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Basis of Commensal Bacillota Resistance to a Novel PolC-type DNA Polymerase III Inhibitor, Ibezapolstat, and the "Narrower" Spectrum of Activity Towards Clostridioides difficile

Dr. Jacob McPherson first became interested in antimicrobial resistance studying the Texas epidemiology of non-susceptible Clostridioides difficile, a leading Gram-positive pathobiont. He received a Bachelor of Science in Cellular and Molecular Biology from the University of Texas at Austin before going on to pursue a PharmD/PhD dual degree program at the University of Houston College of Pharmacy where he continues to study C. difficile infection (CDI). He is a current Gulf Coast Consortia T32 postdoctoral fellow of antimicrobial resistance. His current work focuses on elucidating the structural and kinetic features of commensal Bacillota non-susceptibility to a novel antibiotic, ibezapolstat (IBZ), a Gram-positive selective spectrum (GPSS) PolC-type DNA polymerase III (PolC) inhibitor for the treatment of C. difficile infection (CDI).

He is trained in classical clinical microbiology for the study of antimicrobial resistance, including but not limited to minimum inhibitory concentrations (MIC) and nucleic acid amplification test (NAAT) detection of mechanisms of non-susceptibility. Recently however, he has gained an appreciation for the application of advanced techniques and technologies, like electron cryogenic microscopy (cryo-EM) and molecular dynamics (MD), to better understand the biophysics of drug-target interactions in the Receptor Theory framework of thinking. He hopes is that pairing advanced in silico techniques with classical in vitro assays will better characterize the drug-target interactions in the study of antimicrobial resistant pathogens, such as the microbiome-sparing GPSS nature of the IBZ-PolC interaction for the treatment of CDI.