POLYBIO
SCIENCE IN ACTION

Research infrastructure for infection-associated chronic disease biomarker discovery

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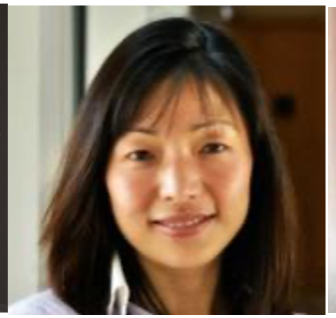

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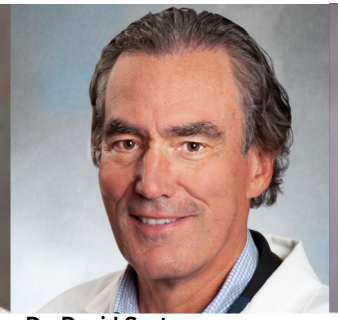

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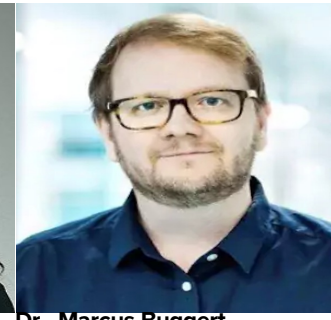

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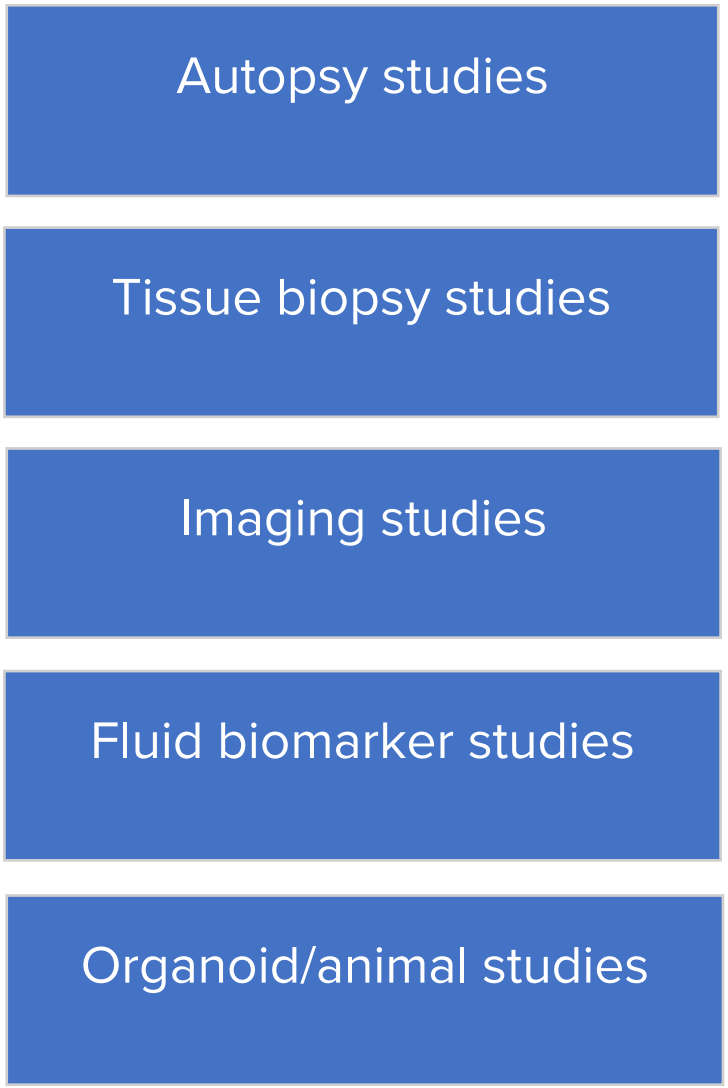
We must embrace open science

Long COVID or Post-acute Sequelae of COVID-19 (PASC): An Overview of Biological Factors That May Contribute to Persistent Symptoms

