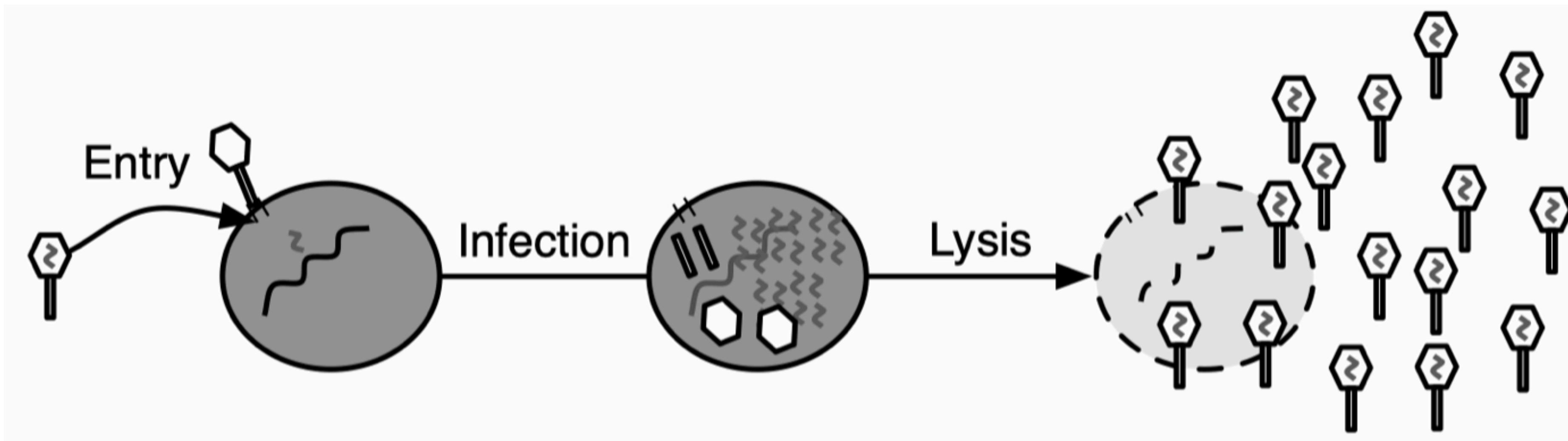


# **Eco-Evo dynamics**

**Evolution & Ecology**

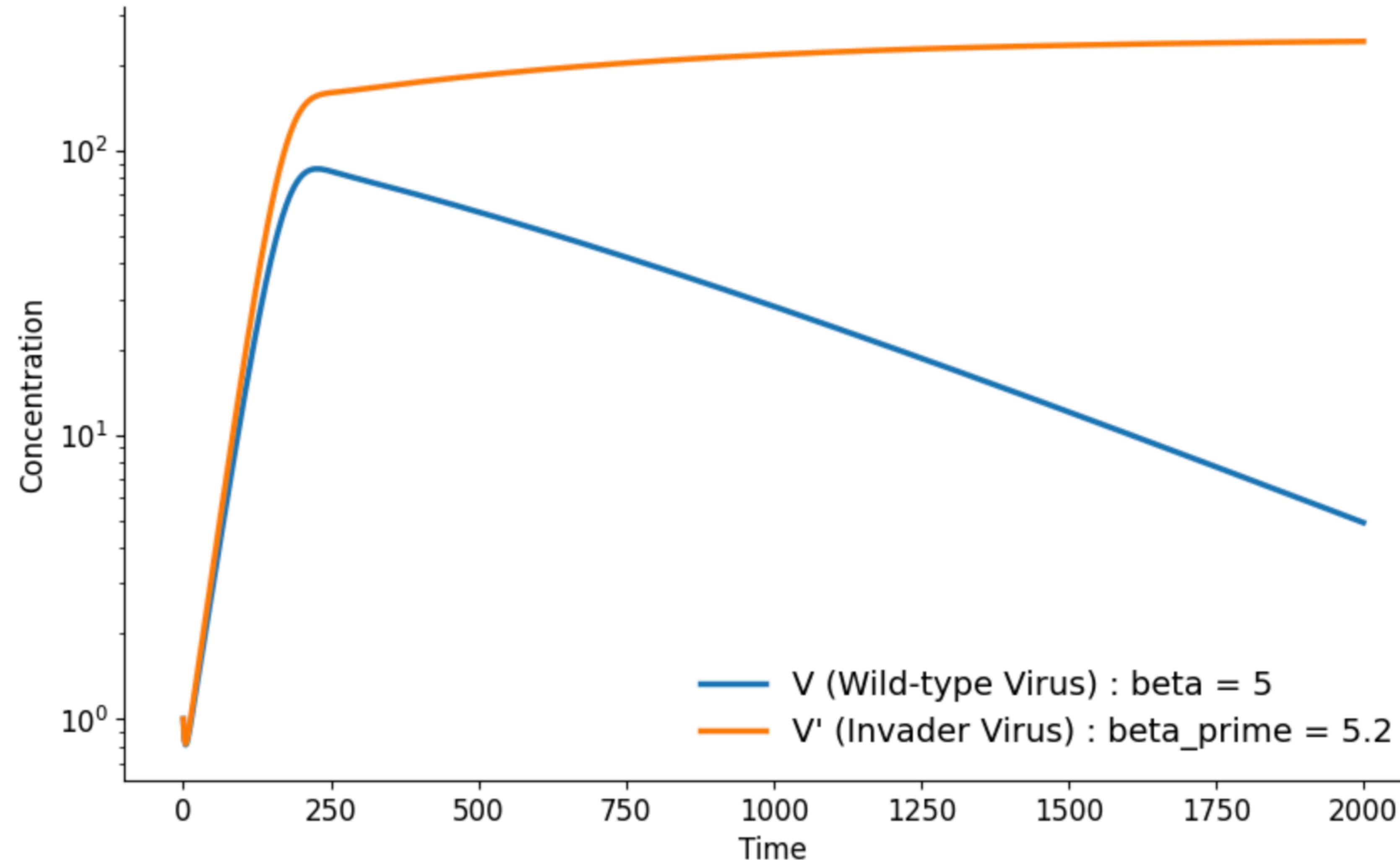
**Jacopo Grilli, Ciudad de Guatemala, 1/12/2025**

