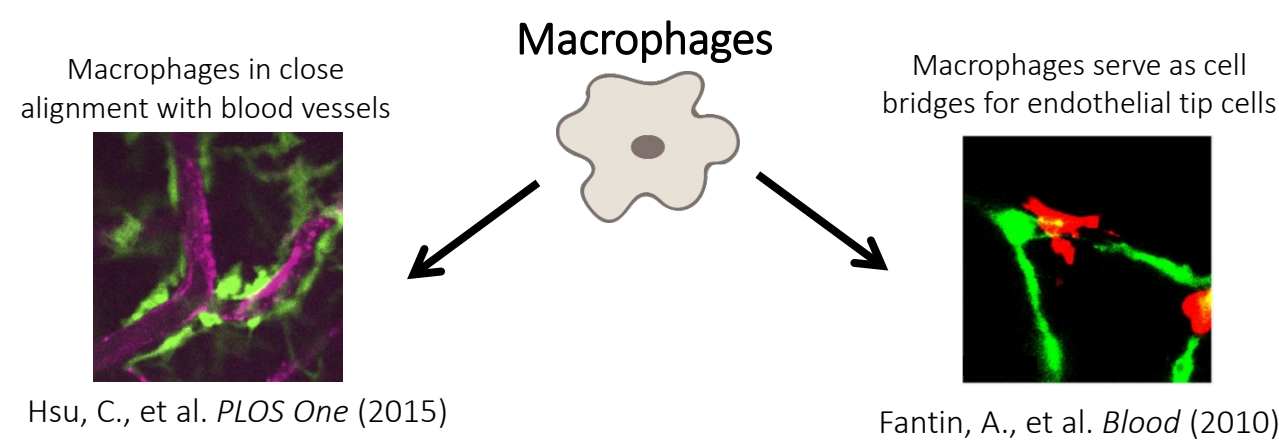


Immune Cells Influence Blood Vessels

Macrophages inform microvessel development

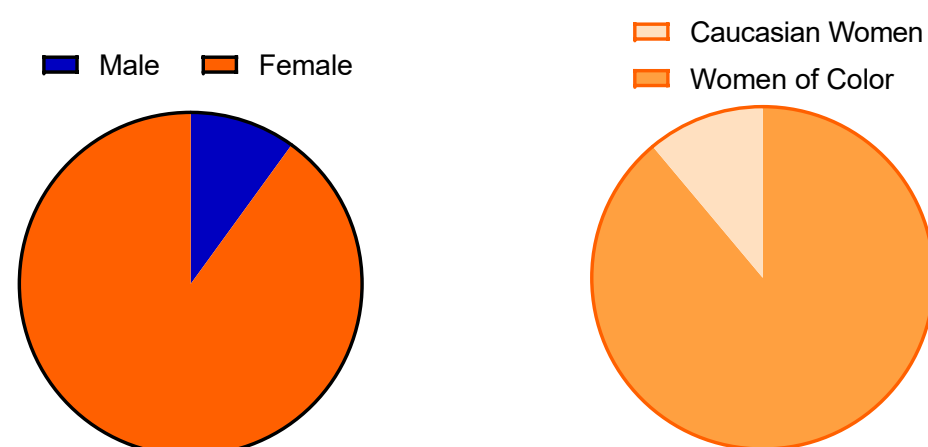
- Removing macrophages impairs vasculature
- Macrophage-endothelial cell interactions drive vascular inflammation (or vasculitis)
- Macrophages align along vessels and interact with endothelial cell sprouts



Develop a 3D tissue platform for vasculitis in Systemic Lupus Erythematosus

Why SLE?