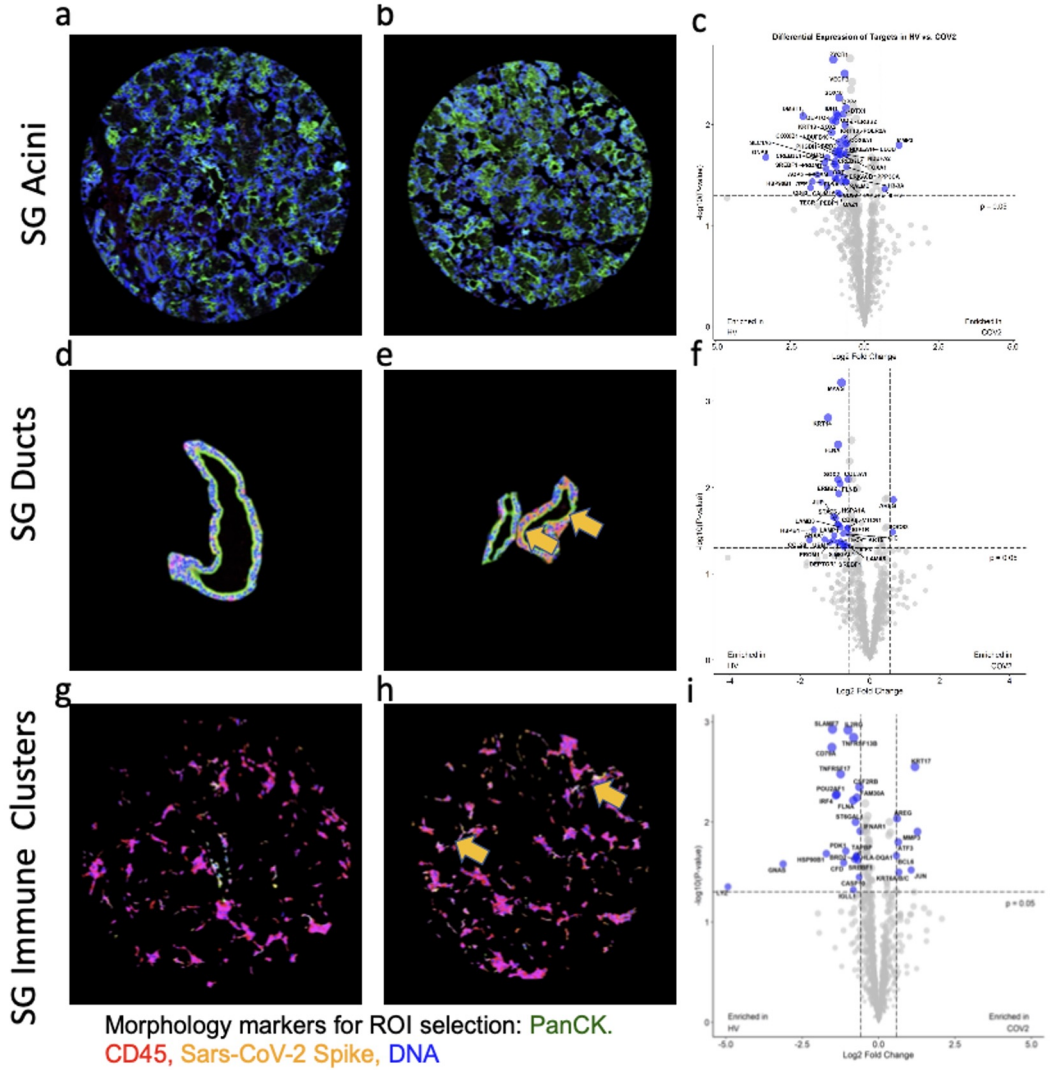
Amy D. Proal[1] and Michael B. VanElzakker[1,2,*]

