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A model for a parameter related to free virus production from infected target cells

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A model for a parameter related to free virus production from infected target cells

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Abstract

In practice it is often necessary to determine unknown parameters in a mathematical model from observed experimental data. The basic viral replication model is commonly used in quantifying viral infection kinetics. It is commonplace when fitting parameters to this model to either fix the initial number of uninfected target cells or the parameter representing the production rate of free virus from infected target cells. However each of these quantities is sensitive to the choice of the other value. In this talk we develop a model of the parameter representing production of free virus from infected target cells. This model relates the value of this parameter to other parameters of the basic viral replication model and the initial number of uninfected target cells. This relationship is made by an estimate of the intrinsic growth rate of the viral load from a phenomenological model of viral load. We discuss the fitting of the basic viral replication model using this model for the production rate of free virus from infected target cells to an experimental data set for influenza A virus.