UNIVERSITY OF SASKATCHEWAN
College of Medicine
DEPARTMENT OF BIOCHEMISTRY, MICROBIOLOGY AND IMMUNOLOGY
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Proteomics Research in Interactions and Structure of Macromolecules

COMBINED SEMINAR SERIES

Department of Biochemistry, Microbiology & Immunology and PRISM Research Centre

Thursday October 29, 2026
11:30 am - 12:30 pm

HLTH GB06

Dr. Marie Delaby, PhD

Postdoctoral Fellow, Dr. Yves Brun Lab University of Montreal

"Different ways to grow: Plasticity and evolution of bacterial cell elongation”



How can closely related bacteria use conserved cellular machinery to grow in different ways? Cell elongation is a fundamental part of bacterial growth and relies on the synthesis of the peptidoglycan cell wall, a major antibiotic target. Yet most of what we know about this process comes from a handful of model organisms, leaving the diversity and evolutionary flexibility of bacterial elongation largely unexplored.

By tracking peptidoglycan synthesis with fluorescent D-amino acids, we found that closely related species of the *Caulobacteraceae* family elongate in strikingly different ways, showing dispersed, midcell or polar patterns of cell wall synthesis, with either unidirectional or bidirectional insertion. In *Asticcacaulis excentricus*, quantitative microscopy and inhibition experiments showed that unidirectional midcell elongation depends on the cell wall synthase PBP2, which concentrates at the growth site rather than being dispersed as in *Caulobacter crescentus*. Mapping these elongation modes onto a phylogeny suggests that unidirectional midcell elongation has been gained or lost at least twice within the family.

These findings reveal an unexpected plasticity in a fundamental cellular process and suggest that different growth strategies can emerge through changes in how conserved machinery is organized and regulated. I will discuss the hypotheses that now guide my research and how I plan to test them. In particular, I will focus on how the organization and regulation of cell wall synthesis machinery may generate distinct elongation programs, whether and how environmental conditions remodel these programs, and how these programs diversify over evolutionary time.

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