

Biomathematics seminar
Tuesday 9/25/07
Speaker: Althea Smith

Title: Comparison of Models of Bacterial Infection in the Intestinal Tract

Abstract:

The small intestine is prone to infections by bacteria that can adhere to the surface wall. We wish to better understand an infection of the small intestine caused by enteropathogenic *Escherichia coli* (EPEC) and to achieve this objective we present three models: a chemostat and two mechanistic spatial models in 1-D and 2-D. The chemostat model is a dynamic model where four biologically significant steady states of the infection were observed: washout, persistence, threshold, and blowup. These results concur with previous work done in this field; however in this instance our model is far less complex. The 2-D mechanistic spatial model suggests that bacteria that adhere to the intestinal wall cause the infection to persist. The 2-D model also suggests that the radial gradients of EPEC are less important than the longitudinal gradients, allowing us to proceed with a 1-D analysis. The 1-D model permits an in-depth realization of the infection process, including bacterial growth and microvilli growth kinetics. This talk will discuss how our 3 models merge EPEC pathogenesis mechanisms with current-day CSTR and PFR colonization models.