# What is optimal?



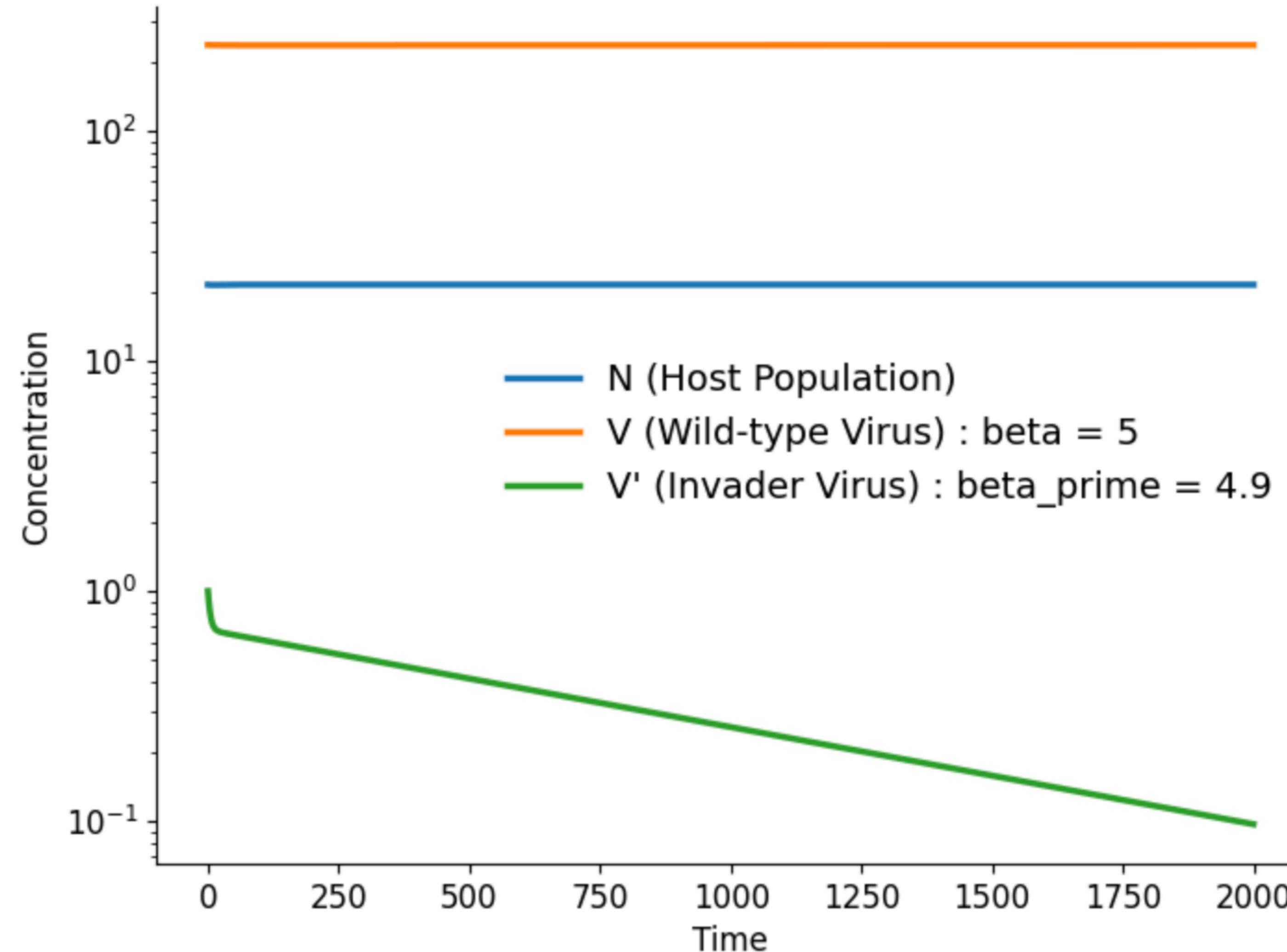
# Multiple phages

# Competition between phages

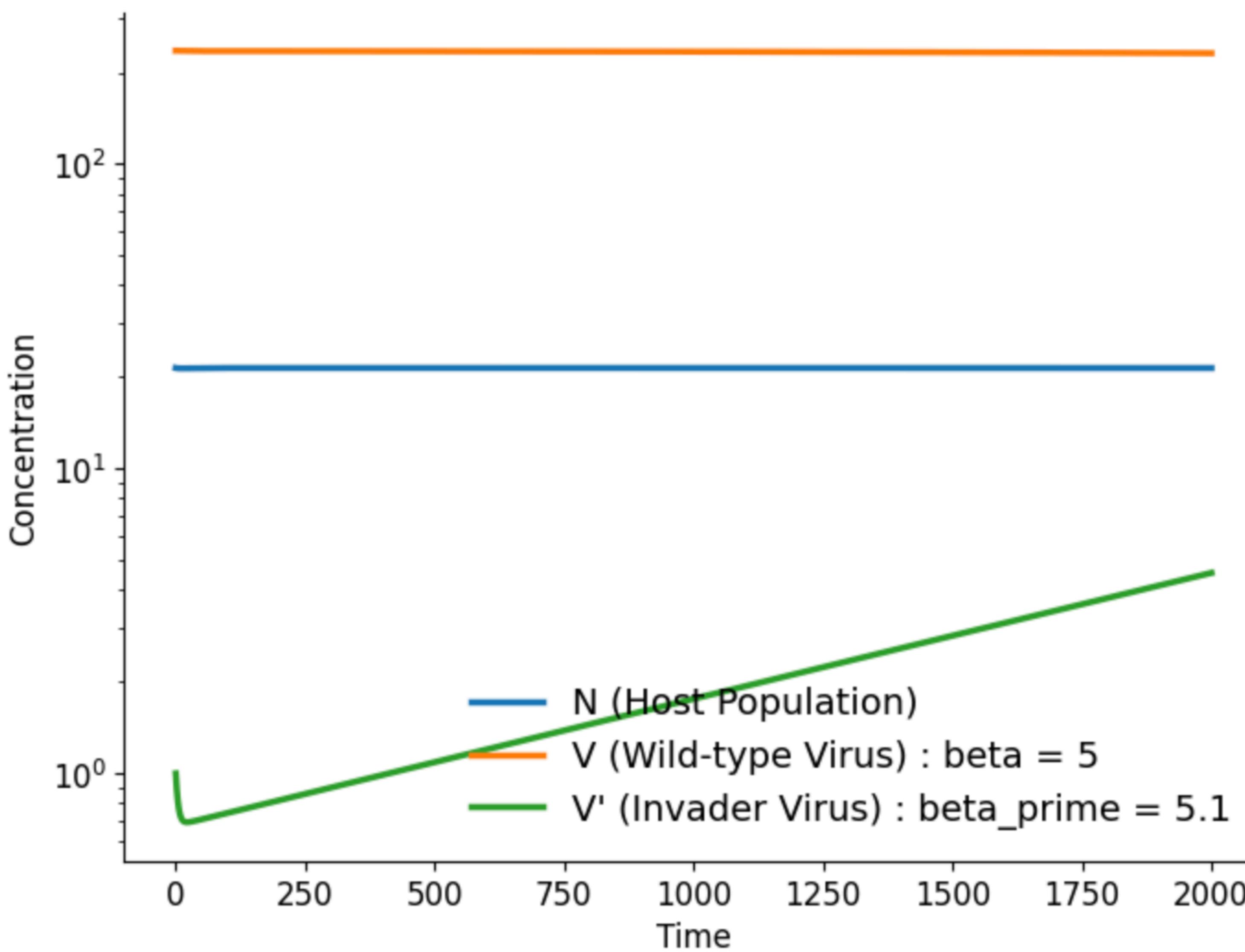


# Invasion

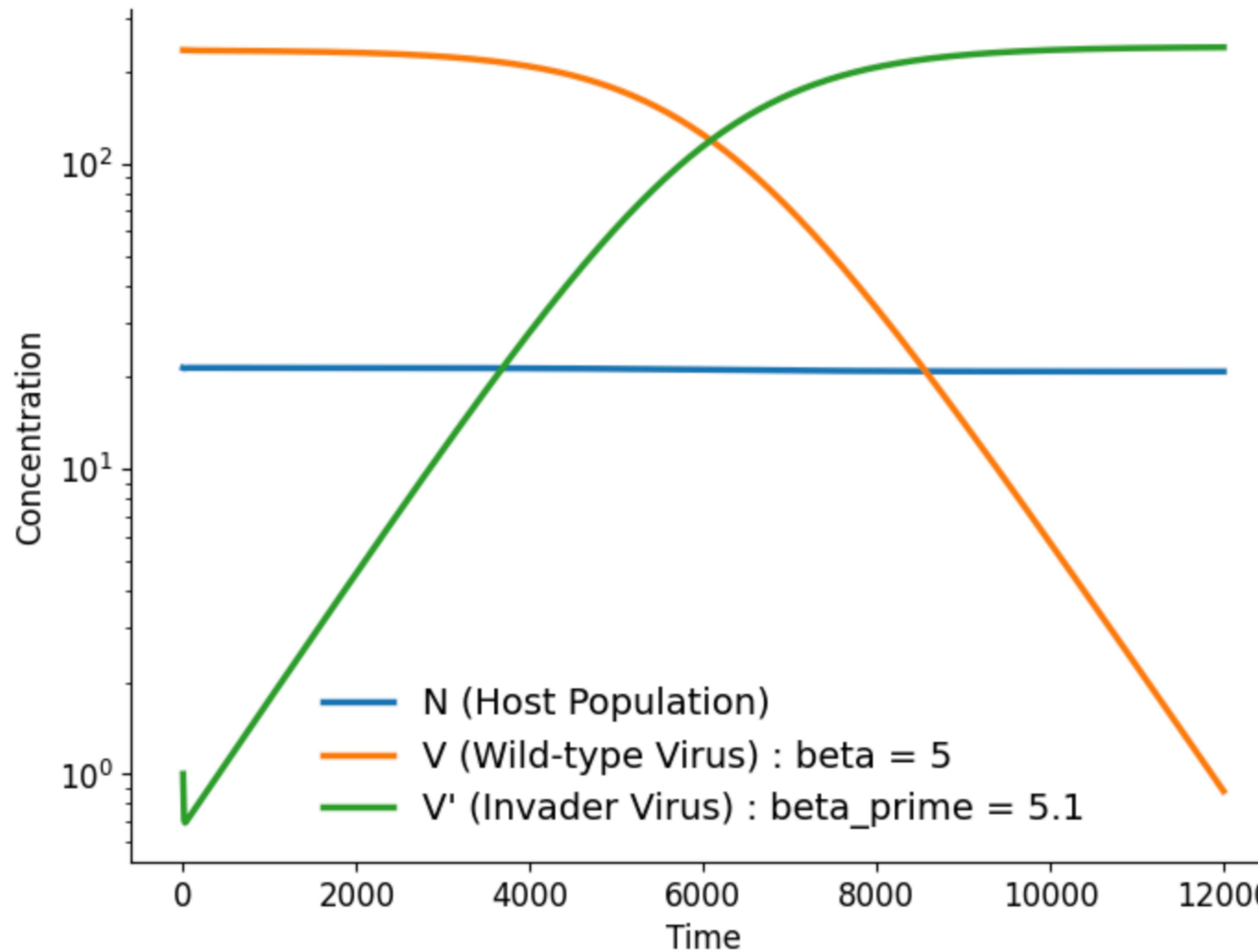
