Diagnostic and Therapeutic Experience in COVID-19

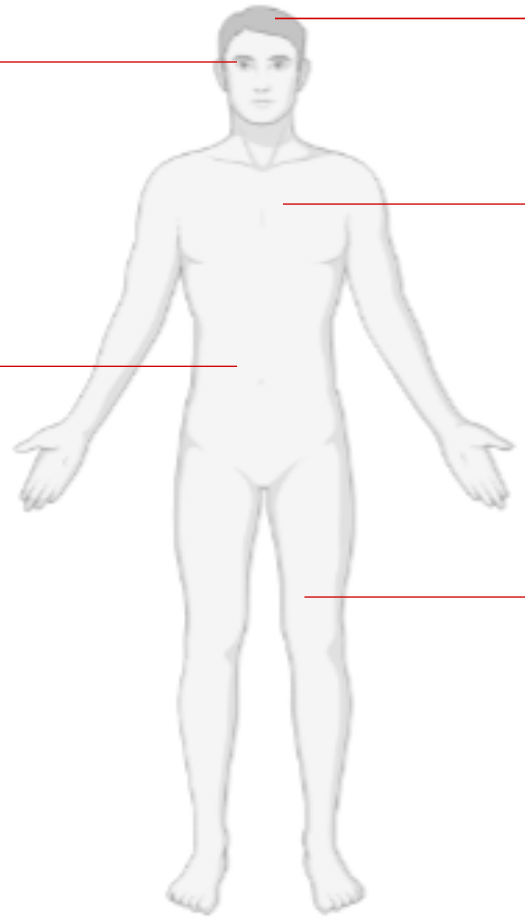
Beate Roxane Jaeger, MD
Board certified for Internal and Laboratory Medicine
St. Georg Clinic, Bad Aibling, Germany

„We have to treat sick individuals, but not illnesses.“ D. Seidel

- Genetic predisposition – age and gender related preconditions – prior infections (e.g. MECFS, EBV) – metabolic disorders (hypertension, diabetes, high Chol, adipositas) – autoimmune diseases – malignomas – neurologic/ psychiatric prior diseases – degenerative diseases (e.g. atherosclerosis) and allergic predispositions

Both, Long COVID and vaccine-acquired COVID are to be considered as systemic diseases, and repeated vaccines weaken the immune system and act as an instigator for preexisting illnesses.

Combination cases: COVID-19 infection and vaccine injuries



Eyesight problems

Headaches; Dizziness;
Depression; Fever;
Flares of consciousness

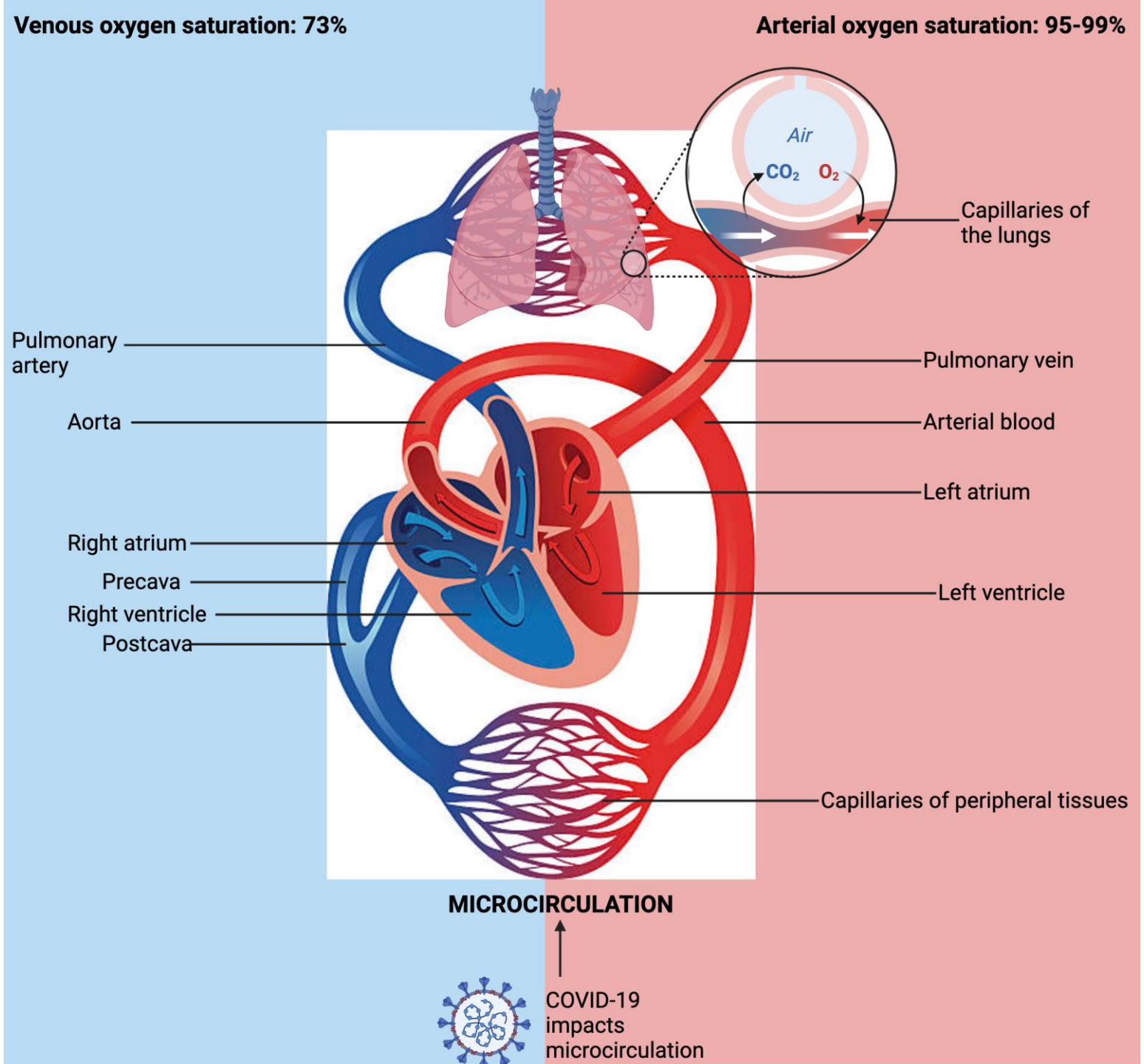
Persistent cough;
Shortness of breath;
Pneumonia; Peri-Myocarditis

Abdominal Pain

Weakness; Muscle Pain;
Joint Pain; Unable to walk;
Leg cramps

Other:
- Fatigue
- PoTS,
  Mcas

SYMPTOMS REPORTED BEFORE TREATMENT


Venous oxygen saturation: 73%
Arterial oxygen saturation: 95-99%
Air
CO_2
O_2
Capillaries of the lungs
Pulmonary artery
Pulmonary vein
Aorta
Arterial blood
Left atrium
Right atrium
Precava
Left ventricle
Right ventricle
Postcava
Capillaries of peripheral tissues
MICROCIRCULATION
COVID-19 impacts microcirculation

H.E.L.P. Apheresis

Heparin-mediated

Extracorporeal

LDL/Fibrinogen

Precipitation

B.Braun

Before and after H.E.L.P. apheresis

45-year-old lady with Long COVID and perimyocarditis

First H.E.L.P. Apheresis Treatment on 05.08.2021			
Parameter	**Before apheresis**	**After apheresis**	**Reference values**
Venous oxygen saturation (%)	16,5 ↓	86,1 ↑	60-80
Fibrinogen (mg/dl)	782 ↑	373 ↓	180-350
D-Dimer (ng/ml)	3108 ↑	2079 ↓	< 500
CRP (mg/L)	130,8 ↑	66,4 ↓	< 5
Haemoglobin (g/dl)	11,1	Unchanged	11,2-15,7
Platelets (/µl)	419	Unchanged	182-369

Circulation. 2023 Mar 14; 147(11): 867–876. Published online 2023 Jan 4.
doi: 10.1161/CIRCULATIONAHA.122.061025

