“Enteric pathogens modulate the host to carve out a niche for expansion in the gut”

Brittany Miller, Bäumler Lab Research

Bacterial pathogens of the family Enterobacteriaceae must be able to successfully overcome innate host strategies for fending off invading bacteria, including competing with the resident gut microbiota, in order to obtain nutrients, replicate, and ultimately cause disease. However, mechanisms used by bacterial pathogens to outcompete the gut microbiota and establish infection are not well understood. For my thesis work, we used the murine pathogen Citrobacter rodentium to show the pathogen can both take advantage of innate host factors for respiration of hydrogen peroxide, as well as alter the host metabolism in a way that benefits the pathogen later on during infection via the respiration of oxygen. We also use the model Salmonella enterica serovar (S.) Typhimurium to show the pathogen can affect levels of a neurotransmitter, GABA, in the gut to induce an immune response that favors S. Typhimurium growth over competing microbes. Overall, we provide evidence that enteric pathogens have evolved methods to take advantage of immune responses to the invading pathogen, which helps them overcome habitat filters and colonization resistance.

Publications