# Failed invasion



# Successful invasion

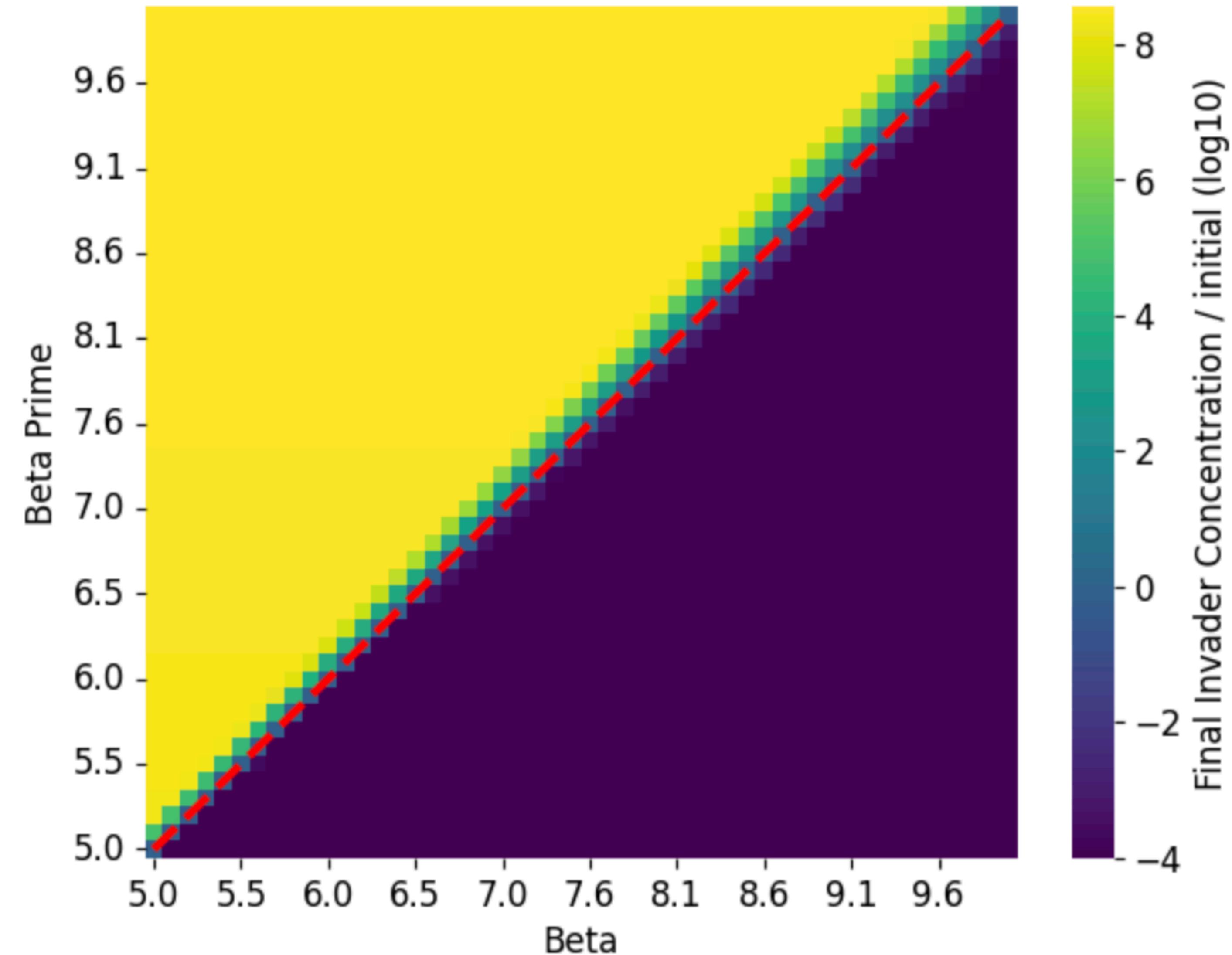


# Successful invasion (longer time)

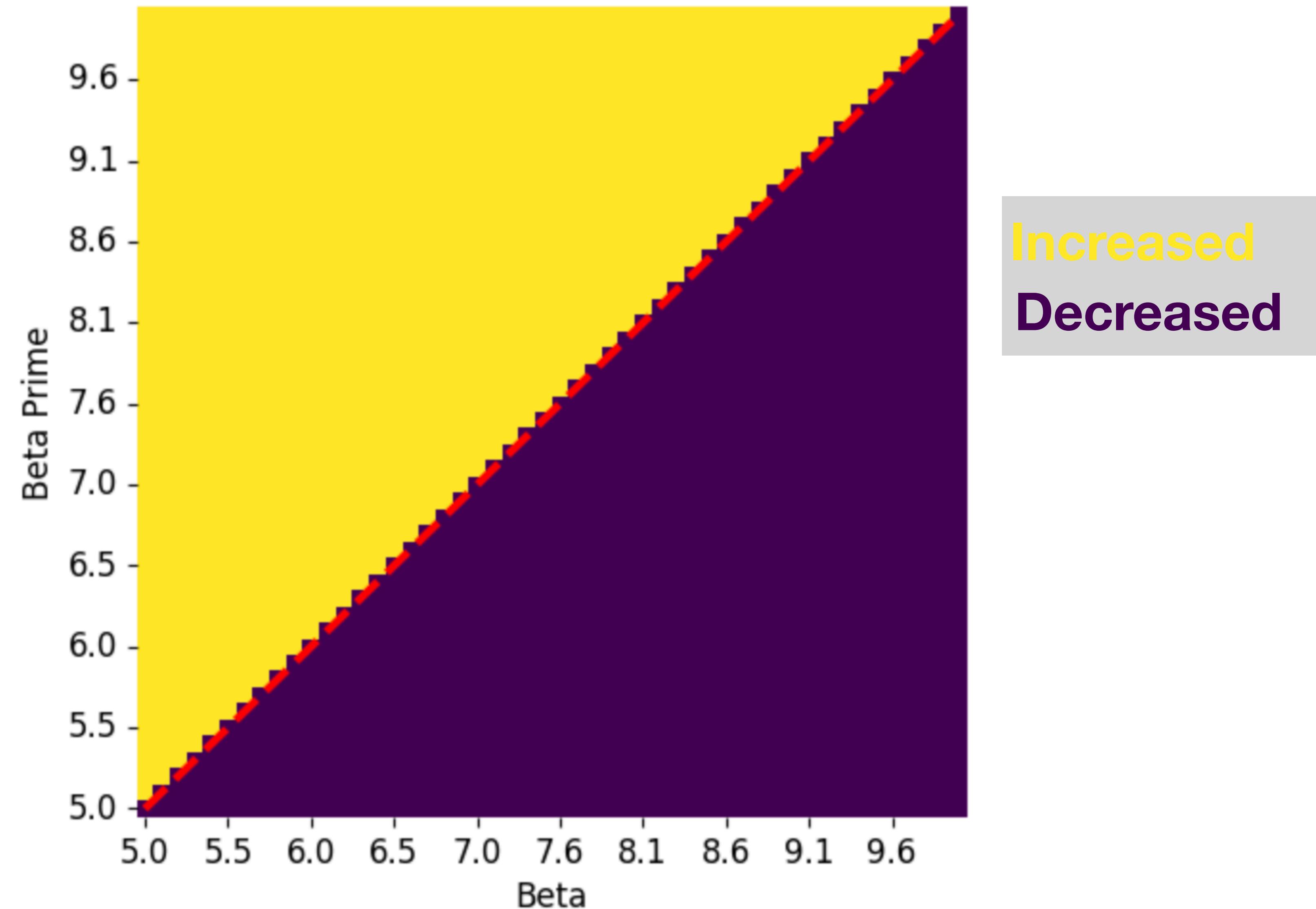


# Invasions, systematically

# Final invader