

BIOCHEMISTRY AND MOLECULAR BIOLOGY SEMINAR SERIES

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Exploring epithelial immunity to bacterial infections using *C. elegans*

Epithelial tissues are a primary interface between hosts and microbes, yet how they detect and respond to bacterial challenge remains incompletely understood. The nematode *Caenorhabditis elegans* provides a powerful *in vivo* model to dissect epithelial immunity, combining conserved innate immune pathways with exceptional genetic and experimental tractability. In this talk, I will explore how *C. elegans* responds to bacterial infection at the epithelial surface using a combination of candidate-driven and unbiased discovery approaches. Using high-throughput phenomics alongside dual transcriptomics, proteomics and targeted metabolomics, we identify core genetic and metabolic networks that shape host–microbe interactions. These approaches reveal both established immune regulators and novel gene families, including Hedgehog-like proteins and nuclear hormone receptors, that modulate epithelial defense, pathogen resistance and host survival. We further uncover dynamic links between immune activation, metabolic reprogramming and ageing. Finally, I will discuss how these responses are shaped by interactions with pathogenic and commensal bacteria within the *C. elegans* microbiota. Together, this work highlights *C. elegans* as a tractable system for uncovering fundamental principles of epithelial immunity and host–microbe communication.

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Bowen Auditorium (McCreary Hall Room 115)

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