



# Understanding a viral explosion

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## Understanding the viral replication and dramatic growth that sometimes appears subsequent to ART treatment is the subject of a new study by scientists

One of the dreaded features of an HIV infection can be the possible rebound of the virus after undergoing an otherwise successful antiretroviral (ART) regimen. Understanding the viral replication and dramatic growth that sometimes appears subsequent to ART treatment is the subject of a new study by scientists from Los Alamos National Laboratory and the National Institutes of Health's [National Institute of Allergy and Infectious Diseases](#).

The formerly suppressed cells are rare, said study coauthor Alan Perelson of LANL's Theoretical Division, but occasionally rebound with exponential growth, in situations where the virus manages to exceed a particular, critical population size, he said.

If a single infected cell produces virus, the paper notes, this virus just might infect a nearby cell, which might eventually result in a sustained chain reaction of infection spread. Alternatively, viral extinction may occur at any early step. The process is highly random (stochastic), posing challenges for experimental capture and analysis.

The mathematics behind the new analysis were done at Los Alamos, in the Theoretical Biology and Biophysics group, seeking to define the crucial transition from latency to exponential spread and to document the probability of establishing exponential viral growth.

**Publication:** Principles Governing Establishment versus Collapse of HIV-1 Cellular Spread.

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