

**Tan, Wai-Yuan; Wu, Hulin**

**Stochastic modeling of the dynamics of  $CD4^+$  T-cell infection by HIV and some Monte Carlo studies.** (English) [Zbl 0887.92021](#)

*Math. Biosci.* 147, No. 2, 173-205 (1998).

Summary: We develop a stochastic model for the interaction between  $CD4^+$ T cells and the human immunodeficiency virus (HIV) by taking into account the basic biological mechanism as described, e.g., by A. S. Perelson et al. [*Math. Biosci.* 114, No. 1, 81-125 (1993; [Zbl 0796.92016](#))], D. Schenzle [*Stat. Med.* 13, 2067-2079 (1994)]. We studied this stochastic model through extensive Monte Carlo simulations. Our results show that, in some cases, there is a positive probability that the virus will be eliminated by the process. We have also shown that, at the earlier stage of the infection, the probability distributions of the  $CD4^+$ T cells and free HIV are skewed; however, these distributions will eventually converge to the Gaussian distributions after several years. A real-data example is given to illustrate the application of our model.

**MSC:**

[92C50](#) Medical applications (general)  
[92C60](#) Medical epidemiology  
[65C05](#) Monte Carlo methods

Cited in **3** Reviews  
Cited in **23** Documents

**Keywords:**

human immunodeficiency virus; HIV

**Full Text:** [DOI](#)

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