

***Vibrio cholerae* Colonization in a Human Host: A Preliminary Study**

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Abstract

Diarrheal disease is a leading cause of morbidity and mortality in the world today. *Vibrio cholerae*, the causative agent of the disease cholera, induces a severe watery diarrhea that persists for days to weeks, leading to dehydration and death if not treated. While animal models and bacterial genetics have begun to unravel the natural history and pathogenesis for this centuries old pathogen, many aspects of the interaction between *V. cholerae* and its human host remain unknown. For example, while the primary determinants of *V. cholerae* colonization include adhesion, mobility, and toxin production, less is known about the dynamics of the interactions of these processes within the human host. We develop a virtual human model for the infection in the gut. Our overall objective is to gain an understanding of the mechanisms that control the interaction between *V. cholerae* and the human host. Elaboration of the processes that allow the microbe to sense and respond to its host environment will allow application of the model to explore antimicrobial therapies aimed at blocking these mechanisms as well as the physical forces acting on the microbe as it establishes itself in the host.