concentration

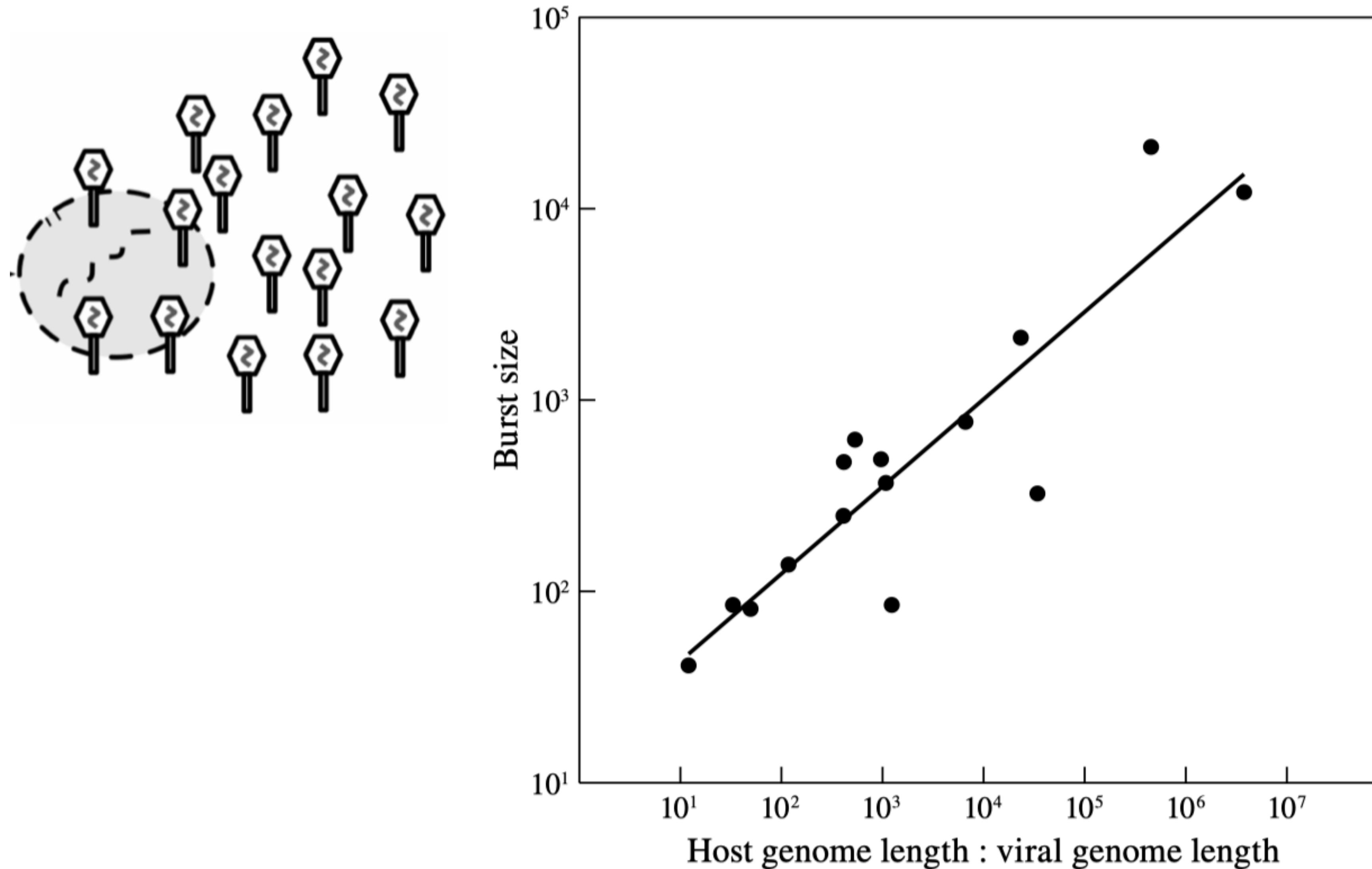


# Final invader concentration. Did it grow?



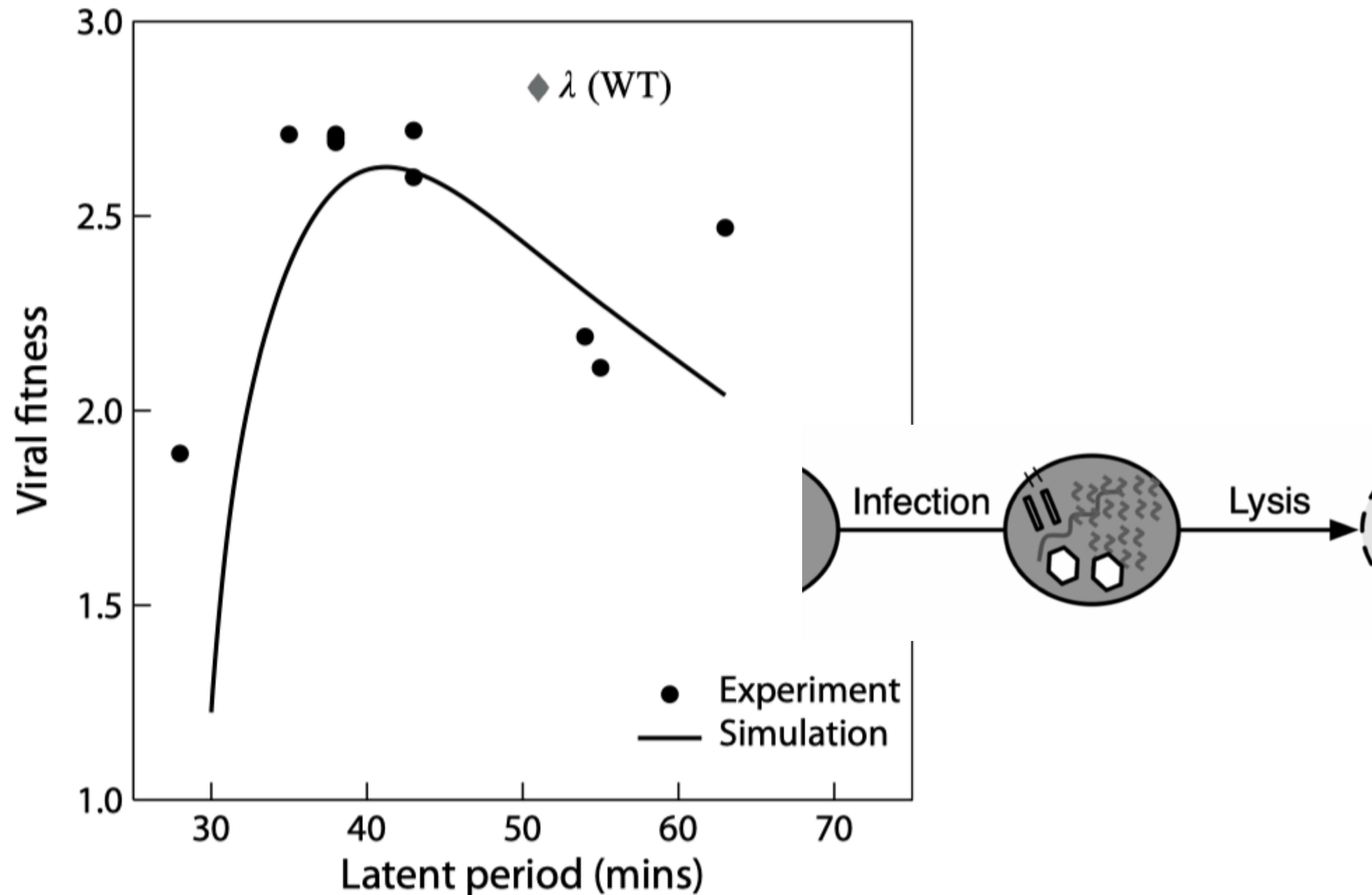
**Optimal: maximize burst size  
Is this the whole story?**

