

Alison A. Weiss, PhD

Professor

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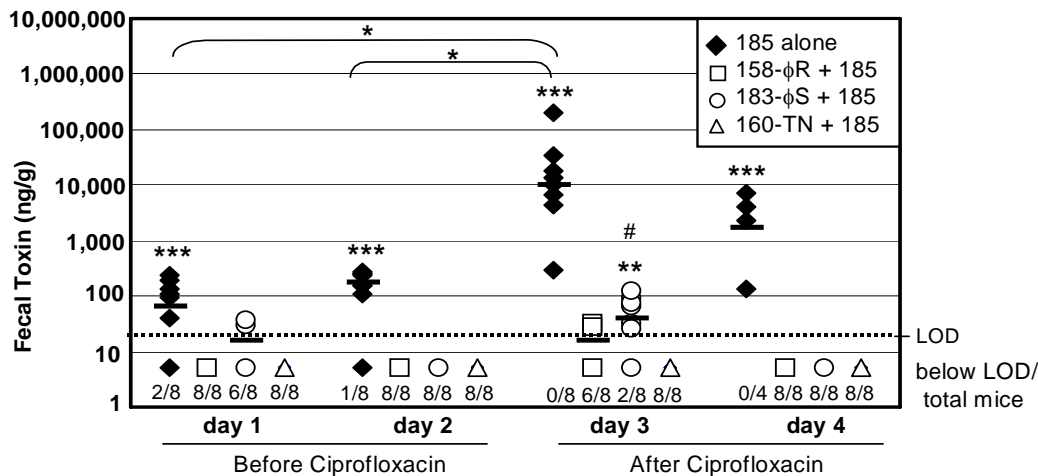
Description of Research:

Dr. Weiss focuses on host pathogen interactions with regard to infectious diarrhea caused by *E. coli* O157:H7. Disease caused by *E. coli* O157:H7 is characterized by diarrhea, hemorrhagic colitis, and the potentially fatal complication, hemolytic uremic syndrome (HUS). Shiga toxin (Stx) is a major virulence factor of *E. coli* O157:H7. Two major antigenic variants of Shiga toxin, Stx1 and Stx2, share 55% amino acid homology. Strains of O157:H7 can produce Stx1, Stx2, or both; however, the ability to produce Stx2 has been associated with progression to severe disease, including HUS. The importance of Stx2 in life-threatening disease has been definitively established in recent studies demonstrating that administration of purified Stx2 led to the development of HUS in experimental models, while an equivalent dose of Stx1 did not. While it is clear that Stx2 can induce cellular death, it is also not clear that cellular death is required for development of HUS. Neutrophil recruitment and activation may play a role in development of HUS. Sublethal doses of Stx2 have been shown to induce endothelial cells to produce an aberrant cytokine cascade that is believed to recruit and retain neutrophils. Currently, she is examining the differences between Stx1 and Stx2 and the relationship to host toxicity.

Collaborations:

Dr. Weiss and her graduate student meet with Dr. Cohen regularly to discuss research experiments regarding the *E. coli* O157:H7 project and are planning a clinical trial of a probiotic isolated by Dr. Weiss.

Representative Figure:



Effect of ciprofloxacin treatment on fecal toxin recovery from mice infected with *E. coli* O157:H7 in the presence or absence of commensal *E. coli*. Mice were inoculated with nonpathogenic *E. coli* and/or *E. coli* O157:H7, and on day 2, each mouse received 10 µg ciprofloxacin by IP injection. Data represent fecal toxin recovery. The geometric mean is indicated by the bar. Limit of detection = LOD (dotted line). * ($P = 0.05$) *** ($P < 0.05$) Fig. 4 from Infect Immun, 2006; 74:1977-1983.