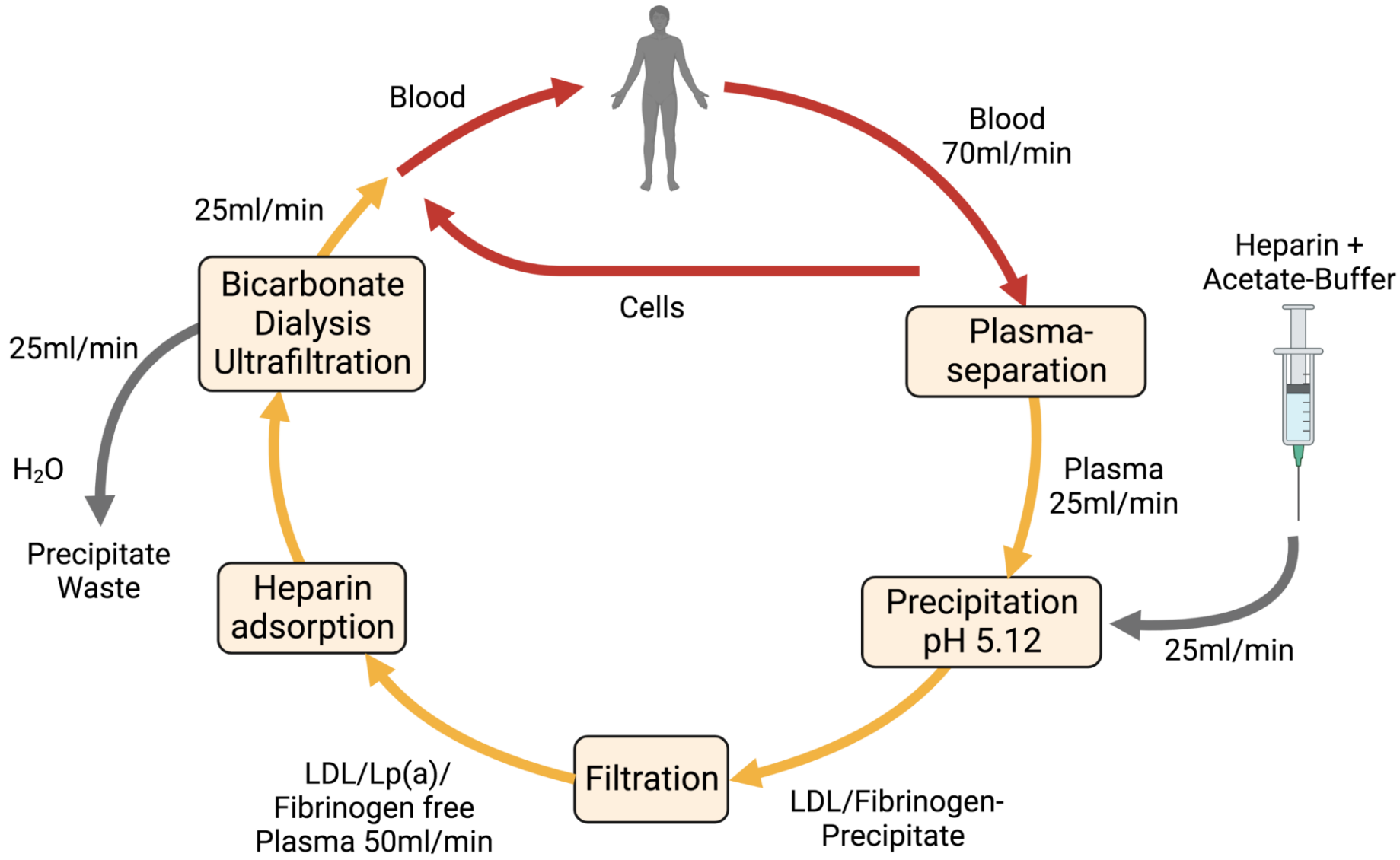
PMCID: PMC10010667 | NIHMSID: NIHMS1859598 | PMID: 36597886

Circulating Spike Protein Detected in Post–COVID-19 mRNA Vaccine Myocarditis

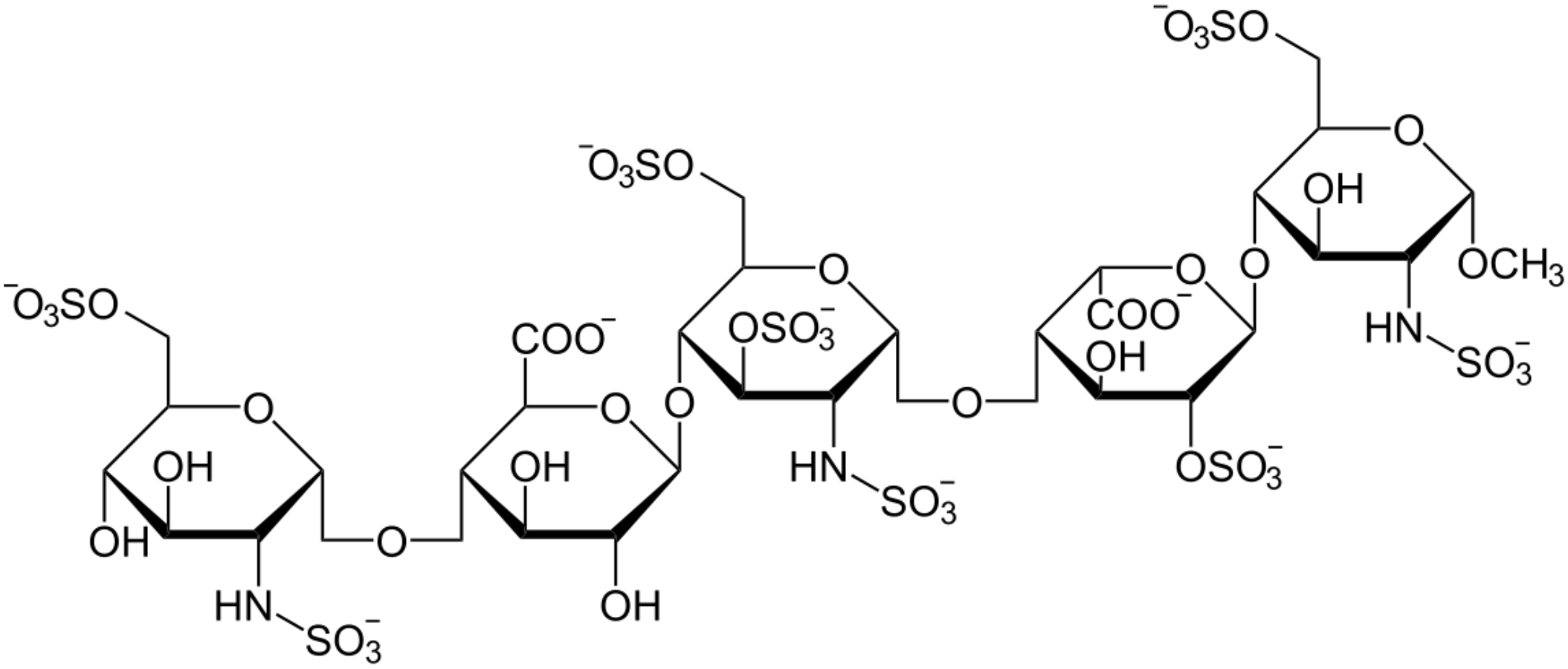
Lael M. Yonker, MD,[1,2,6,*] Zoe Swank, PhD,[6,7,*] Yannic C. Bartsch, PhD,[6,9*] Madeleine D. Burns, MS,[1,2] Abigail Kane, MD,[1,2] Brittany P. Boribong, PhD,[1,2,6] Jameson P. Davis, BS,[1,2] Maggie Loiselle, BS,[1,2] Tanya Novak, PhD,[6,10] Yasmeen Senussi, MBBS,[6,7,8] Chi-An Cheng, PhD,[6,7,8] Eleanor Burgess, MS,[9] Andrea G. Edlow, MD,[3,4,10] Janet Chou, MD,[6,11] Audrey Dionne, MD,[6,12] Duraisamy Balaguru, MD,[2,6] Manuella Lahoud-Rahme, MD,[2,6] Moshe Arditi, MD,[13] Boris Julg, MD, PhD,[5,6,9] Adrienne G. Randolph, MD,[6] Galit Alter, PhD,[6,9] Alessio Fasano, MD,[1,2,6†] and David R. Walt, PhD[6,7,8†]

Author information Article notes Copyright and License information PMC Disclaimer

