TITLE: Determining whether malnourished hosts act as norovirus reservoirs

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RESEARCH PROJECT DESCRIPTION

While healthy adults infected with a human norovirus develop acute self-limited gastroenteritis, several risk groups are susceptible to severe, prolonged, and even life-threatening infections. These groups include infants, young children, the elderly, immunocompromised patients, and the malnourished. In particular, human norovirus infections have been estimated to cause over a million hospitalizations and 200,000 fatalities of malnourished children in developing countries each year. The increased disease severity in the immunocompromised host correlates with much greater diversity in the intra-host viral quasispecies, leading many to speculate that chronically infected immunocompromised patients represent reservoirs of emergent human norovirus strains. Based on the underlying principles of viral phylodynamics, viruses should adapt within a host most readily under conditions of intermediate levels of immunity. A logical postulate based on this principle is that highly diverse viral swarms are generated in malnourished hosts who have a reduced but not ablated ability to mount an antiviral immune response. Thus, we hypothesize that malnourished hosts represent an important reservoir of phenotypically distinct emergent human norovirus strains. Projects suitable for a medical student summer project include: (1) extracting RNA from samples of healthy and malnourished mice infected with a murine norovirus, performing RT-PCR to amplify a portion of the viral genome, and sequencing the PCR products to determine the amount of viral evolution that has occurred in the different host environments; and (2) performing the same set of experiments using fecal samples from a cohort of children in Haiti. This latter project would entail travel to a UF field site in the Gressier region of Haiti where we have a microbiology and molecular biology laboratory suitable for carrying out these studies. These projects are currently funded through internal sources at UF. This is a new project in the Karst laboratory that is in its early development, thus we have not yet published on it.