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Cameron Browne* (cambrowne@louisiana.edu). *Predator-prey dynamics of evolving HIV/SIV and immune response within a host.*

The dynamics of virus and immune response within a host can be viewed as a complex and evolving ecological system. For example, during HIV infection, an array of CD8+ T-cell immune response populations effectively target different HIV epitopes (viral proteins), however the virus can rapidly evolve resistance at distinct epitopes. In recent work, we analyzed stability and equilibria in a general model for the prey-predator network of multiple virus and immune response populations in HIV. In a parallel interdisciplinary study, we found significant cross-correlation between several immune cell populations and viral effective population sizes (N_e) sampled from experiments of the simian immunodeficiency virus (SIV)-infected macaque model of HIV infection. Connecting the theoretical modeling with this data, we observe that simulations of extended versions of the virus-immune network model mimic the observed large-scale oscillations in N_e . The results suggest that HIV diversity within the host is governed by a dynamic and complex predator-prey relationship, wherein the virus sequentially adapts to a series of weakening immune responses with accumulating viral diversity. (Received January 21, 2020)