. The condition raises policy questions, such as how best to support patients.