# Variation of the burst size



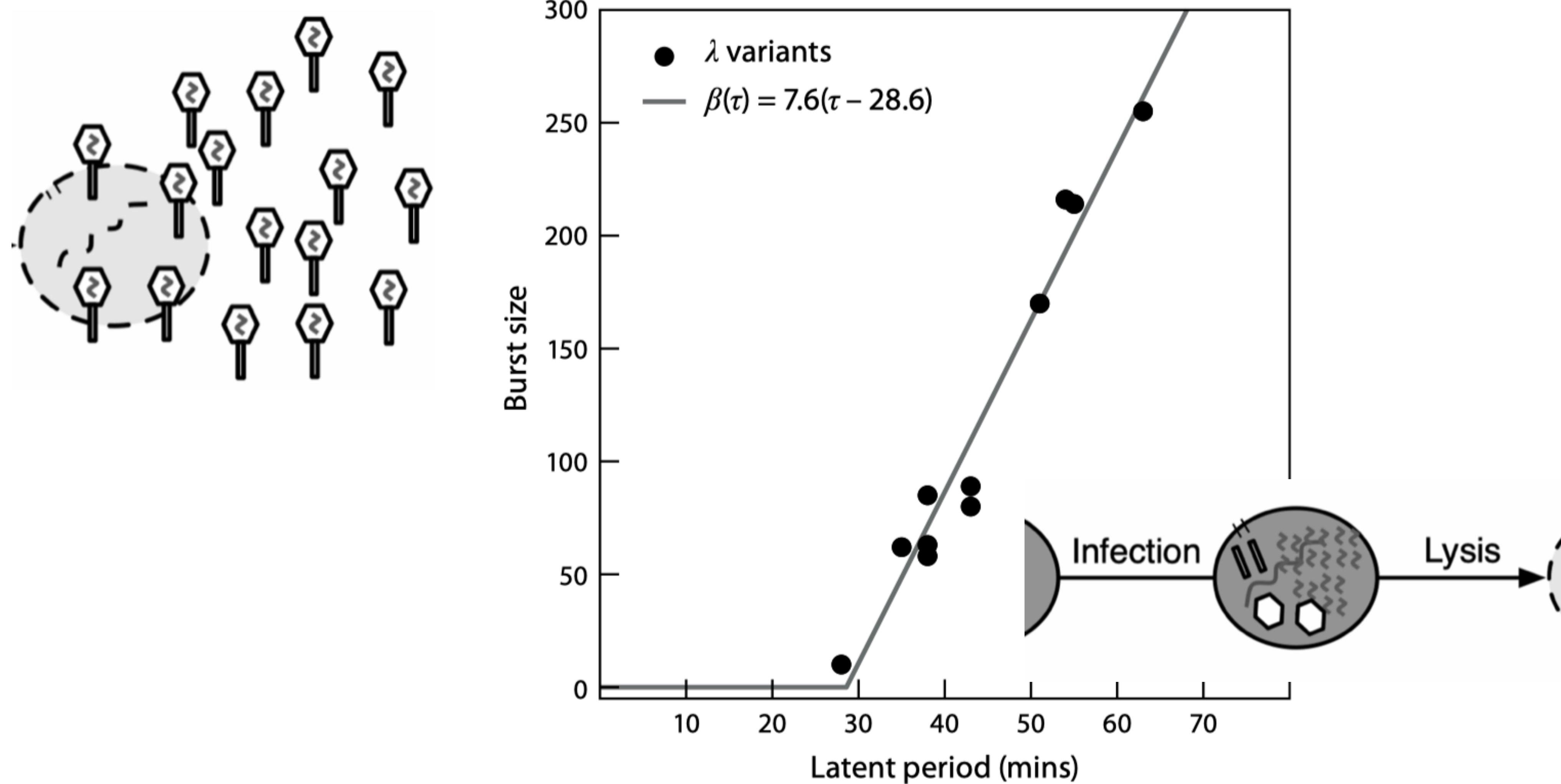
Brown et al., 2006

# Intermediate optimal latency time



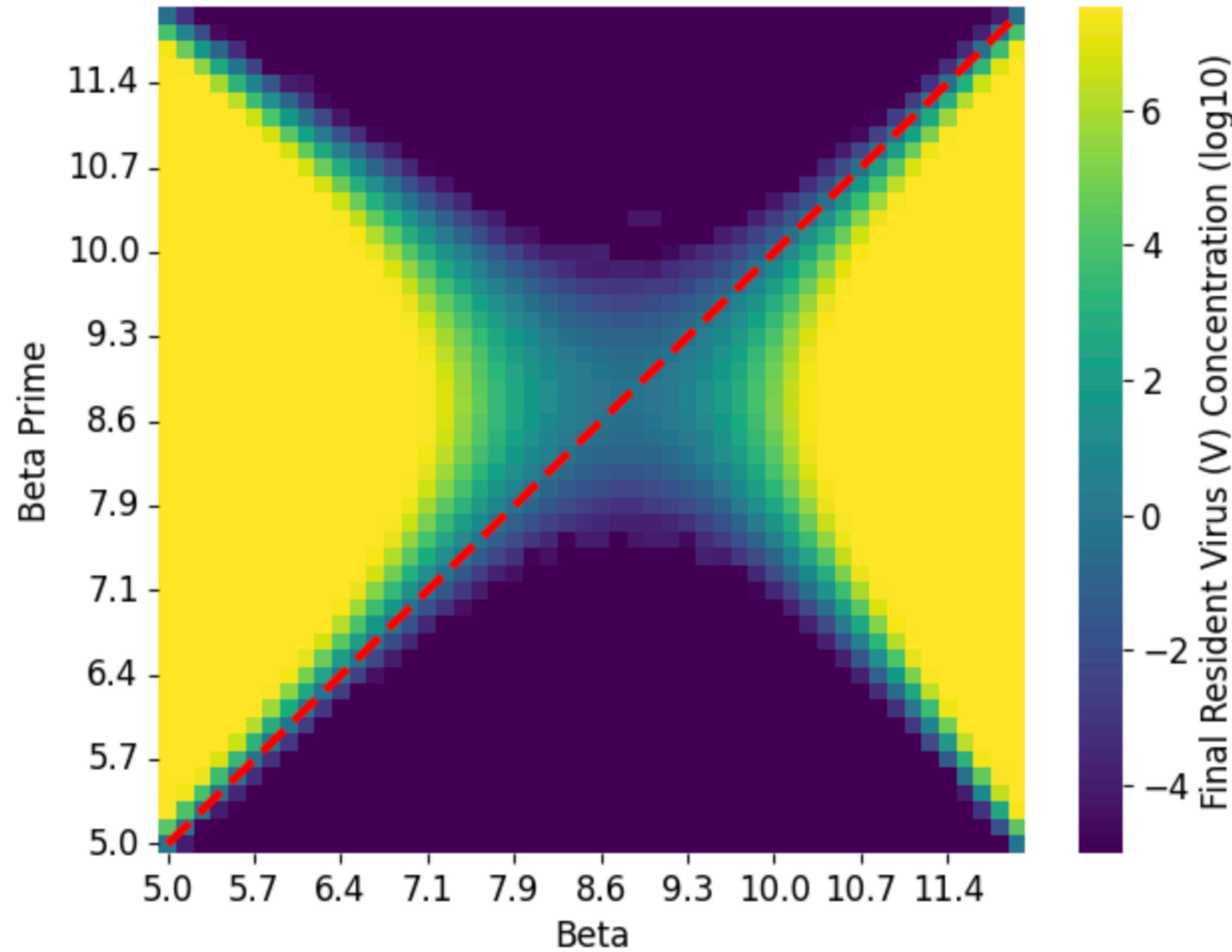
Wang et al., 2006

# Latency time and burst are not