Dr. Ben Vezina
Infectious Diseases
Email: Benjamin.Vezina@monash.edu

Biography

I am a research scientist who studies the DNA of bacteria using computational biology, then tests hypotheses in the laboratory using micro and molecular biology.
I am currently working as a postdoctoral research fellow with Dr. Kelly Wyres within the Infectious Diseases Genomics @ Alfed, within the Department of Infectious Diseases, School of Translational Medicine at Monash University (2020 - current). I use genomic and bioinformatic techniques to look at the evolutionary history of *Klebsiella pneumoniae*, a notable infectious pathogen. I study the metabolism of these pathogens via metabolic modelling and comparative genomics.
Prior to this, I completed a 1.5 year postdoctoral position at the Griffith Institute of Drug Discovery, Griffith University (2018 - 2019). I used structural biology and computational approaches to inform wet-lab experiments to study the circular bacteriocin, plantacyclin B21AG.
I have also worked as a research scientist at RMIT university doing diagnostics, RNA sequencing analysis and genomics of chicken pathogen *Campylobacter hepaticus*, the cause of spotty liver disease (2018).
I completed a PhD in molecular and microbiology at the Biomedicine Discovery Institute, Monash University (2014 - 2018), where I worked on constructing a live vaccine for chickens, using the commensal bacteria *Ligilactobacillus agilis*. I discovered new constitutive promoters which I then used as genetic tools and novel expression systems.
I completed Honours at Deakin University (2013) where I constructed novel shuttle plasmids for commensal bacteria *Ligilactobacillus agilis* using native plasmids as a backbone.

Qualifications

Molecular and Microbiology, PhD, Development of Lactobacillus agilis La3 as a live vector for the delivery of vaccine antigens to the gastrointestinal tract of chickens
1 Feb 2014 → 1 May 2018
Award Date: 1 Aug 2018

Employment

Research Fellow

Infectious Diseases
MONASH UNIVERSITY
19 Oct 2020 → present

Freelance Computational Biology

1 Apr 2020 → 1 Oct 2020

Postdoctoral Research Fellow

Griffith University
Nathan, Australia
11 Jan 2019 → 15 Apr 2020

Research Scientist

RMIT University
Melbourne, Australia
1 Jan 2018 → 1 Sept 2018

Research outputs

Bactabolize is a tool for high-throughput generation of bacterial strain-specific metabolic models
Vezina, B., Watts, S. C., Hawkey, J., Cooper, H. B., Judd, L. M., Jenney, A. W. J., Monk, J. M., Holt, K. E. & Wyres, K. L., Oct 2023, In: eLife. 12, 22 p., e87406.

Genomic dissection of endemic carbapenem resistance reveals metallo-beta-lactamase dissemination through clonal, plasmid and integron transfer
Macesic, N., Hawkey, J., Vezina, B., Wisniewski, J. A., Cottingham, H., Blakeway, L. V., Harshegyi, T., Pragastis, K., Badoordeen, G. Z., Dennison, A., Spelman, D. W., Jenney, A. W. J. & Peleg, A. Y., 8 Aug 2023, In: Nature Communications. 14, 1, p. 4764 1 p.

Transmission of Klebsiella strains and plasmids within and between grey-headed flying fox colonies
Vezina, B., Judd, L. M., McDougall, F. K., Boardman, W. S. J., Power, M. L., Hawkey, J., Brisse, S., Monk, J. M., Holt, K. E. & Wyres, K. L., Sept 2022, In: Environmental Microbiology. 24, 9, p. 4425-4436 12 p.

Genomic surveillance reveals antibiotic resistance gene transmission via phage recombinases within sheep mastitis-associated *Streptococcus uberis*
Vezina, B., Rosa, M. N., Canu, A. & Tola, S., 7 Jul 2022, In: BMC Veterinary Research. 18, 1, 13 p., 264.

A curated collection of *Klebsiella* metabolic models reveals variable substrate usage and gene essentiality
Hawkey, J., Vezina, B., Monk, J. M., Judd, L. M., Harshegyi, T., López-Fernández, S., Rodrigues, C., Brisse, S., Holt, K. E. & Wyres, K. L., May 2022, In: Genome Research. 32, 5, p. 1004-1014 11 p.

Trycycler: consensus long-read assemblies for bacterial genomes
Wick, R. R., Judd, L. M., Cerdeira, L. T., Hawkey, J., Méric, G., Vezina, B., Wyres, K. L. & Holt, K. E., 14 Sept 2021, In: Genome Biology. 22, 1, 17 p., 266.

Trycycler: consensus long-read assemblies for bacterial genomes
Wick, R. R., Judd, L. M., Cerdeira, L. T., Hawkey, J., Meric, G., Vezina, B., Wyres, K. L. & Holt, K. E., 4 Jul 2021, 15 p. bioRxiv.

