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EDUCATION

2017-2023 Ph.D, Microbiology & Immunology, McGill University, Montreal, Canada

2012-2017 B.Sc (Honours), Biochemistry, University of Manitoba, Winnipeg, Canada

RESEARCH EXPERIENCE

2023-current **Massachusetts General Hospital**
Research Fellow
Supervisor: Deborah T. Hung, M.D. Ph.D.
Pseudomonas aeruginosa: Perturbation single-cell RNA sequencing

- Genome-wide CRISPRi library to assign gene function using single-cell transcriptomes and define genetic vulnerabilities

Pseudomonas aeruginosa: Small molecule mechanism of action

- Describing targets of small molecule inhibitors from RNA sequencing

2017-2023 **McGill University**
Graduate Student
Supervisor: Marcel A. Behr, M.D.
Mycobacterium abscessus: Drug discovery and antimicrobial resistance

- HTS identified epetraborole as a potent antibiotic
- Demonstrated that norvaline can limit resistance to epetraborole
- Characterized novel editing-deficient resistance mechanism to norvaline
- Developed *in-cellulo* target engagement assay using nanoBRET

2016 **University of Manitoba**
Undergraduate Summer Research Assistant
Supervisor: Steve Whyard, Ph.D.
Aedes aegypti ModSP and flavivirus NS1 protein-protein interactions

- Cloned and expressed fusion proteins using baculovirus expression system in SF9 insect cell line

2015 **University of Manitoba**
Undergraduate Summer Research Assistant/Honour's Student
Supervisor: Mazdak Khajehpour, Ph.D.
Understanding the hydrophobic effect using β-cyclodextrins

- Observed guest-host interaction between naphthalene dye and β -cyclodextrin using temperature-jump fluorescence spectroscopy
- Showed that NaCl lowers the activity of water
- Demonstrated that activity of water is primary driver of hydrophobic effect

PUBLICATIONS

Peer-Reviewed Publications

Sullivan JR, et al. (2025). An Inducible CRISPRi system for phenotypic analysis of essential genes in Pseudomonas aeruginosa. *BioRxiv*.

Danchuk SN, Duffy SC, **Sullivan JR**, et al. (2025). Virulence hierarchies within the Mycobacterium tuberculosis complex. *In revision Proc Natl Acad Sci USA.*

Meirelles MA, Almeida VM, **Sullivan JR**, et al. (2024). Rational Exploration of 2,40Diaminopyrimidines as DHFR Inhibitors Active against Mycobacterium abscessus and Mycobacterium avium, Two Emerging Human Pathogens. *J Med Chem* **67**,21.

Romano KP*, Bagnall J*, Warrier T#, **Sullivan JR**#, Ferrara K, Orzechowski M, Nguyen PH, Raines K, Livny J, Shoresh N, Hung DT. (2024). Perturbation-specific transcriptional mapping for unbiased target elucidation of antibiotics. *Proc Natl Acad Sci USA **121***.

Sullivan JR, Courtine C, Taylor L, Solomon O, Behr MA. (2023). Loss of allosteric regulation in α-IPMS identified as an antimicrobial resistance mechanism. *npj Antimicrob Resist* **1**, 7.

Sullivan JR, Yao J, Courtine C, Lupien A, Herrmann J, Müller R, Behr MA. (2022). Natural products lysobactin and sorangicin A show in vitro activity against Mycobacterium abscessus complex. *Microbiol Spectr.* 10, 6.

Fanti R, Vasconcelos S, Catta-Preta C, **Sullivan JR**, Riboldi G, dos Reis C, Ramos P, Edwards A, Behr MA, Couñago R. (2022). A target engagement assay to assess uptake, potency and retention of antibiotics in living bacteria. *ACS Infect. Dis.* 8, 1449-1467.

Sullivan JR, Lupien A, Kalthoff E, Hamela C, Taylor L, Munro KA, Schmeing TM, Kremer L, Behr MA. (2021). Efficacy of epetraborole against Mycobacterium abscessus is increased with norvaline. *PLoS Pathog*. 17(10): e1009965.

Reingewertz TH, Meyer T, McIntosh F, **Sullivan JR**, Chang Y, Behr MA, Barkan D. (2020). Differential sensitivity of mycobacteria to isoniazid is related to differences in KatG-mediated enzymatic activation of the drug. *Antimicrob Agents Chemother*. 64, 2, e01899-19.

