Summary: In this paper, an HIV infection model with latent infection, Beddington-DeAngelis infection function, B-cell immune response and four time delays is formulated. The well-posedness of the model solution is rigorously derived, and the basic reproduction number $R_0$ and the B-cell immune response reproduction number $R_1$ are also obtained. By analyzing the modulus of the characteristic equation and constructing suitable Lyapunov functions, we establish the global asymptotic stability of the uninfected and the B-cell-inactivated equilibria for the four time delays, respectively. Hopf bifurcation occurs at the B-cell-activated equilibrium when the model includes the immune delay, and the B-cell-activated equilibrium is globally asymptotically stable if the model does not include it. Numerical simulations indicate that the increase of the latency delay, the cell infection delay and the virus maturation delay can cause the B-cell-activated equilibrium stabilize, while the increase of the immune delay can cause it destabilize.

MSC:

92C32 Pathology, pathophysiology
34D23 Global stability of solutions to ordinary differential equations

Keywords:
latent infection; B-cell immune response; delay; Beddington-DeAngelis function; stability; Hopf bifurcation

Full Text: DOI

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