Flow Scheme of the H.E.L.P. Procedure



Heparin binds spike protein and ACE receptor used by the virus to enter

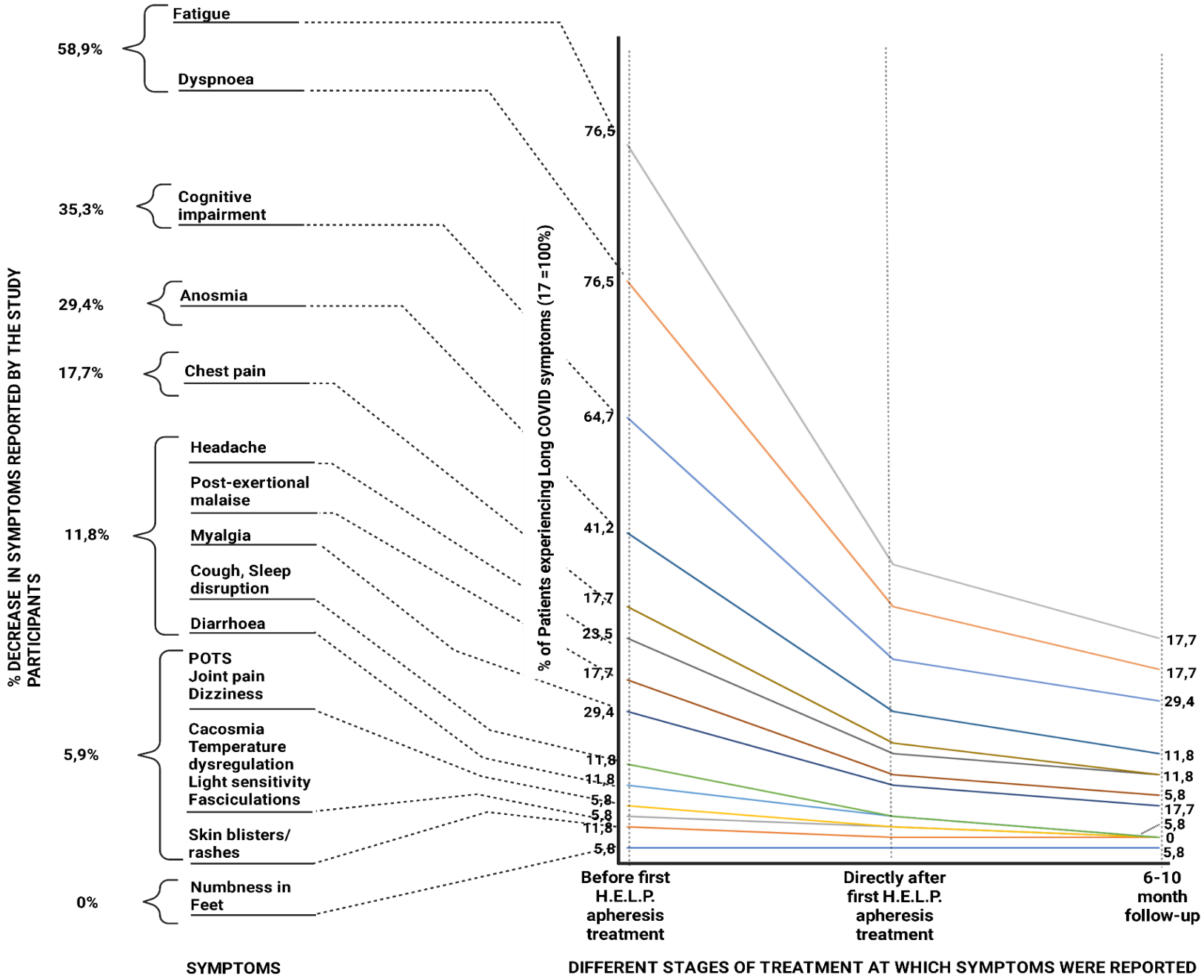


Wikipedia

Potential benefits of H.E.L.P. apheresis in COVID-19

- Heparin binds SARS-CoV-2 spike protein
- Fibrinogen ↓ 50-70%
- ↓ procoagulant precursors by 35-50%
- 400,000 units unfractionated heparin dissolve microthrombi
- ↑ myocardial, cerebral, and pulmonary blood flow
- ↓ cytokines (IL-6, IL-8, TNF-α), CRP, and viral and bacterial toxins, possibly prions
- Direct access to micro and microcirculation
- ↓ LDL-C, Lp(a), VLDL, lipid nanoparticles
- Protective IgM or IgG antibodies are not removed
- Leukocyte and platelet function unaffected
- Can be used in combination with antivirals, antibiotics, antihypertensives, and anticoagulants

Percentage reduction of Long COVID symptoms post H.E.L.P. apheresis



2022 Theoretical Paper

> Front Cardiovasc Med. 2022 Oct 11;9:1007636. doi: 10.3389/fcvm.2022.1007636. eCollection 2022.

The potential of heparin-induced extracorporeal LDL/fibrinogen precipitation (H.E.L.P.)-apheresis for patients with severe acute or chronic COVID-19

Beate Roxane Jaeger [1], Hayley Emma Arron [2], Wiltrud M Kalka-Moll [3], Dietrich Seidel [4]

