MAR17-2016-020484

Abstract for an Invited Paper
for the MAR17 Meeting of
the American Physical Society

Delbruck Prize Award: Insights into HIV Dynamics and Cure

ALAN S. PERELSON, Theoretical Biology Biophysics Group, Los Alamos National Laboratory

A large effort is being made to find a means to cure HIV infection. I will present a dynamical model of a phenomenon called post-treatment control (PTC) or functional cure of HIV-infection in which some patients treated with suppressive antiviral therapy have been taken off of therapy and then spontaneously control HIV infection. The model relies on an immune response and bistability to explain PTC. I will then generalize the model to explicitly include immunotherapy with monoclonal antibodies approved for use in cancer to show that one can induce PTC with a limited number of antibody infusions and compare model predictions with experiments in SIV infected macaques given immunotherapy. Lastly, I will argue that quantitative insights derived from models of HIV infection have and will continue to play an important role in medicine.