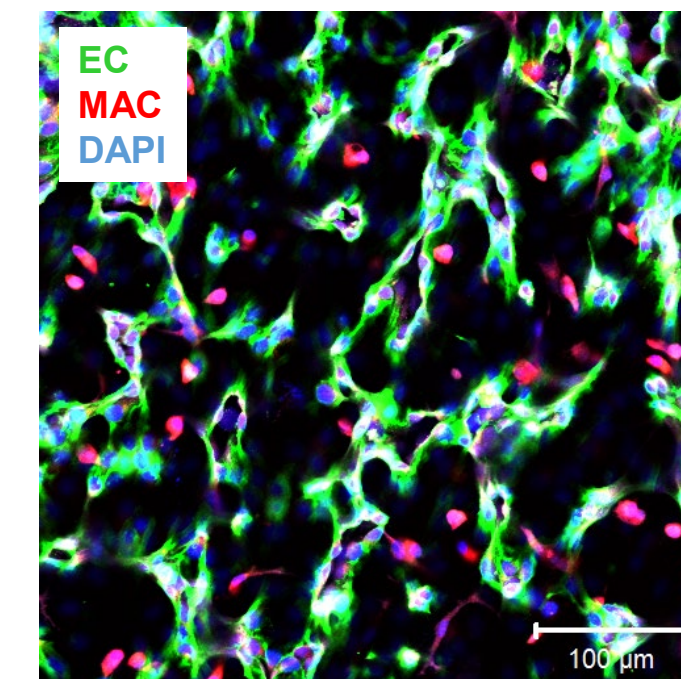
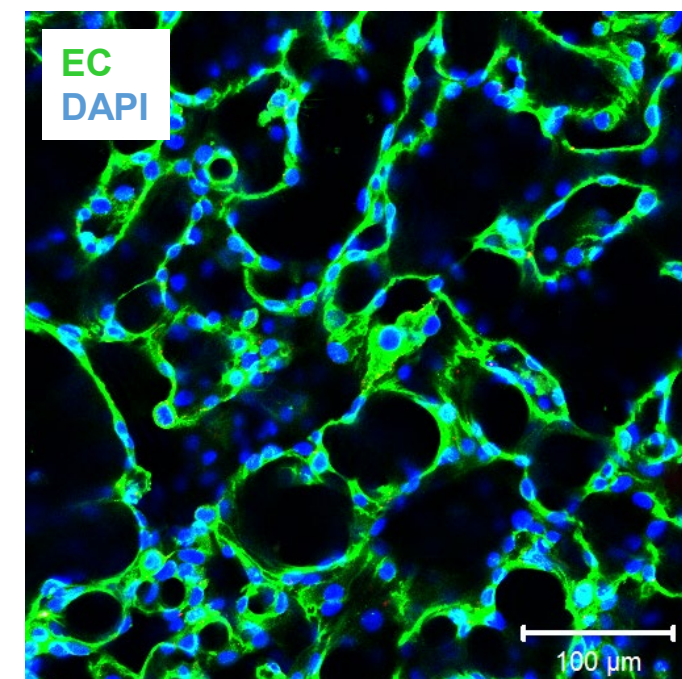
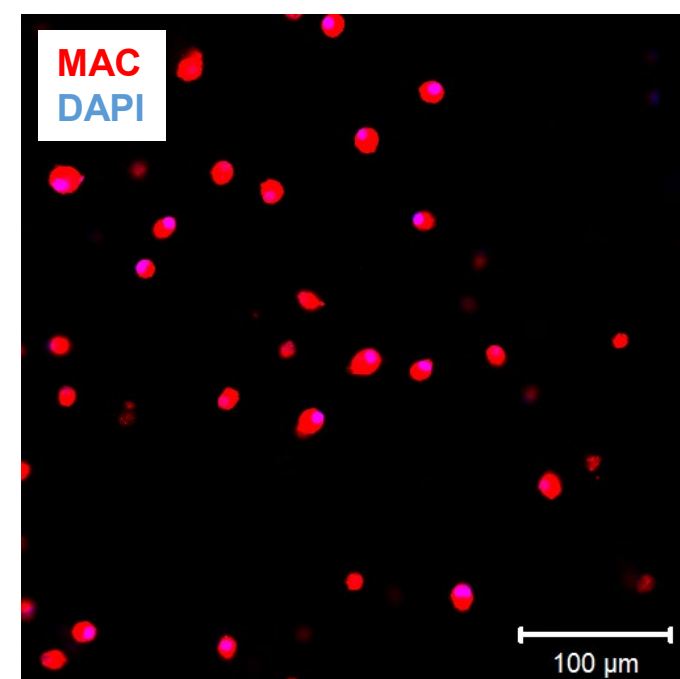
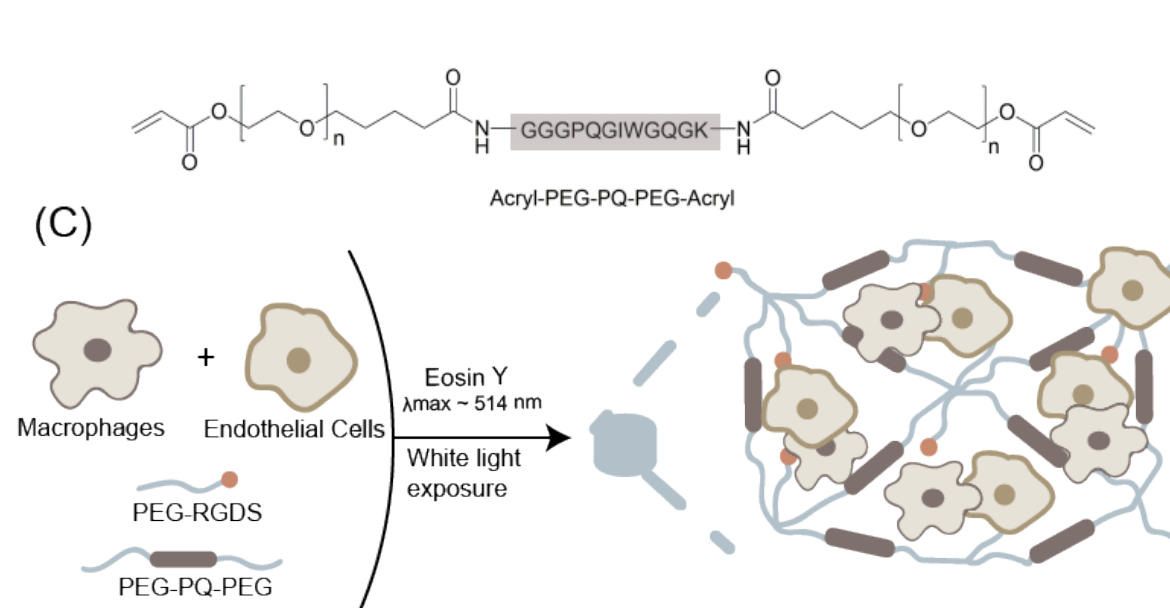
