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Research Interests

More and more, we are coming to appreciate the influence that the bacteria that live on and in our intestines, lungs and skin have on human health. These bacteria provide protection from invading pathogens, educate our immune system, and can protect us from developing allergies. However, dysregulation of these bacteria or the immune response to them can contribute to the development or progression of chronic inflammatory diseases such as Inflammatory Bowel Disease (IBD) and other autoimmune or chronic inflammatory disorders. In addition, bacteria are not the only types of bugs residing within us, and it is unclear how resident viruses, fungi or worms influence host health.

My lab is interested in understanding how the host recognizes the diverse species that reside in the gut - from microscopic viruses to large, multicellular helminthic worms - and tailors an immune response of the appropriate scope and magnitude necessary to achieve homeostasis. In particular, we hope that our research investigating the “multibiome” will provide insight into how dysregulation of these intestinal communities contributes to disease, and in how we might use these species or the products they make to manipulate the immune response to restore homeostasis and health.

Addressing these gaps in knowledge will provide new opportunities for therapeutic intervention to enhance immunity (in the case of vaccination) or to rein in excessive immune responses in patients suffering from chronic inflammatory disorders.
The intestine is a dynamic immune environment colonized by the 'Mucosal Immune System'.

Intestinal Lumen

- Autoimmunity
- Chronic inflammation
- Vaccine responses

Helminth

Antibody

Normal Bacteria

CD4⁺ T cell