independent

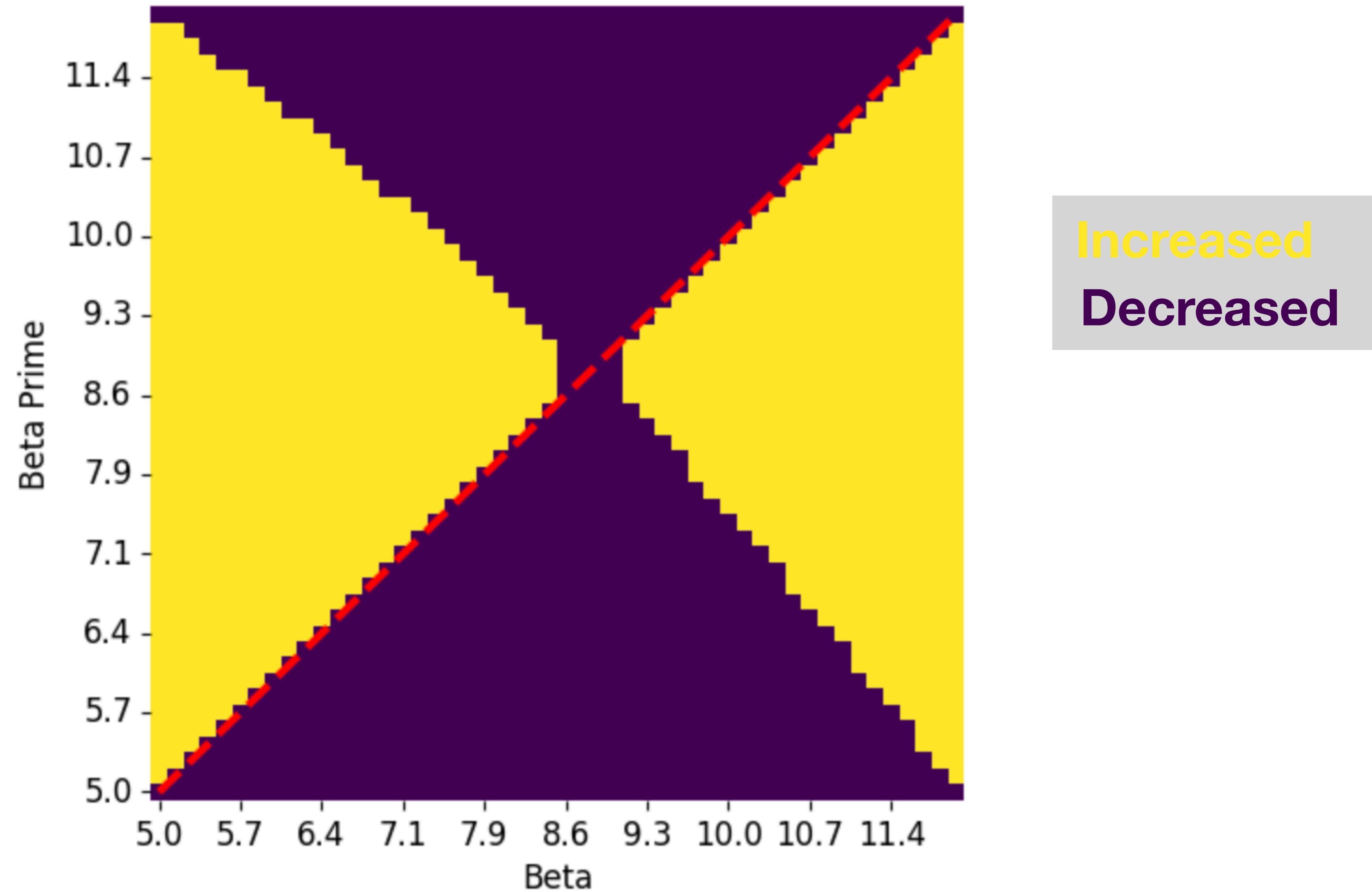


# Tradeoff

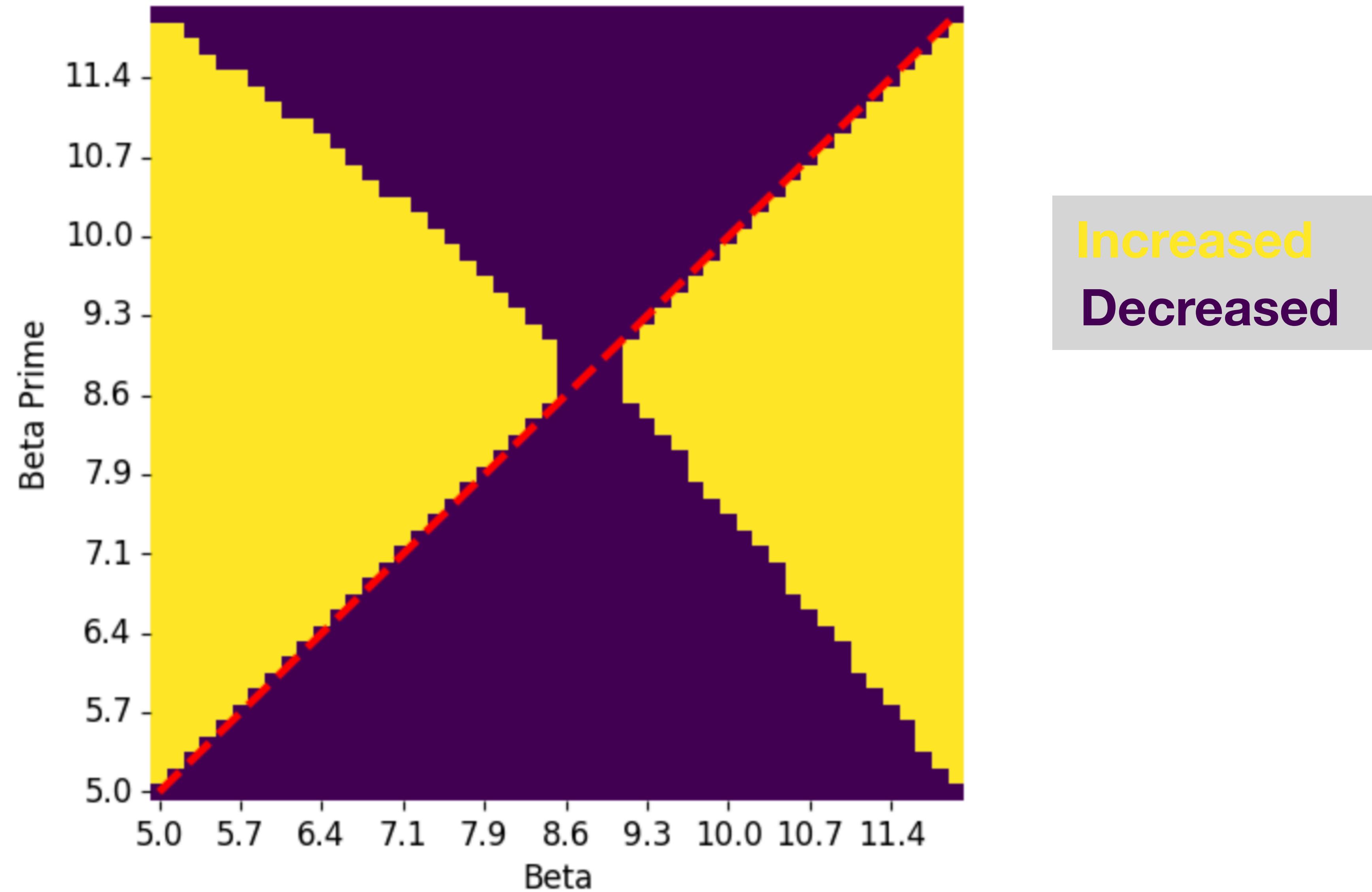
# Final invader concentration



# Final invader concentration. Did it grow?

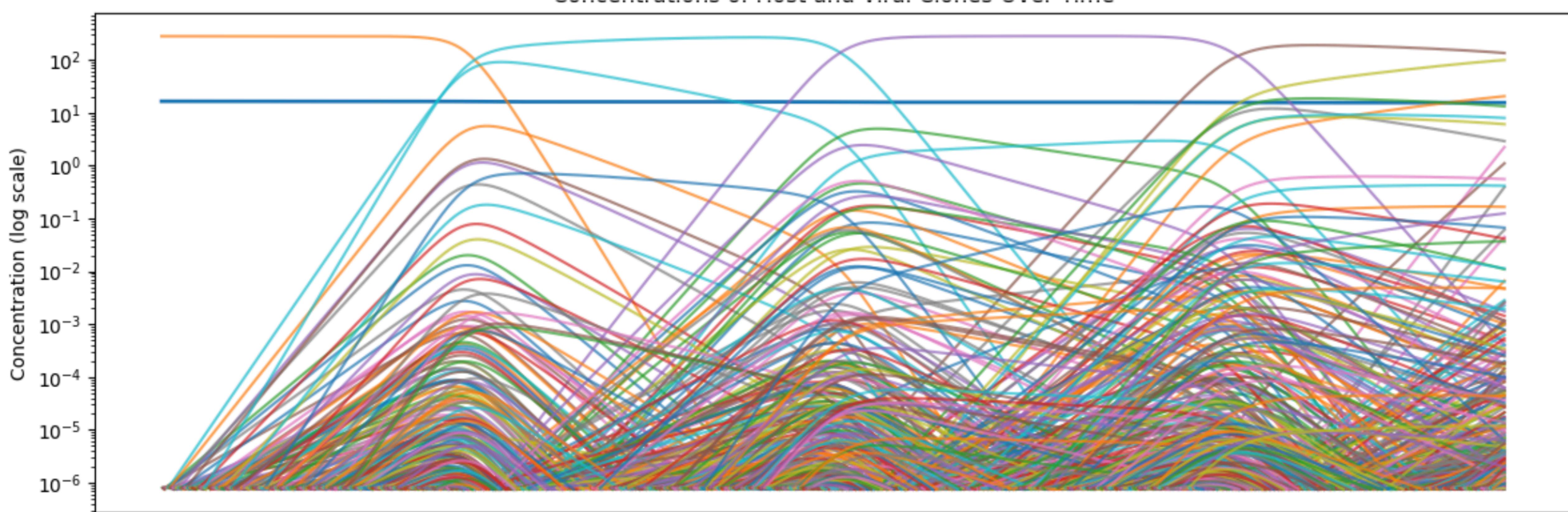