Stable Recombinant-Gene Expression from a Ligilactobacillus Live Bacterial Vector via Chromosomal Integration
Vezina, B., Allnutt, T., Keyburn, A. L., Wade, B., Van, T. T. H., Johanesen, P., Lyras, D. & Moore, R. J., Jun 2021, In: Applied and Environmental Microbiology. 87, 11, 17 p., e00392-21.

Sequence characterisation and novel insights into bovine mastitis-associated Streptococcus uberis in dairy herds
Vezina, B., Al-harbi, H., Ramay, H. R., Soust, M., Moore, R. J., Olchowy, T. W. J. & Alawneh, J. I., 4 Feb 2021, In: Scientific Reports. 11, 1, 16 p., 3046.

Transmission of *Klebsiella* strains and plasmids within and between grey-headed flying fox colonies
Vezina, B., Judd, L. M., McDougall, F. K., Boardman, W. S. J., Power, M. L., Holt, K. E. & Wyres, K. L., 2021, p. 32. 1 p.

Catalytically Active Bioseparation Resin Utilizing a Covalent Intermediate for Tagless Protein Purification
Evert, B., Vezina, B. & Rehm, B. H. A., 21 Dec 2020, In: ACS Applied Bio Materials. 3, 12, p. 8911-8922 12 p.

Survey and Sequence Characterization of Bovine Mastitis-Associated *Escherichia coli* in Dairy Herds
Alawneh, J. I., Vezina, B., Ramay, H. R., Al-Harbi, H., James, A. S., Soust, M., Moore, R. J. & Olchowy, T. W. J., 7 Dec 2020, In: Frontiers in Veterinary Science. 7, 582297.

Prediction of Burkholderia pseudomallei DsbA substrates identifies potential virulence factors and vaccine targets
Vezina, B., Petit, G. A., Martin, J. L. & Halili, M. A., 20 Nov 2020, In: PLoS ONE. 15, 11 November, 21 p., e0241306.

Crystal structure and site-directed mutagenesis of circular bacteriocin plantacyclin B21AG reveals cationic and aromatic residues important for antimicrobial activity
Gor, M. C., Vezina, B., McMahon, R. M., King, G. J., Panjikar, S., Rehm, B. H. A., Martin, J. L. & Smith, A. T., 15 Oct 2020 , In: Scientific Reports. 10, 1, 16 p., 17398.

Discovery and characterisation of circular bacteriocin plantacyclin B21AG from Lactiplantibacillus plantarum B21
Golneshin, A., Gor, M-C., Williamson, N., Vezina, B., Van, T. T. H., May, B. K. & Smith, A. T., Aug 2020, In: Heliyon. 6, 8, 14 p., e04715.

Bioinformatic prospecting and phylogenetic analysis reveals 94 undescribed circular bacteriocins and key motifs
Vezina, B., Rehm, B. H. A. & Smith, A. T., 6 Apr 2020, In: BMC Microbiology. 20, 1, 16 p., 77.

Campylobacter hepaticus, the Cause of Spotty Liver Disease in Chickens: Transmission and Routes of Infection
Phung, C., Vezina, B., Anwar, A., Wilson, T., Scott, P. C., Moore, R. J. & Van, T. T. H., 15 Jan 2020, In: Frontiers in Veterinary Science. 6, 8 p., 505.

Survival mechanisms of Campylobacter hepaticus identified by genomic analysis and comparative transcriptomic analysis of in vivo and in vitro derived bacteria
Hao Van, T. T., Lacey, J. A., Vezina, B., Phung, C., Anwar, A., Scott, P. C. & Moore, R. J., 5 Feb 2019, In: Frontiers in Microbiology. 10, 19 p., 107.

Whole genome analysis reveals the diversity and evolutionary relationships between necrotic enteritis-causing strains of Clostridium perfringens
Lacey, J. A., Allnutt, T. R., Vezina, B., Van, T. T. H., Stent, T., Han, X., Rood, J. I., Wade, B., Keyburn, A. L., Seemann, T. , Chen, H., Haring, V., Johanesen, P. A., Lyras, D. & Moore, R. J., 22 May 2018, In: BMC Genomics. 19, 1, 22 p., 379.

Activities

MicroSeq2022
Ben Vezina (Session chair)
8 Sept 2022

MicroSeq2022
Ben Vezina (Speaker)
7 Sept 2022

Invited speaker at ASM Victoria - One Health Microbial Genomics seminar
Ben Vezina (Contributor)
31 May 2022

Monash Young MedTech Innovators Medhack Elevate (hackathon) Co-designer/expert
Ben Vezina (Advisor)
6 May 2022 → 8 May 2022

Invited speaker at Informal Online Bioinformatics Seminar
Ben Vezina (Contributor)
9 Mar 2022

MicroSeq2021
Ben Vezina (Speaker)
9 Sept 2021

Annual Scientific Meeting of the Australian Society for Microbiology 2021
Ben Vezina (Speaker)
2 Jun 2021

MicroSeq2020
Ben Vezina (Session chair)
11 Nov 2020

MicroSeq2020
Ben Vezina (Speaker)
10 Nov 2020