1077-92-1848 **Courtney L Davis*** (cdavis@cscamm.umd.edu). *Toward a Vaccine: Modeling the Immune Response Against Shigella.*

The bacteria Shigella causes roughly 120 million dysentery infections and kills 1.1 million people per year worldwide, with the majority of deaths occurring in children under five in developing countries. Treatment of shigellosis is difficult due to growing antibiotic resistance, and no vaccine exists despite decades of clinical work. A major hurdle in vaccine development is identifying immune mechanisms that are necessary and/or sufficient for protecting against Shigella infections.

We have developed the first mathematical models of the immune response against Shigella. With these models, we are working to identify key immune interactions responsible for conferring immunity against Shigella. Our work focuses primarily on humoral (antibody and B-cell mediated) immune responses, as these can be most readily elicited with vaccines, and we examine the efficacy of antibodies targeting individual antigens as well as multifaceted responses against a variety of bacterial components. The mathematical models consist of systems of delay differential equations that capture the multiple time scales involved in immune activation and activity. Parameterization and validation of the model is being completed in close collaboration with experimentalists and vaccinologists. (Received September 21, 2011)