



Category
winner

Rachel Kratofil

Category: Cellular and Molecular Biology

Essay title: *Working up an appetite to promote repair: Immune-derived hunger hormones restore tissue post-infection*

Biography

Dr. Rachel Kratofil is from Victoria, Canada. She received her BSc in Biochemistry from the University of Victoria and her PhD in Immunology from the University of Calgary, where she was the recipient of the Canadian Governor General's Gold Medal for her graduate work on immune regulation of hunger hormones, leptin and ghrelin, during tissue repair.

In October 2022, Rachel joined the labs of Drs. Shruti Naik and Victor Torres at NYU Grossman School of Medicine as a postdoctoral fellow, where she currently studies how barrier tissues adapt to microbial cues during injury.

Abstract

Neutrophils and monocytes are early immune responders to infection, but their roles in tissue repair post-infection remain unclear. We used a relevant skin infection model with live intravital imaging to capture immune cell recruitment. While neutrophils engaged bacteria, monocytes stayed nonmotile and at a distance from bacteria. Neutrophil depletion impaired bacterial clearance, but monocyte depletion caused delayed healing and increased vasculature due to elevated leptin levels.

Further experimentation showed that recombinant leptin promoted angiogenesis and blocking leptin signaling ameliorated hyper-angiogenesis. Endothelial LepR was critical for leptin-driven angiogenesis. Ghrelin injections reduced vasculature, implying a role for hunger hormones in repair. This research uncovered a novel link between immune cells and hormonal regulation of revascularization and this mechanism may apply to other diseases like cancer.