Book Chapters

Sullivan JR, Behr MA. (2020). Drug Susceptibility Testing & Antimicrobial Resistance in Mycobacterium avium subsp. paratuberculosis. Paratuberculosis: Organisms, Disease, Control. (2)

RESEARCH FUNDING

2022-2025	Fonds de recherche du Québec - Santé
2020-2021	Faculty of Medicine Harrison Watson Studentship
2020-2021	Research Institute of the McGill University Health Centre Studentship
2018-2020	Cystic Fibrosis Canada Studentship
2018-2019	CIHR Frederick Banting and Charles Best Canada Graduate Scholarship
2016	University of Manitoba Faculty of Science Undergraduate Summer Research Award
2015	University of Manitoba H.D. Gesser Undergraduate Summer Research Award

TEACHING EXPERIENCE

2019-2023	Teaching Assistant, Department of Microbiology & Immunology, McGill University, Montreal, Canada MIMM 465 Bacterial Pathogenesis, 90 students
2018	Teaching Assistant, Department of Microbiology & Immunology, McGill University, Montreal, Canada MIMM 385 Laboratory in Immunology, 80 students
2017	Teaching Assistant, Department of Chemistry, University of Manitoba, Winnipeg, Manitoba, Canada CHEM 2370 Catabolism, Synthesis, and Informational Pathways, 40 students
2016	Teaching Assistant, Department of Chemistry, University of Manitoba, Winnipeg, Manitoba, Canada

CHEM 2360 Biomolecules and an Introduction to Metabolic Energy, 40 students

COURSE DEVELOPMENT

2020-2023 MIMM 465 Bacterial Pathogenesis, Department of Microbiology & Immunology, McGill University (With Course Coordinator Prof. M. Reed)

PERSONEL SUPERVISION/MENTORSHIP

2025-2026 Caleb Miller, Senior at Lexington Highschool
2024-2025 Sophie Chen, 1st year Molecular and Cellular Biology, Harvard University
2023-2025 Rebecca Barrick, Research technician
2022-2023 Marcus Saldanha, 4th year Microbiology & Immunology, McGill University
2021-2022 Christophe Courtine, 4th year Microbiology & Immunology, McGill University

PRESENTATIONS

Oral Presentations

Drug discovery for *Mycobacterium abscessus*. Francis Crick Institute, London, 2023

Drug discovery for *Mycobacterium abscessus*. Microbiology & Immunology. McGill University, 2022

Efficacy of epetraborole against *Mycobacterium abscessus* is increased with norvaline. Microbiology & Immunology Graduate Research Day. McGill University, 2021

A novel screening platform for non-tuberculous mycobacteria drug discovery. Keystone Tuberculosis: Mechanisms, Pathogenesis, and Treatment. Banff, Canada, 2019

Poster Presentations

Efficacy of epetraborole against *Mycobacterium abscessus* is increased with norvaline. EMBO TB Workshop. Institut Pasteur-Paris, 2022

Efficacy of epetraborole against *Mycobacterium abscessus* is increased with norvaline. Colorado Mycobacteria Conference. Colorado State University, 2022

A novel screening platform for drug discovery in non-tuberculous mycobacteria. 7th Annual McGill International TB Centre Research Day. McGill University, 2019

A novel screening platform for drug discovery in non-tuberculous mycobacteria. Rare Disease Day. McGill University, 2019

A novel screening platform for drug discovery in non-tuberculous mycobacteria. Global Health Night. McGill University, 2019

A novel screening platform for drug discovery in non-tuberculous mycobacteria. Keystone Tuberculosis: Mechanisms, Pathogenesis and Treatment. Banff, Canada, 2019

Understanding the hydrophobic effect using β-cyclodextrins as a model system. Biophysical Society of Canada 2nd Annual Meeting. University of Manitoba, 2016

Understanding the hydrophobic effect using β-cyclodextrins as a model system. 15th Annual Chemical Biophysics Conference. University of Toronto, 2016

HONOURS AND DISTINCTIONS

2023	Best publication award, McGill International TB Centre
2018	Max Stern Recruitment Fellowship, McGill University
2017-2022	Microbiology & Immunology Graduate Excellence, McGill University
2017	Society of Chemical Industry Merit, University of Manitoba
2017	Mike and Lesia Muzylowski Scholarship of Excellence, University of Manitoba
2016	University of Manitoba Student Union Scholarship
2016	Biophysical Society of Canada Poster Award

PROFESSIONAL MEMBERSHIPS

2021-2022	Editor Medical Sciences, McGill Journal of Medicine
2017-Present	McGill International TB Centre: PAHO/WHO Collaborating Centre for Tuberculosis Research

REFERENCES

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