



Tori Barnhouse

Modeling the hematopoietic stem cell perivascular niche using a 3D co-culture

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ABSTRACT:

My project focuses on developing a perivascular niche mimetic biomaterial system, using endothelial and stromal cells to form networks within a 3D environment to replicate key biological signals involved in HSC fate decisions. Using a biomaterials-based system of methacrylamide-functionalized gelatin (GelMA) hydrogels which have previously been developed in my lab, I plan to create endothelial and mesenchymal stem cell networks that mimic the in vivo vasculature of bone marrow. This tunable platform allows me to control the stiffness of the microenvironment, presentation of niche cells or biomolecules, and diffusive properties of the gel to ask questions about microenvironmental control of HSC fate. By gaining a better understanding of the relationship between HSCs and the vasculature, we can translate our findings into manipulations that allow for the expansion of HSCs in vitro while maintaining their ability to engraft and differentiate to improve patient outcomes of HSC transplants.

AWARDS/PUBLICATIONS:

- University of Illinois College of Engineering SURGE Fellowship



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