# What do you expect over long time?

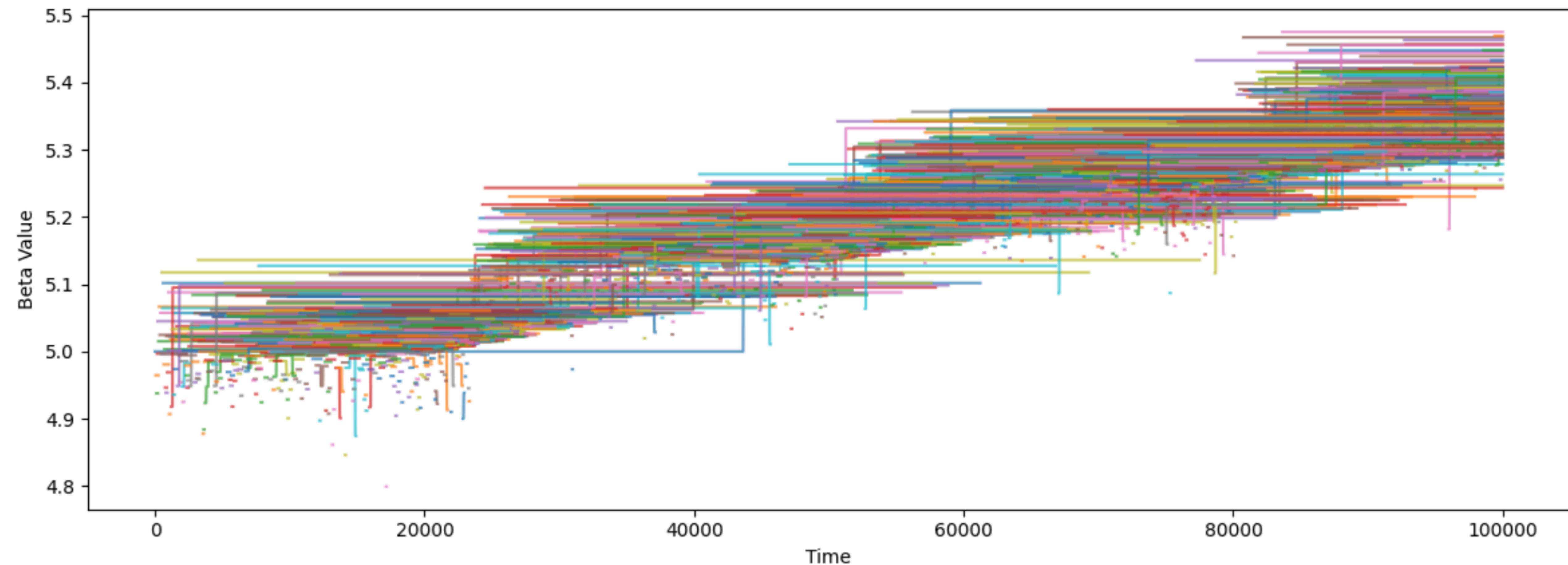


# Invasions, systematically

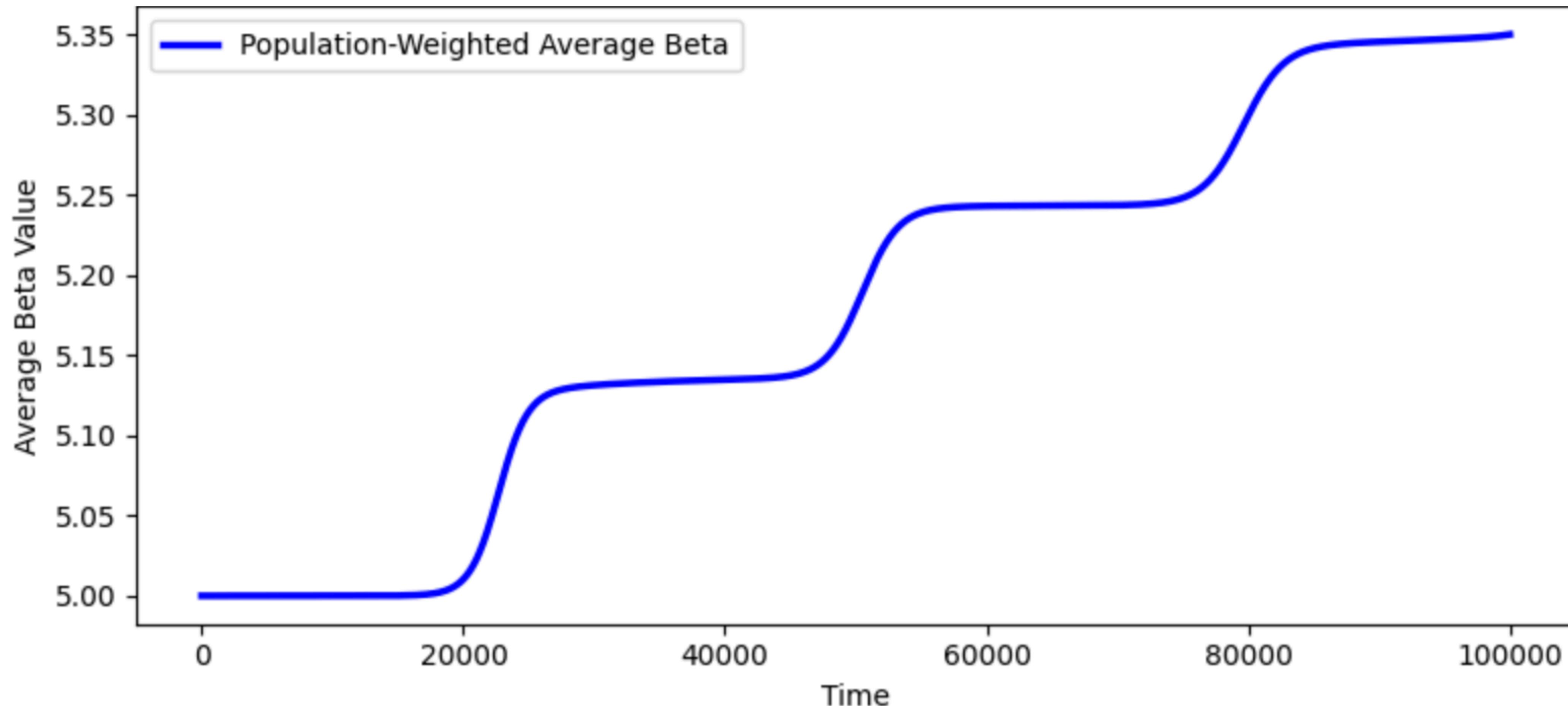
# Evolutionary trajectories



# Evolutionary trajectories



# Evolutionary