ReadME

- Viral Invasion Threshold R_i vs Morphine Effects and Pharmacodynamic parameters
  - If $R_i < 1$, the infection dies out or is controlled.
  - If $R_i > 1$, the infection will persist.
- The blue curve is the solution curve.
- The red-dashed line is when $R_i = 1$.

Parameters:

Morphine Effect

morphine influences affects the Target T cells susceptiblity by changing the expression of the coreptors

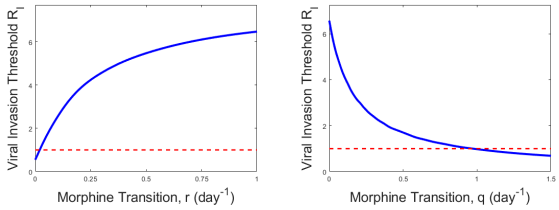
- r $\equiv$ morphine transition rate of $T_L \to T_H$
- q $\equiv$ morphine transition rate of $T_H \to T_L$

Note: T_L T cells with low susceptibility to infections; T_H T cells with high susceptiblity to infections.

Pharmacodynamics of ART

- $m_i \equiv$ drug slope inhibition (of infectivity)
- $n = \frac{D^i_{max}}{ED50} \equiv$ Drug maximum concentration ratio of inhibitory to reach 50% effect
- $t_{\frac{1}{2}} \equiv$ drug half-life
- $\tau \equiv$ drug intake interval

Viral Invasion Threshold R_i vs. Morphine Effect

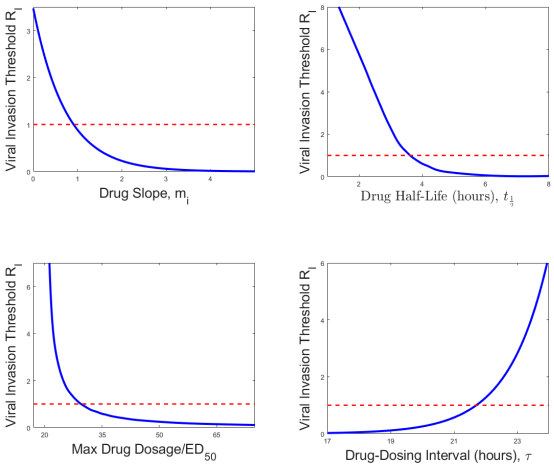


- As r is varied, the higher the morphine level, the solution curve of R_i is above the red-dashed line. This implies the quantity of the second generation of the infection increses

and leads to persistence in the infection.

- As q is varied, the infection of the R_i will eventually be controlled as the solution curve will be $R_i < 1$.

Viral Invasion Threshold R_i vs. Pharmacodynamic parameters



- As $m_i, t_{\frac{1}{2}}$, and n are varied, the infection will eventually die out where $R_i < 1$.
- Since τ is dosing interval, increasing means skipping or missing dosage intervals, thus the infection will persist. Frequent intakes will control the infection.