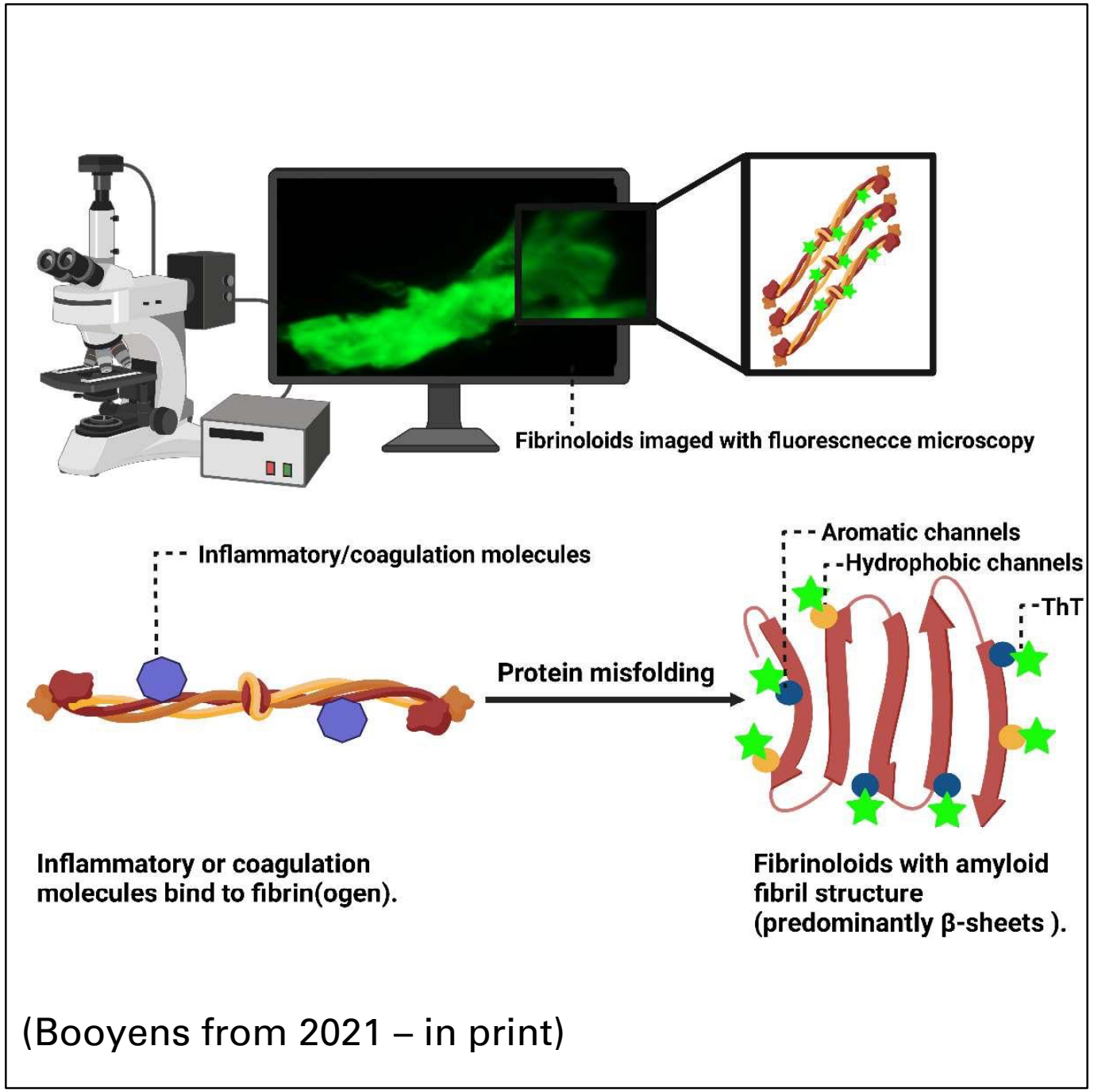
Affiliations + expand

PMID: 36304538 PMCID: PMC9592739 DOI: 10.3389/fcvm.2022.1007636

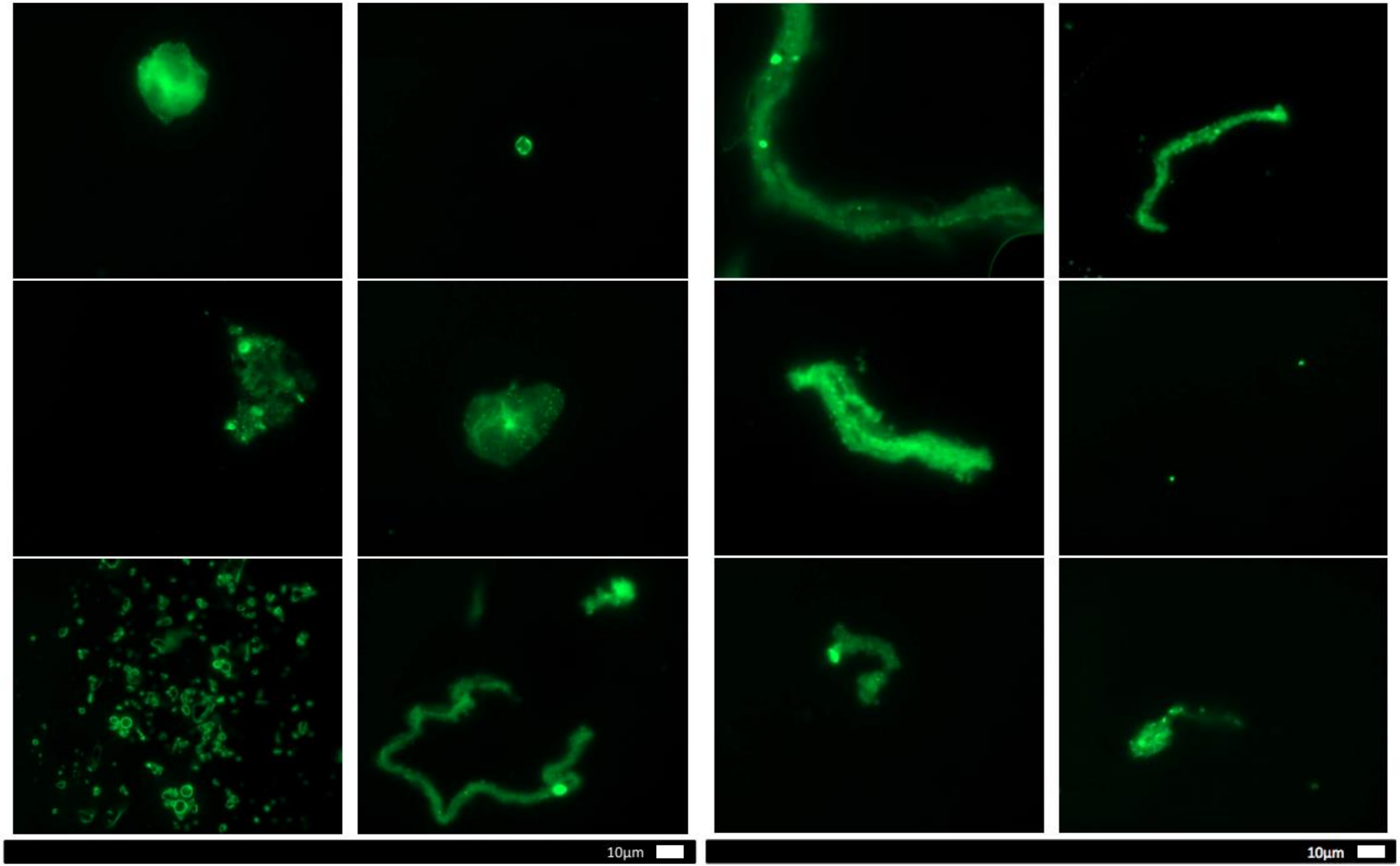
Free PMC article

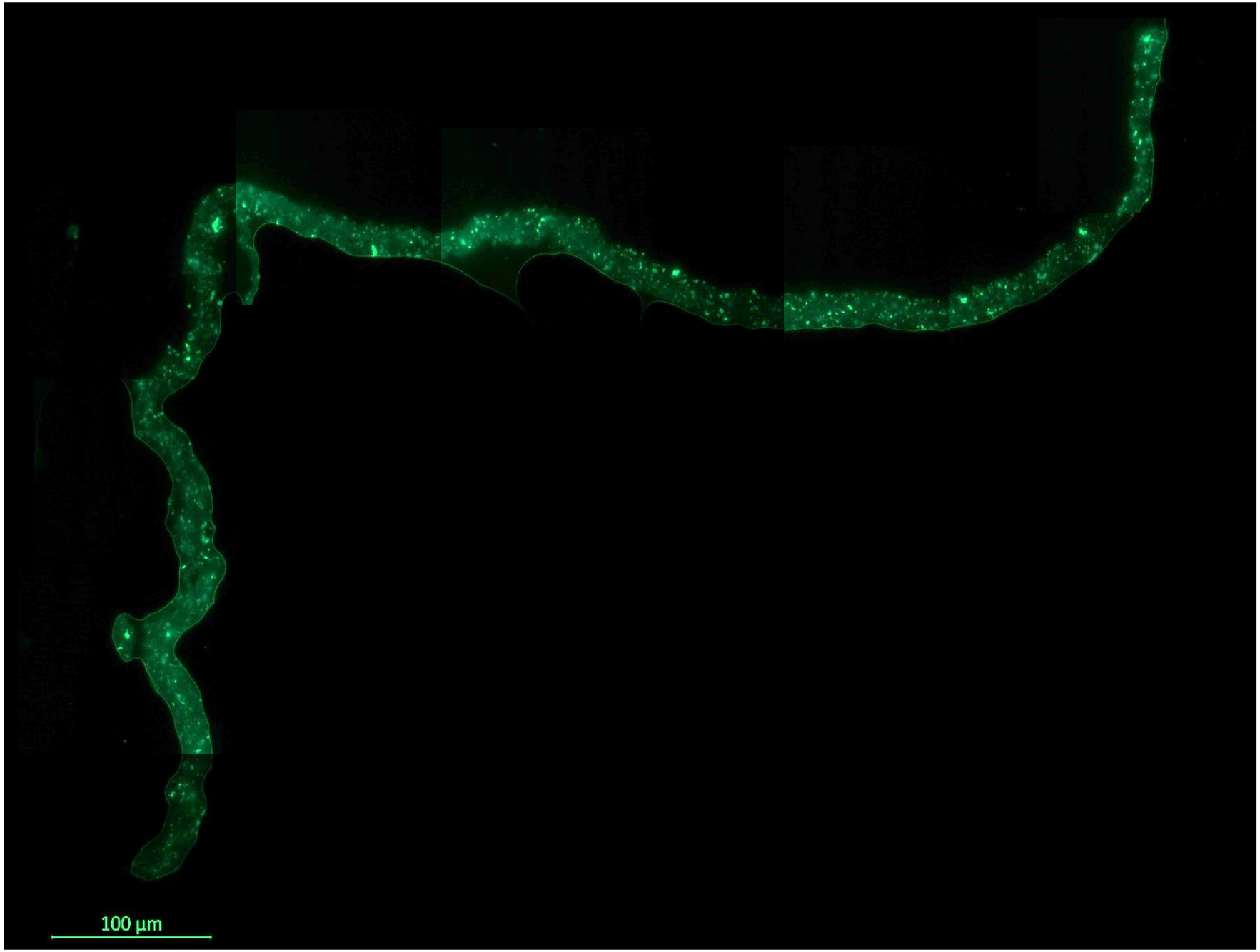
Detection of microclots & endothelial damage

- Inflammatory molecules bind to fibrinogen forming protein misfolding
- Thioflavin T (ThT) binds to beta-sheet structures in fibrinogen