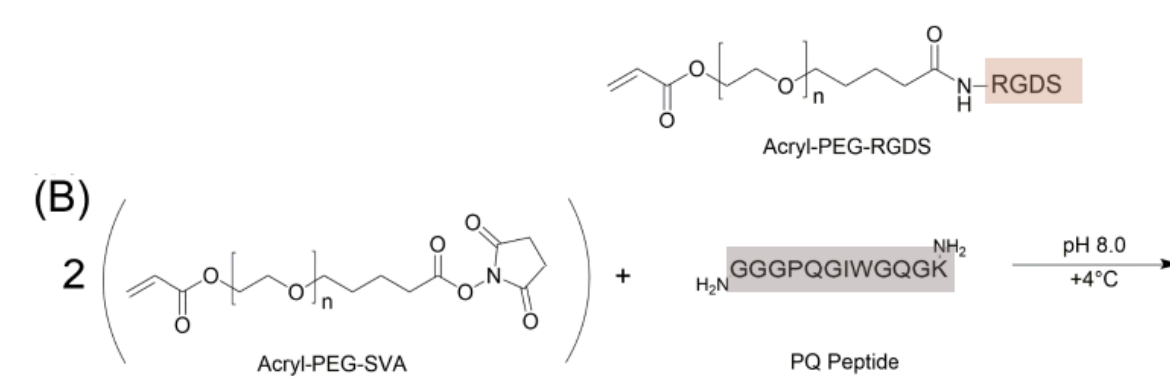
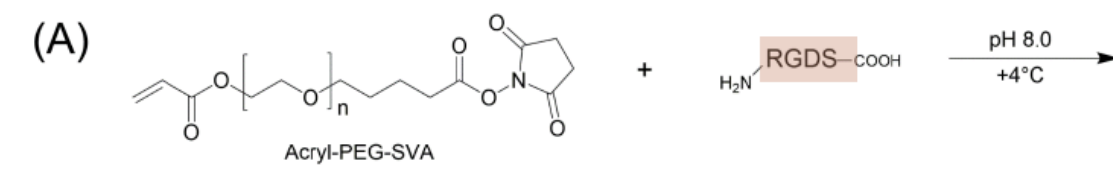
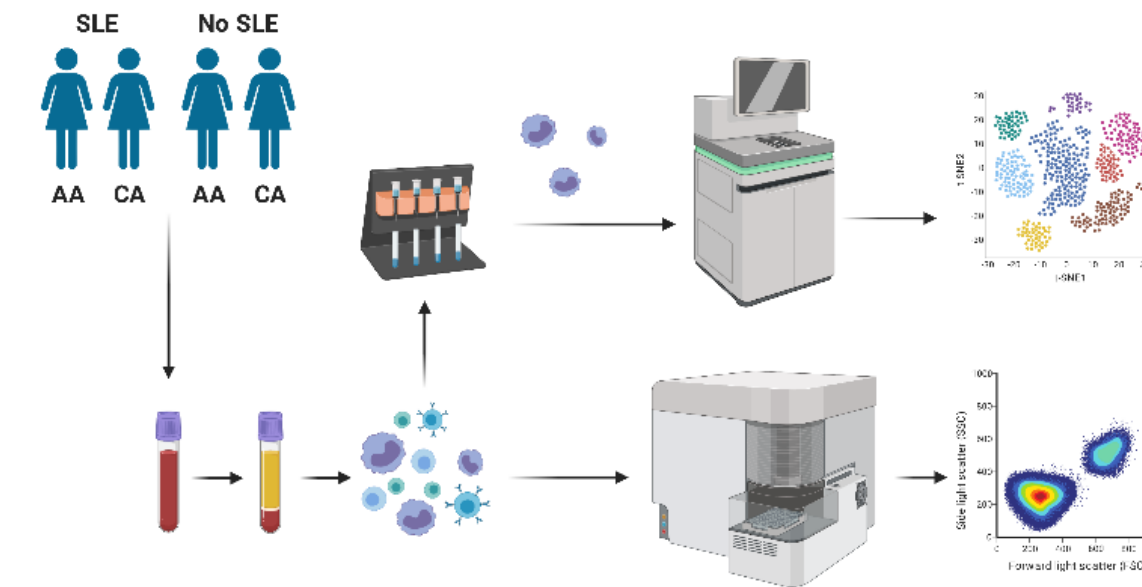
- Chronic autoimmune disease
- leads to inflammation and tissue damage
- SLE disproportionately affects women and minorities
- Chronic inflammation leads to cardiovascular disease
- Microvascular inflammation or small vessel vasculitis (SVV)



