New treatment model for HIV

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Treatment of HIV patients must balance the need to suppress viral replication against the harmful side effects and significant cost to the patient of antiretroviral therapy.

This tradeoff has led to the development of various drug-sparing HIV-1 treatment strategies, which often results in the emergence of resistant viruses and overall treatment failure. This has prompted an interest in induction–maintenance (IM) treatment strategies, in which brief intensive therapy is used to reduce host viral levels, which is then followed by a simplified and more easily tolerated maintenance regimen.

IM approaches remain an unproven concept in HIV therapy. In a study publishing July 13, 2007 in PLoS *Computational Biology*, clinical responses to antiretroviral drug therapy are simulated for the first time, and the model is then applied to IM therapy. Marcel Curlin, Shyamala Iyer, and John Mittler, from the University of Washington, find that IM is expected to be successful beyond three years and that six to ten months of induction therapy should achieve durable suppression of HIV and maximize the possibility of eradicating viruses resistant to the maintenance regime. They also find the counter-intuitive result that for induction regimens of limited duration the optimal time to initiate induction therapy may be several days or weeks after the start of regular (maintenance) therapy.

These results are important not simply because they show how this particular, albeit important, therapy strategy may be optimized, but because they illustrate the more general potential for mathematical

models to influence therapy decisions. “Our experience has been that clinicians and policy makers are often hesitant to consider, sometimes even hostile towards, mathematical modeling approaches. Instead, they rely on intuition or await the results of expensive, long-term clinical trials”, says Mittler. By presenting a detailed model that makes concrete quantitative predictions and gives some interesting, counter-intuitive qualitative results, this paper may help to change attitudes concerning the value of dynamical modeling approaches.

Source: Public Library of Science