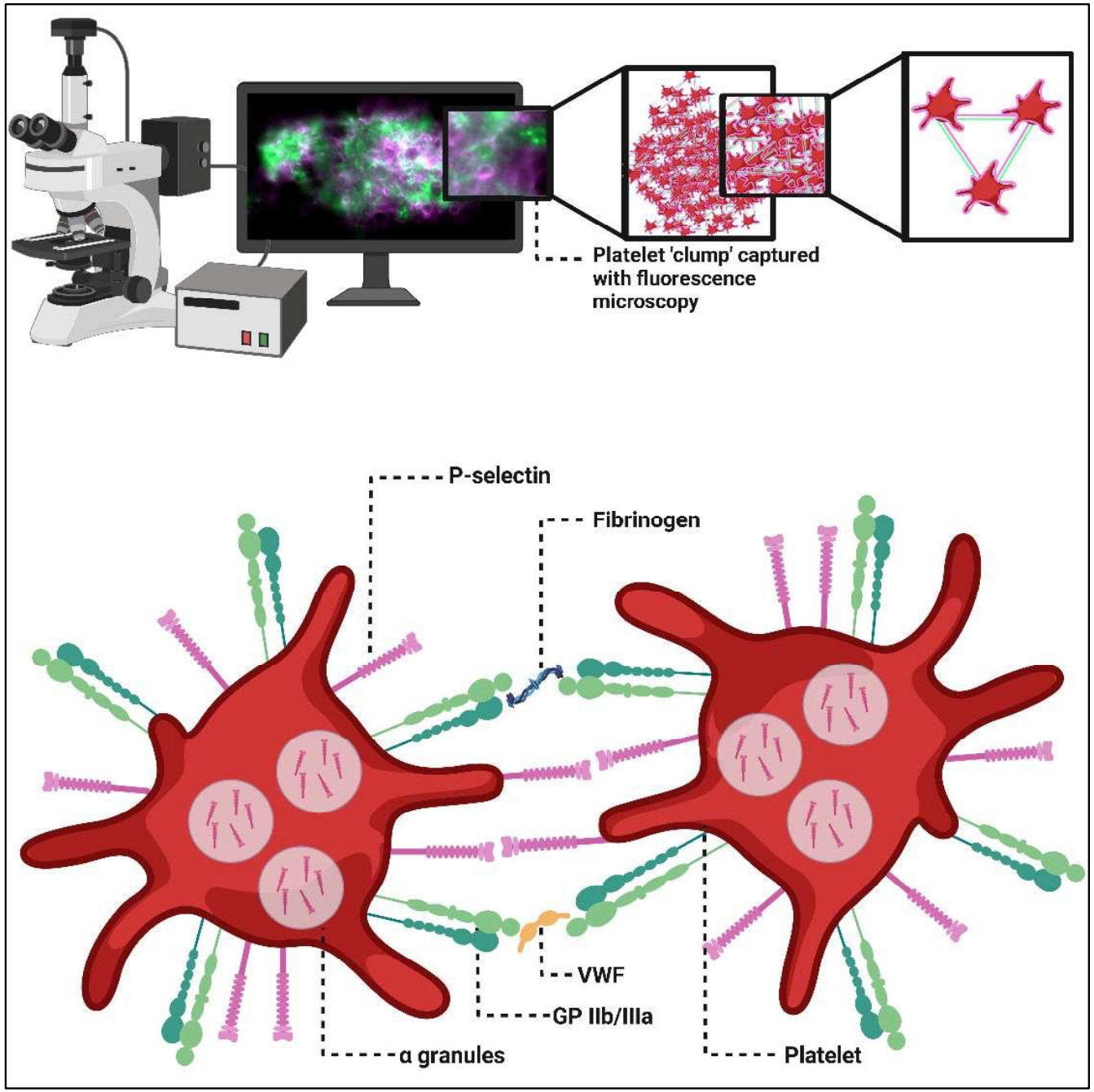
(Booyens from 2021 – in print)


10µm
10µm


100 µm

Observing platelet pathology

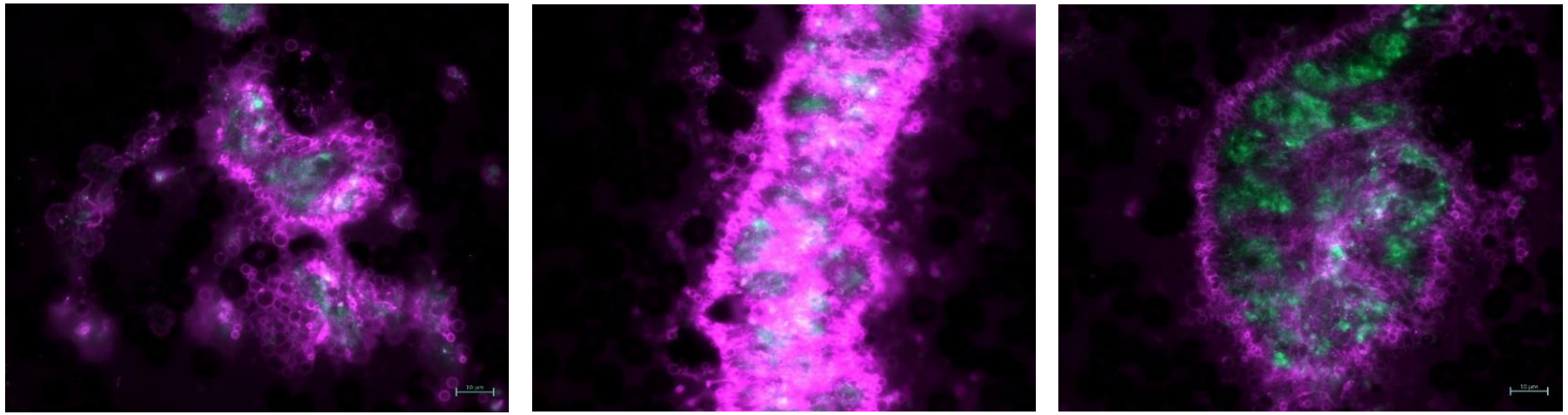
- Platelet activation: Pseudopodia and P-selectin translocate to platelet membrane
- GP IIb/IIIa from adjacent platelets bind to fibrinogen to cause platelet adhesion
- CD62P and PAC-1 fluorescent markers detect platelet spreading and clumping



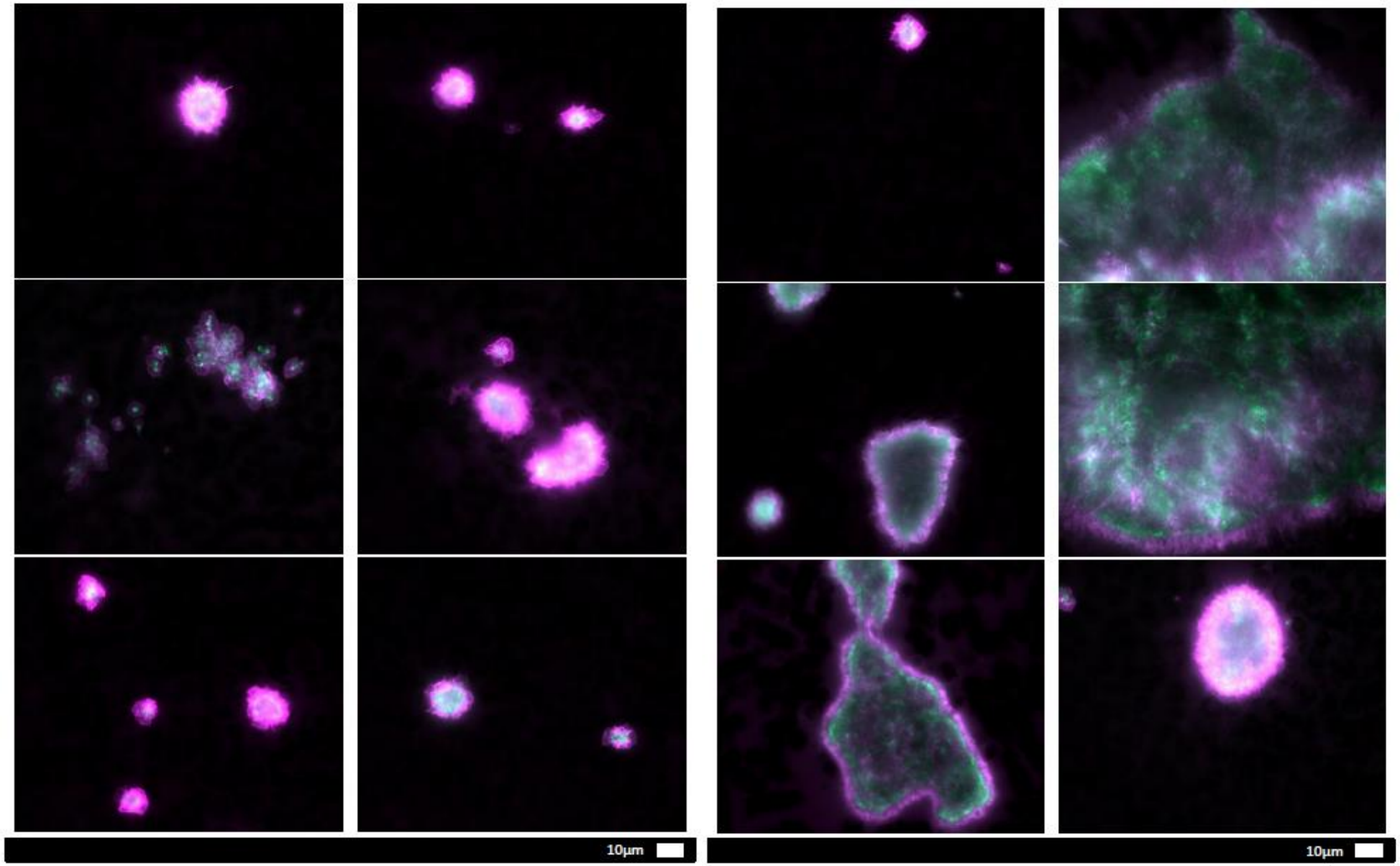
(Booyens from 2021 – in print)