Ongoing Research

Characterizing Monocytes in SLE

- See Holly Ryan's Poster- MD/PhD student training on this project
- Isolate monocytes from patient samples
 - Critical differences are seen between African American and European American immune cells
- Characterize the monocyte differences using flow cytometry and NanoString gene expression software



Day 7, 5% (w/v) PEG-PQ-PEG 3.5 mM PEG-RGDS

Development of 3D Poly(ethylene glycol) Polymer System

- Development of poly(ethylene glycol) PEG hydrogels for our 3D tissue culture platform of vasculitis in SLE
- A- Cell adhesion- Chemical reaction for the formation of PEG-RGDS, a cell-adhesive polymer.
- B- Cell-Degradation- Chemical reaction for the formation of PEG-PQ-PEG.
- C- Cell encapsulation (occurs over 45 seconds) into the PEG hydrogel platform.

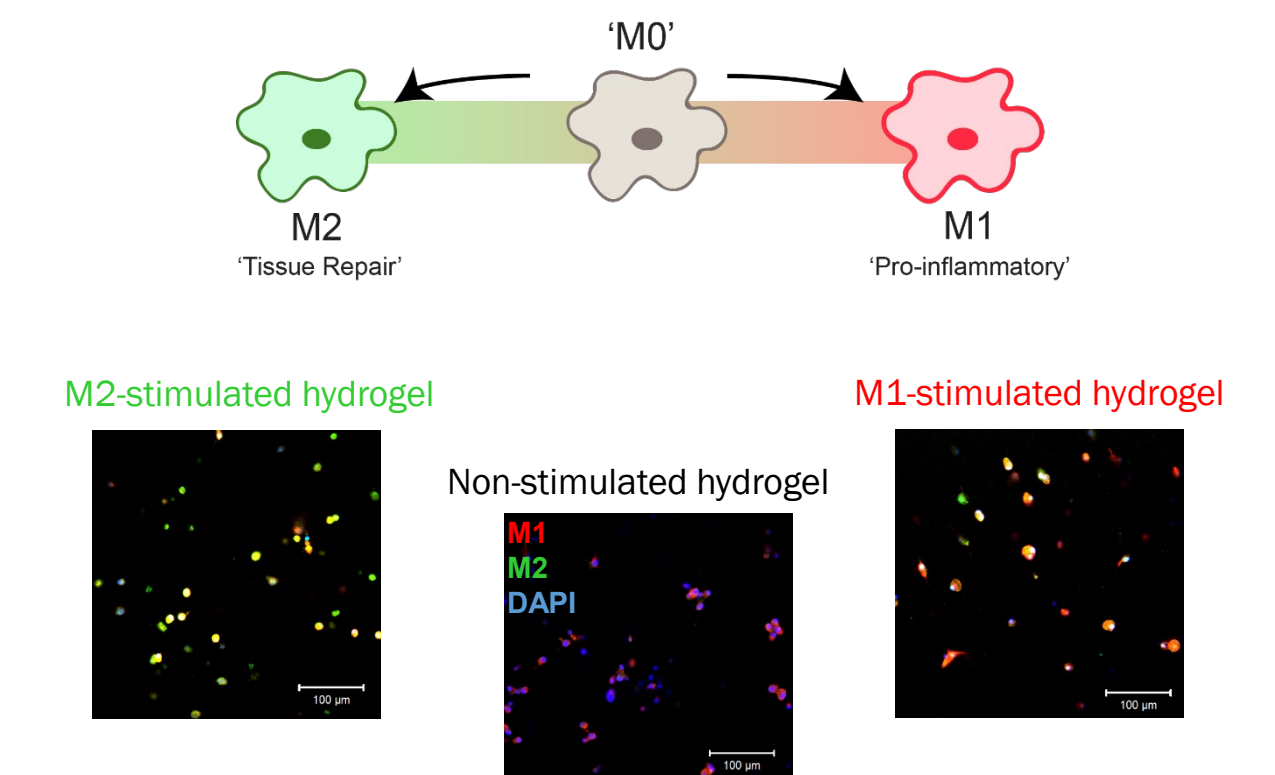
Cells Used In Our System

- Macrophages (MAC): primary bone-marrow derived or blood-derived monocyte/macrophages
- Endothelial cells (EC): Commercially available human umbilical vein endothelial cells or dermal microvascular endothelial cells

Additional Projects

Developing Materials to Manipulate Immune Cells in Wound Healing

- Biomaterials can be: Natural, Synthetic, or Hybrid
- Hybrid materials combine natural and synthetic elements of biomaterials
- We design immuno-biomaterials for guiding the immune cell response



MOORE LAB

Graduate Students



Holly Ryan
MD/PhD



Justin Silberman
PhD



Aakanksha Jha
PhD

Our mission is to leverage biomaterial design for immune cell tuning and disease modeling.

Our creed is being collaborative, innovative, and passionate.

Science is real • Black Lives Matter • Love is Love • Immigrants Are Welcome • Immune Engineering is Cool