HARVARD
FAS Center for Systems Biology

Department of
Systems Biology

Undergraduate Summer Internship in Systems Biology

Internship Project Description: Summer 2018

Project Title: Characterization of Host RNA Editing Enzymes Acting on Ebola Virus RNA
Supervisor Name: Pardis Sabeti
Lab PI Name: Pardis Sabeti

Project Description:
Several hundreds of Ebola virus (EBOV) genomes were sequenced from human clinical samples during the West African epidemic. A fraction of these genomes exhibit a striking pattern of A>G / T>C hypermutation, a signature of cellular adenosine deaminases acting on double-stranded RNA (ADARs). This pattern has even been observed in non-human primates treated with antibody cocktails, suggesting that host RNA editing may constitute one route of Ebola virus escape from selective pressure. While the interferon-inducible ADAR1 has been repeatedly implicated, no molecular work has definitely identified the specific enzyme responsible for this hypermutation; moreover, it remains unclear whether this factor is pro- or anti-viral (or both!). Our aim is to determine whether ADAR1 is the key enzyme responsible for A>G / T>C hypermutation, to identify potential hypermutation hotspots on the viral genome, and to further show that hypermutation can provide virus with increased mutation rate and therefore faster evolution.