Platelet hyperactivation in Long COVID

Patient A



Patient B


10µm
10µm

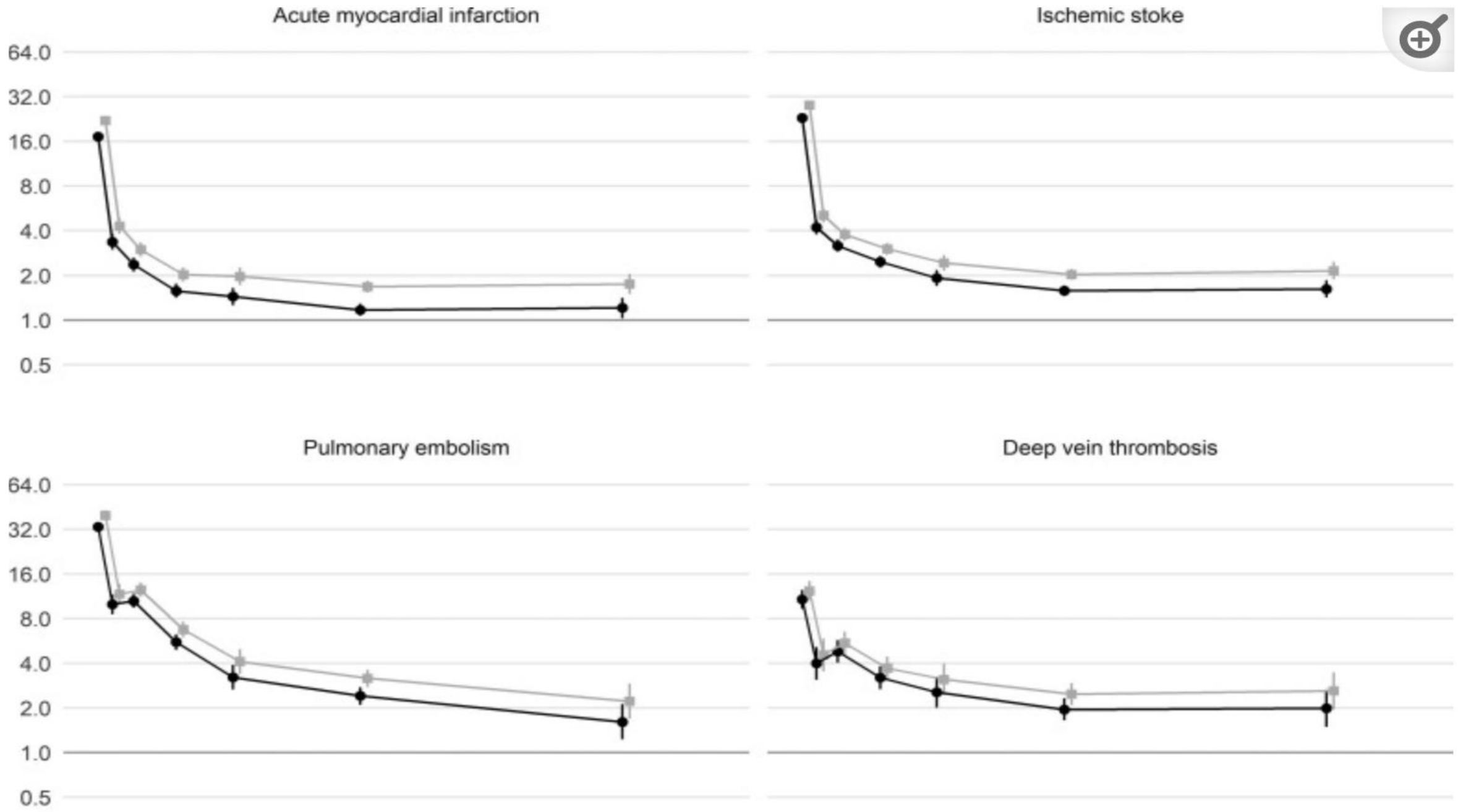
Association of COVID-19 With Major Arterial and Venous Thrombotic Diseases: A Population-Wide Cohort Study of 48 Million Adults in England and Wales

Rochelle Knight [# 1 2 3 4], Venexia Walker [# 1 4], Samantha Ip [# 5 6], Jennifer A Cooper [1 2], Thomas Bolton [5 7 8], Spencer Keene [5 7], Rachel Denholm [1 2 9], Ashley Akbari [10], Hoda Abbasizanjani [10], Fatemeh Torabi [10], Efosa Omigie [11], Sam Hollings [11], Teri-Louise North [1], Renin Toms [1 12], Xiyun Jiang [5], Emanuele Di Angelantonio [5 7 13 14], Spiros Denaxas [15 16 17 18], Johan H Thygesen [16], Christopher Tomlinson [16 19 17], Ben Bray [20], Craig J Smith [21 22], Mark Barber [23], Kamlesh Khunti [24], George Davey Smith [1 4], Nishi Chaturvedi [25], Cathie Sudlow [8], William N Whiteley [# 26 27], Angela M Wood [# 5 7 13 14 28 29], Jonathan A C Sterne [# 1 2 9]; CVD-COVID-UK/COVID-IMPACT Consortium and the Longitudinal Health and Wellbeing COVID-19 National Core Study

