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Modeling within-host dynamics of influenza virus infection including kinetics of innate and adaptive immune responses

Despite vaccines and antiviral agents, influenza infection remains a major public health problem worldwide. It is of great importance to study the biological events underlying virus replication and host immune response in order to develop more effective vaccines, treatments, and other prevention strategies. Here, we develop a new mathematical model to study the within-host dynamics of influenza infection. By comparing modeling predictions with both interferon and virus kinetic data, we examine the relative roles of target cell availability, innate and adaptive immune response in controlling the virus. This work provides a detailed and quantitative understanding of the biological factors that can explain the virus kinetics during a typical influenza infection.