We must study tissue in addition to body fluids such as blood



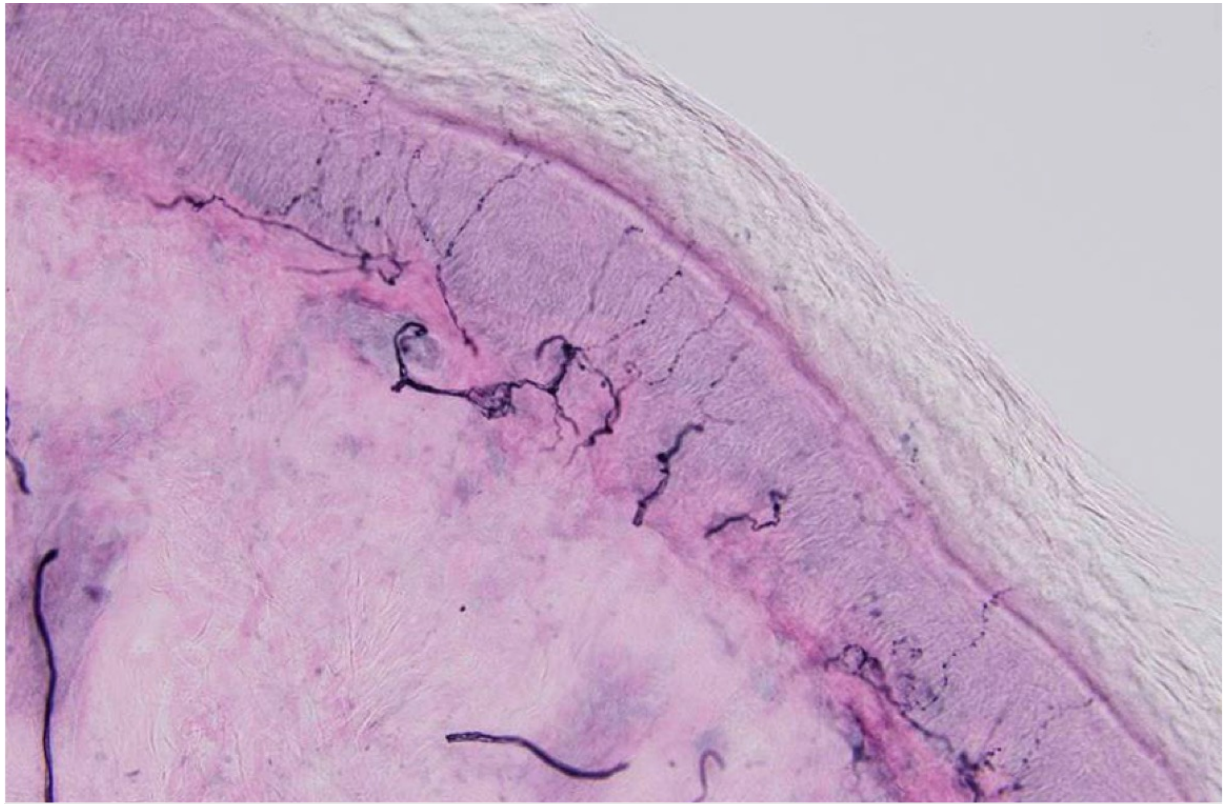
We must determine the *activity* of pathogens and the immune response

- Sequencing technologies like **spatial transcriptomics** that allow for a detailed understanding of immune and host genome activity near identified pathogens.
- **Single nuclei RNA sequencing** to identify the detailed landscape of tissue, blood vessel and nervous system changes.
- **Microbiome-based technologies** that can characterize the collective activity of microbial ecosystems in body tissues.
- Technologies (TCR seq, BCR seq) that capture the **activity of individual immune cells** responding to pathogen or microbiome activity.



Salivary gland tissue examined via spatial transcriptomics technology. Yellow arrows indicate regions positive for the SARS-CoV-2 spike protein (Image courtesy of Marcelo Freire, JCVI)

We should perform similar forms of analysis on patients with different infection-associated chronic conditions



A skin punch biopsy sample used in the diagnosis of small fiber neuropathy
Source: Therapath