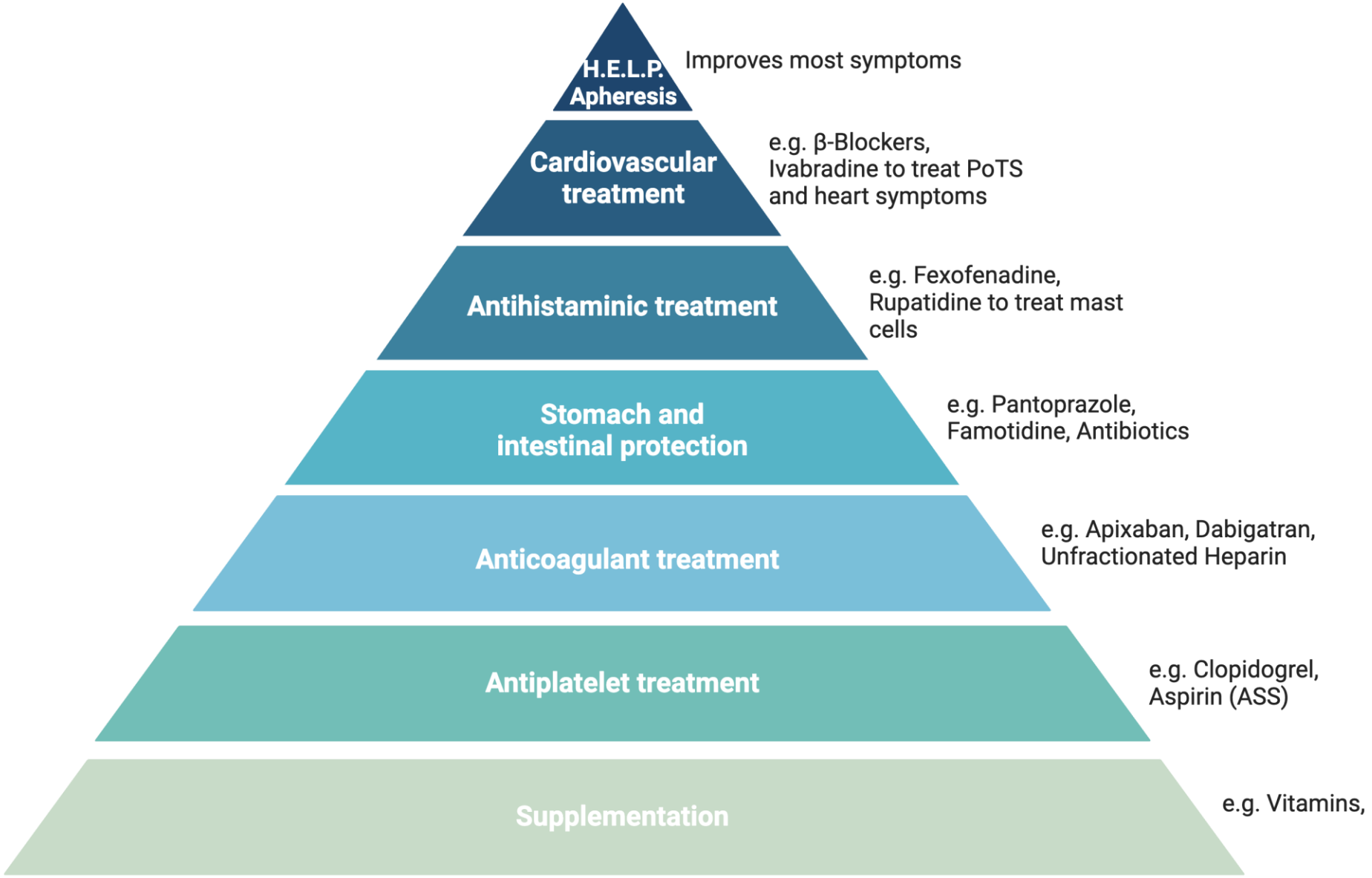
Affiliations + expand

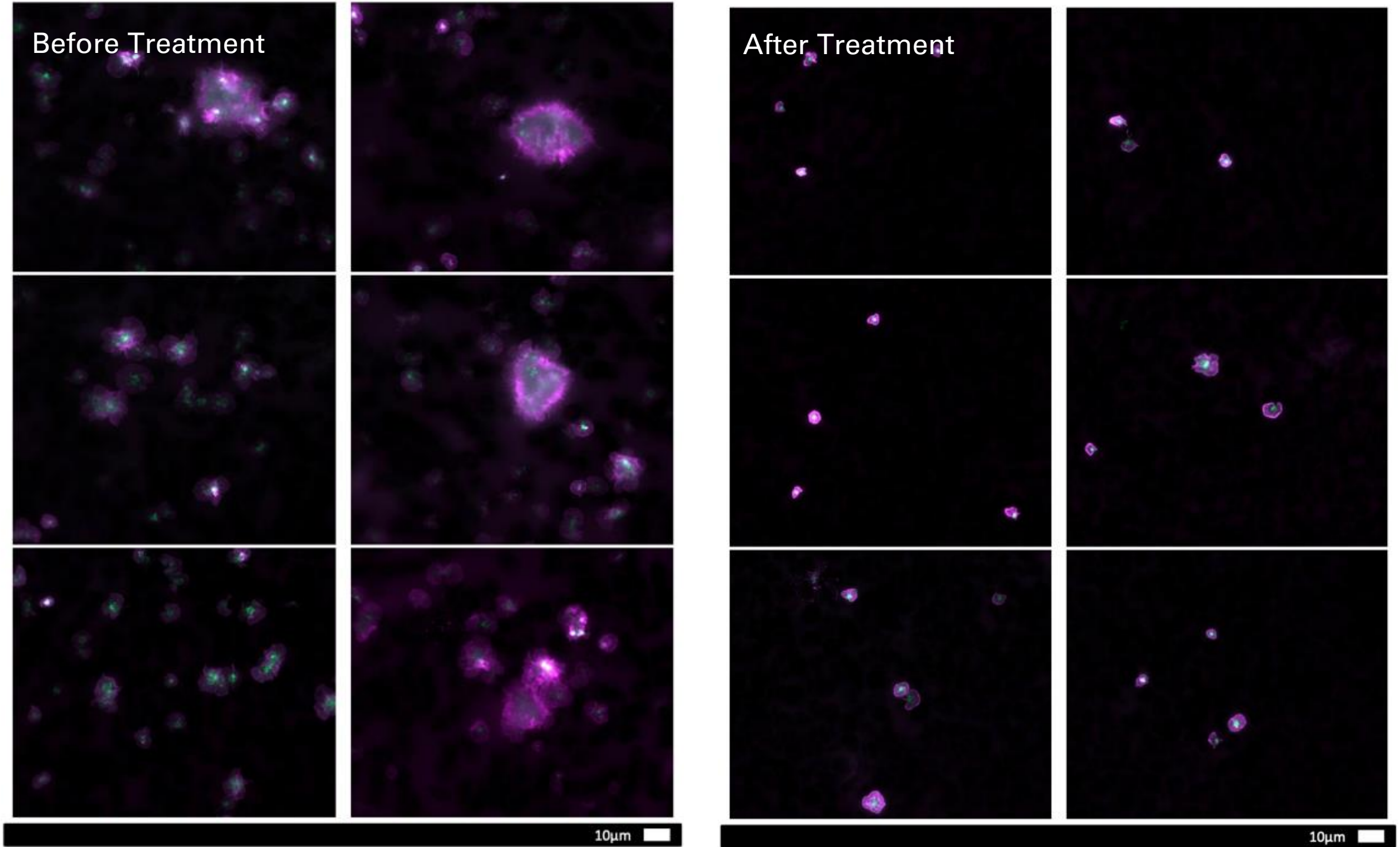
PMID: 36121907 PMCID: PMC9484653 DOI: 10.1161/CIRCULATIONAHA.122.060785

