Analysis of stochastic viral infection models with budding and bursting strategies

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Stochastic viral infection models with two modes of infection transmission (virus-to-cell and cell-to-cell) as well as antibody response, are presented. The budding and bursting strategies for the release of virions are taken into consideration in the formulation of the stochastic differential equation models. The stochastic means and standard deviations of the uninfected and infected cells, viruses, and antibodies are numerically computed and graphically compared with the results obtained from the deterministic models. The results demonstrate that the likelihood of viruses going extinct is dependent not only on whether the basic reproduction number is greater than unity but also on the initial viral load. The numerical findings also imply that, in the case of budding as compared to bursting strategy, the probability of virus extinction is relatively higher.

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