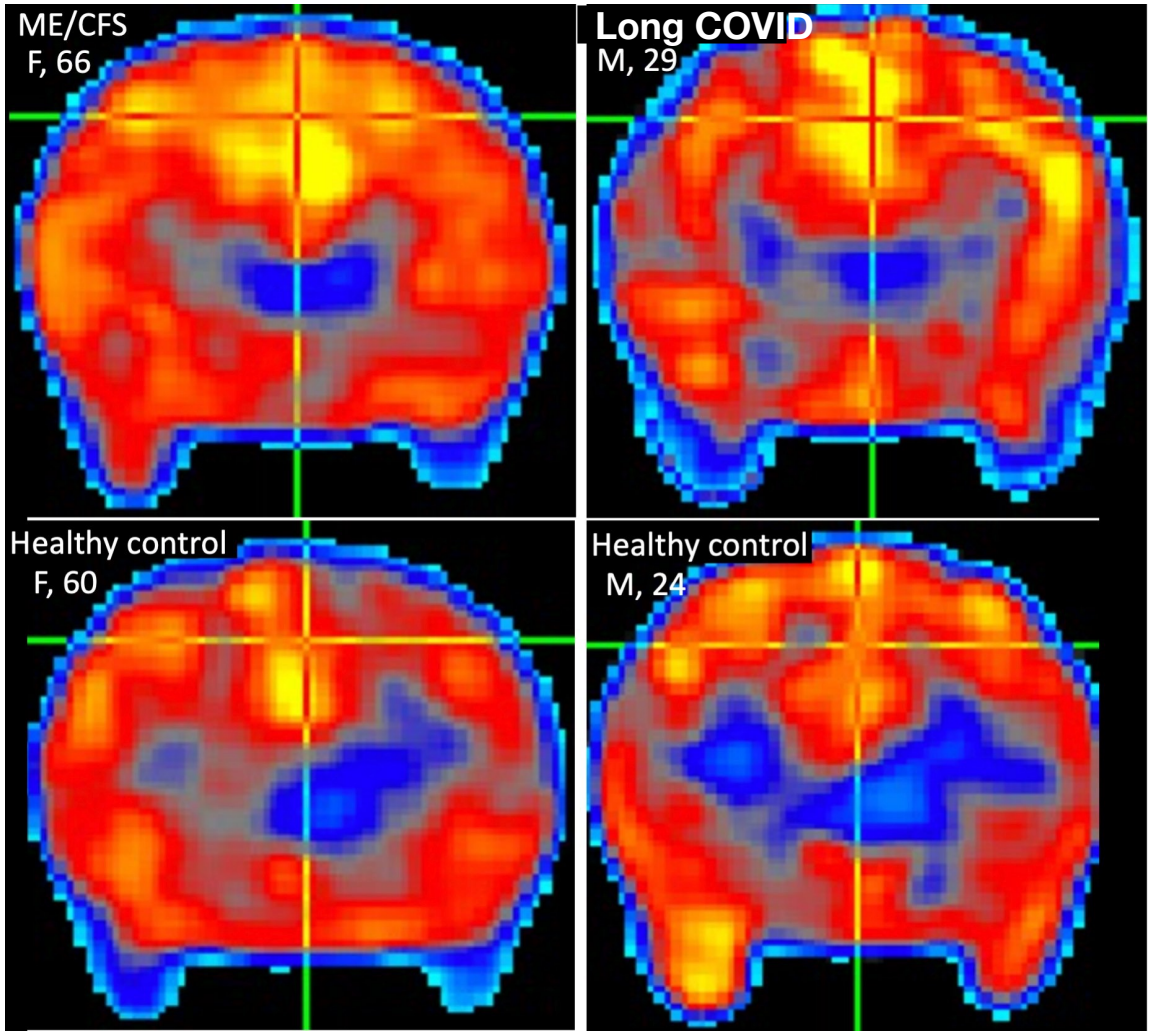
Long COVID

ME/CFS

LongLyme

Ehlers-Danlos Syndrome

We should perform many different forms of analysis on the same well-characterized study participants



- Fibrin-amyloid microclots
- Platelet activation
- Neutrophil motility
- Neutrophil extracellular traps (NETs)
- Pathogen proteins
- Gut permeability biomarkers
- Microbiome
- Viral neutralization/IgG glycosylation