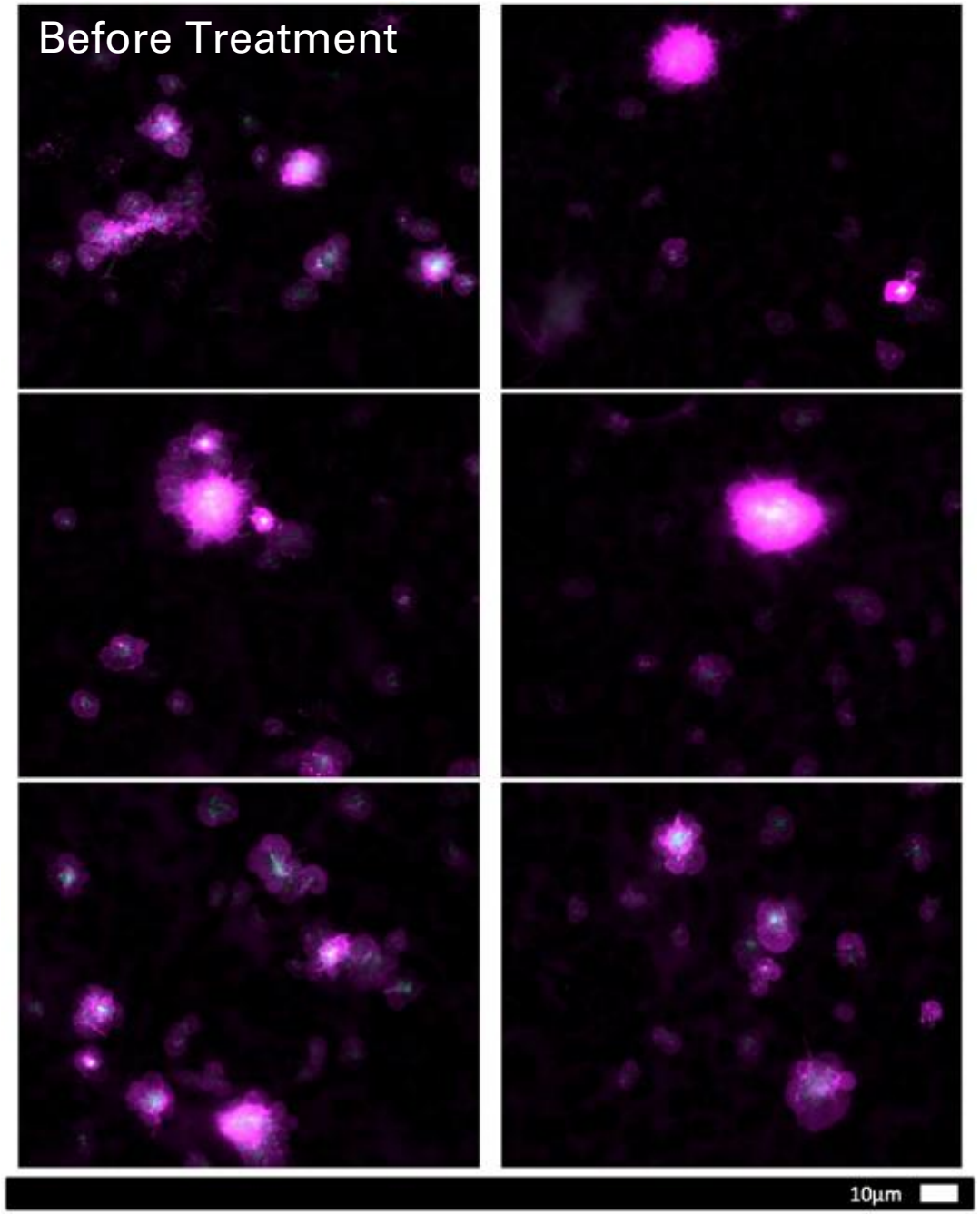
Free PMC article

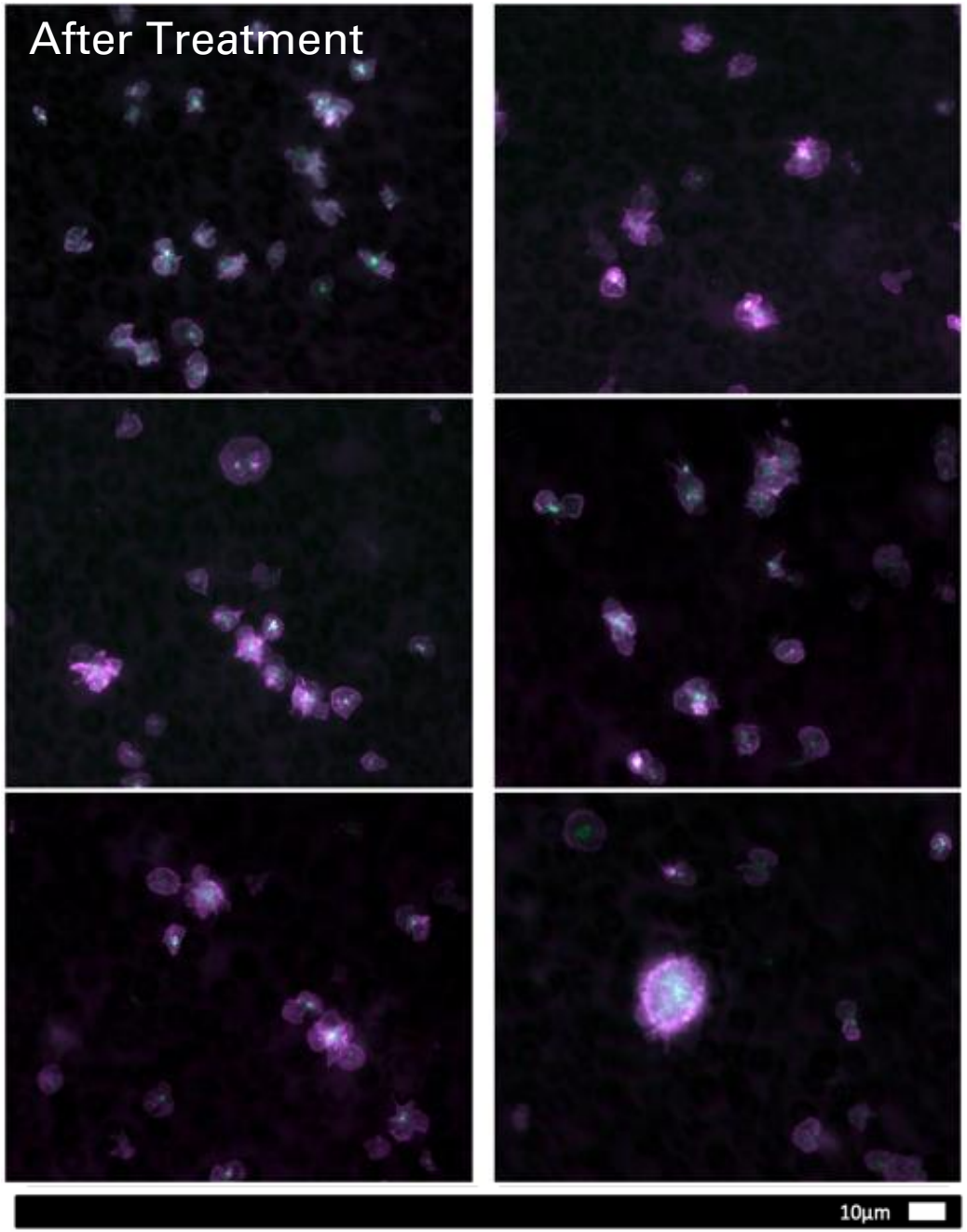

Acute myocardial infarction
Ischemic stoke
Pulmonary embolism
Deep vein thrombosis
64.0
32.0
16.0
8.0
4.0
2.0
1.0
0.5

Treatment Regimen



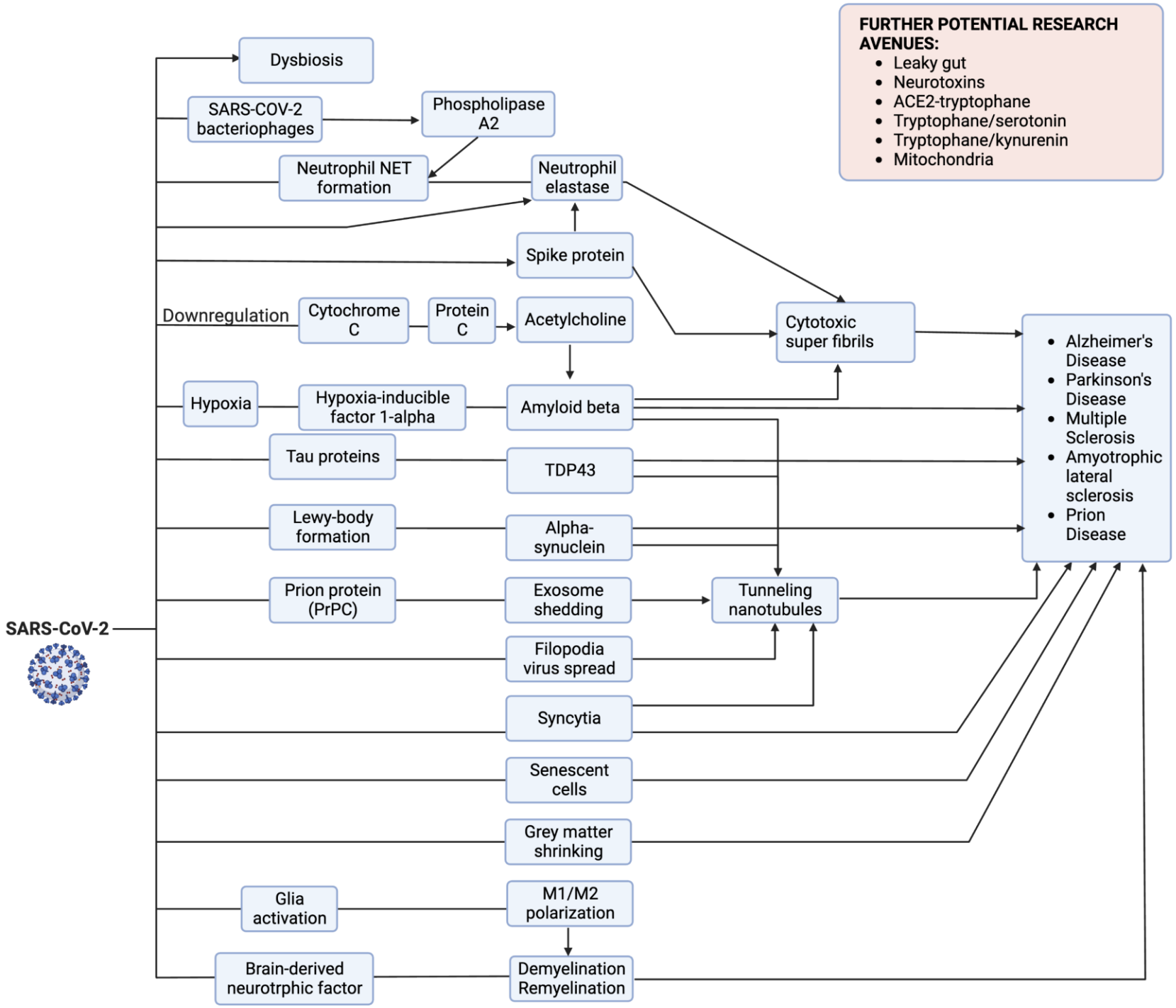

Before Treatment
After Treatment
10µm
10µm


Before Treatment
10µm


After Treatment
10µm

Patient C:

- **Age:** 7
- **Gender:** Female
- **Cause:** COVID-19 infection (March 2021) worsened by vaccination (03/2021, 11/2021, 2022)
- **Before symptoms:**
  - Unable to walk, unable to attend school, noise sensitive, frustration
  - June 2022: Mild endothelial damage and microclots, significant platelet hyperactivation with spreading and massive clumping.
- **Anticoagulant treatment:** 75mg Clopidogrel for 2 months (June 2022)
- **After symptoms:**
  - Massive improvement in first week, improvement in mood, decreased noise sensitivity, able to play, able to attend school, increased energy.
  - Still deficits in Maths and concentration.
  - March 2023: Reduced microclot and endothelial damage, still platelet hyperactivation


FURTHER POTENTIAL RESEARCH AVENUES:
Leaky gut
Neurotoxins
ACE2-tryptophane
Tryptophane/serotonin
Tryptophane/kynurenin
Mitochondria
SARS-CoV-2
Dysbiosis
SARS-COV-2 bacteriophages
Phospholipase A2
Neutrophil NET formation
Neutrophil elastase
Spike protein
Downregulation
Cytochrome C
Protein C
Acetylcholine
Cytotoxic super fibrils
Hypoxia
Hypoxia-inducible factor 1-alpha
Amyloid beta
Tau proteins
TDP43
Lewy-body formation
Alpha-synuclein
Prion protein (PrPC)
Exosome shedding
Tunneling nanotubules
Filopodia virus spread
Syncytia
Senescent cells
Grey matter shrinking
Glia activation
M1/M2 polarization
Brain-derived neurotrphic factor
Demyelination Remyelination
Alzheimer's Disease
Parkinson's Disease
Multiple Sclerosis
Amyotrophic lateral sclerosis
Prion Disease