trajectories



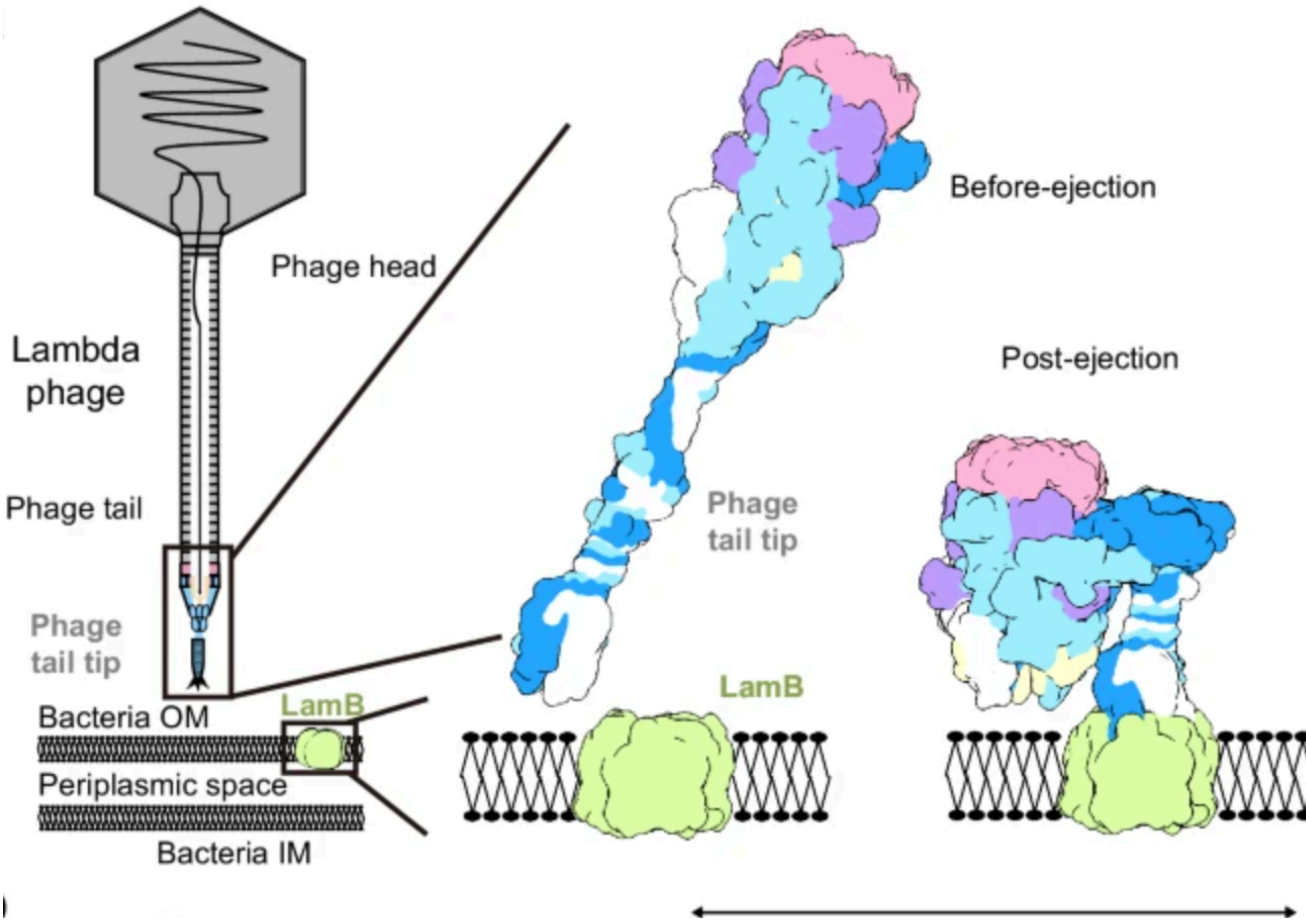
# Adaptive dynamics

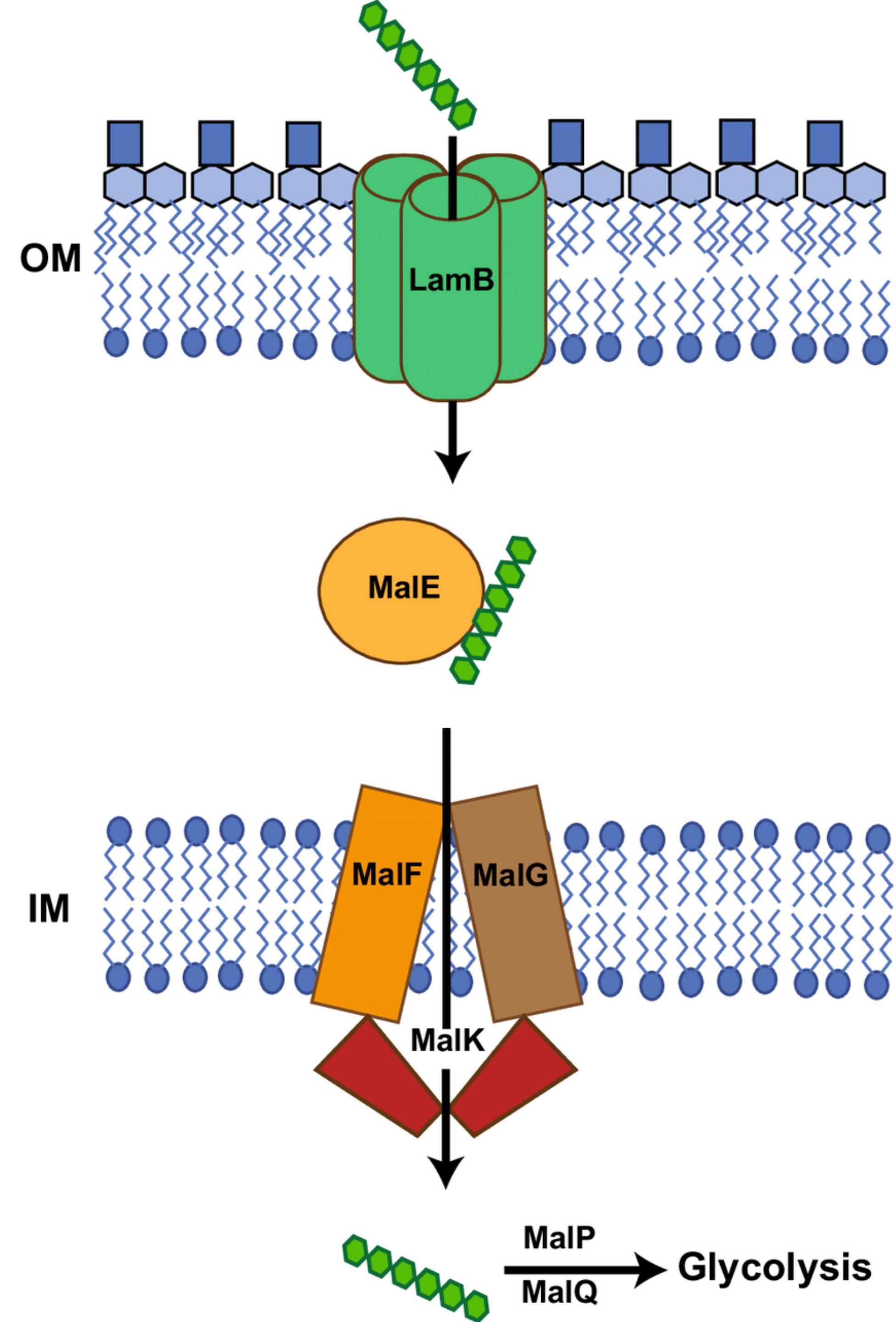
# An optimal compromise

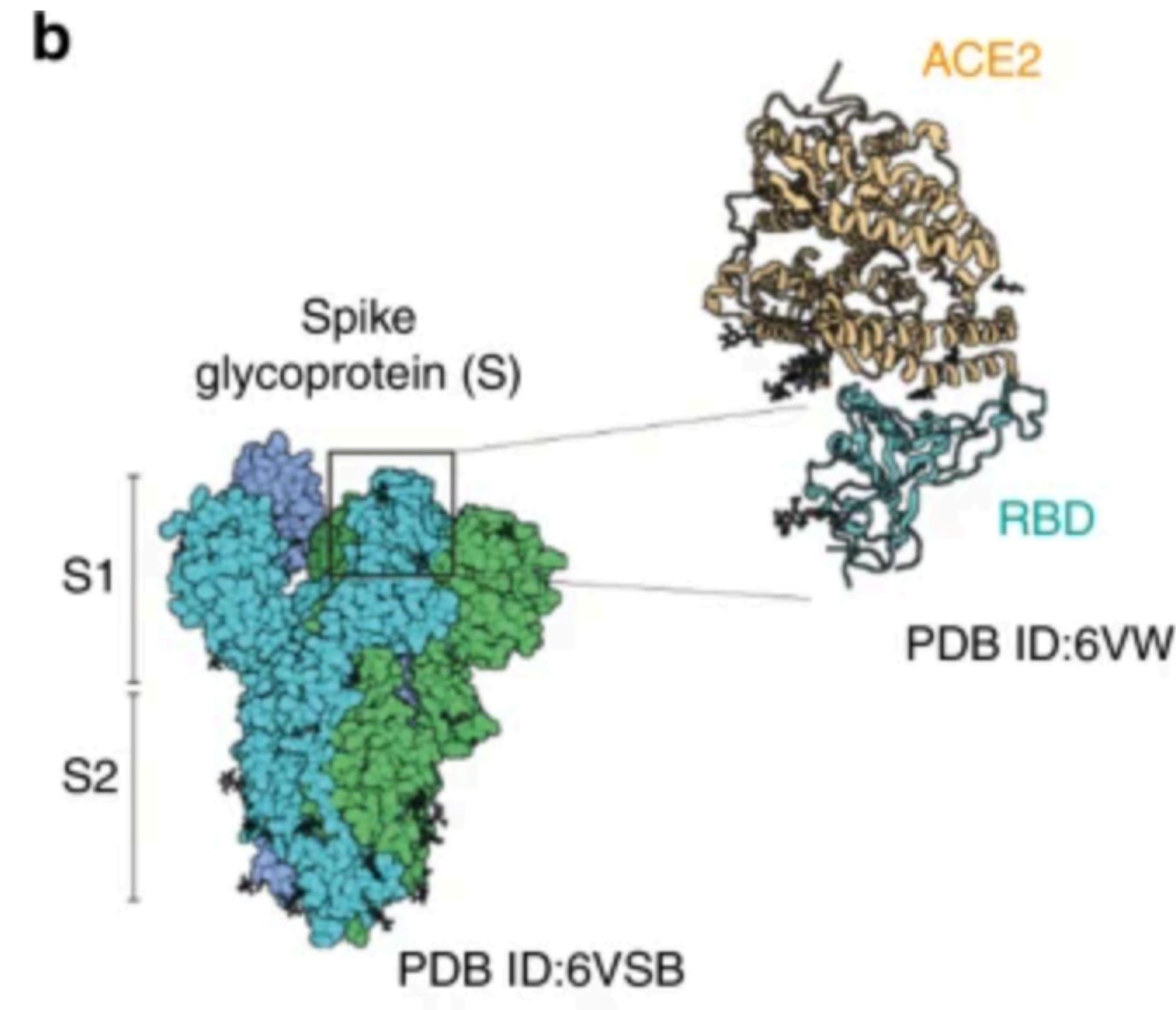
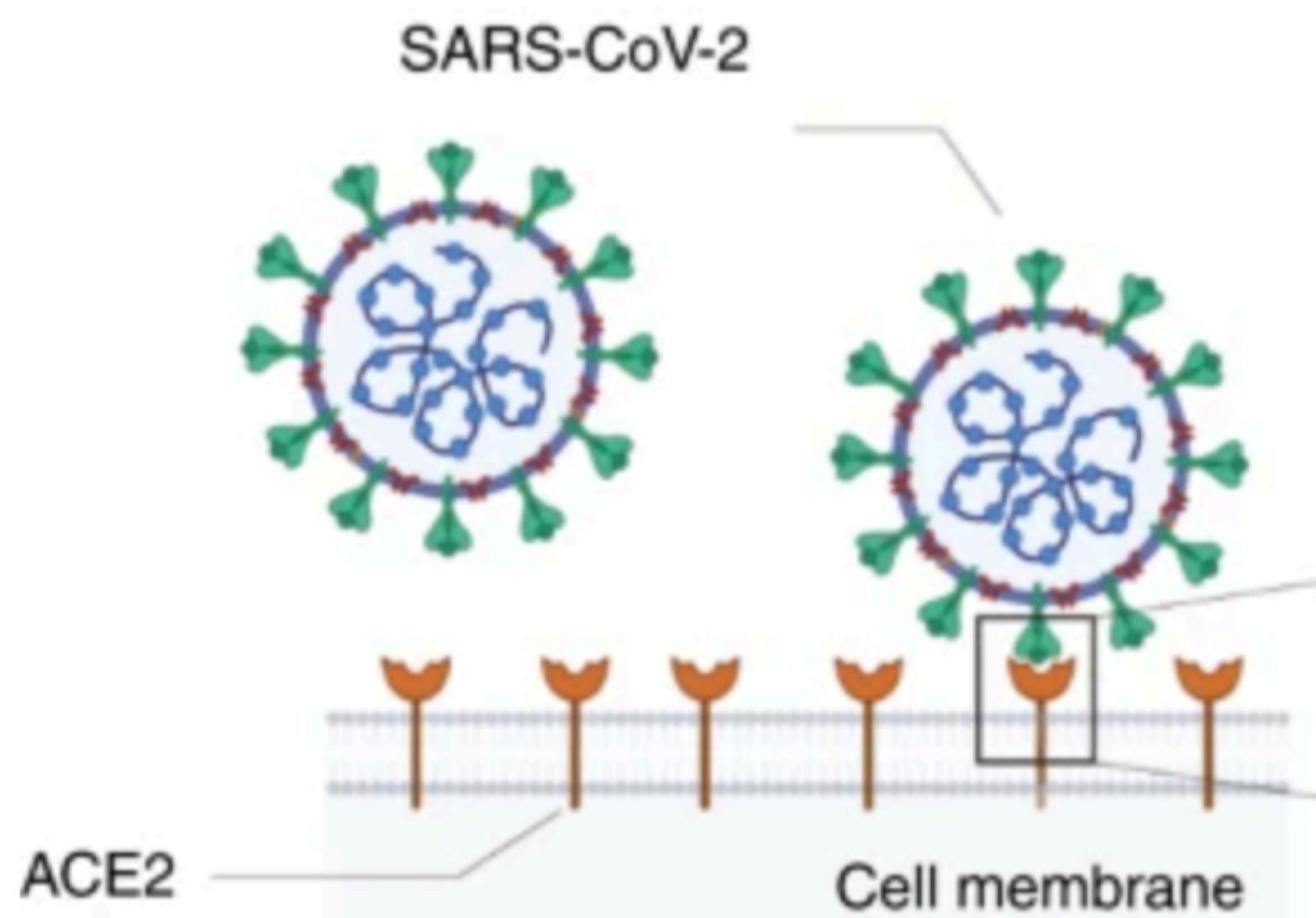
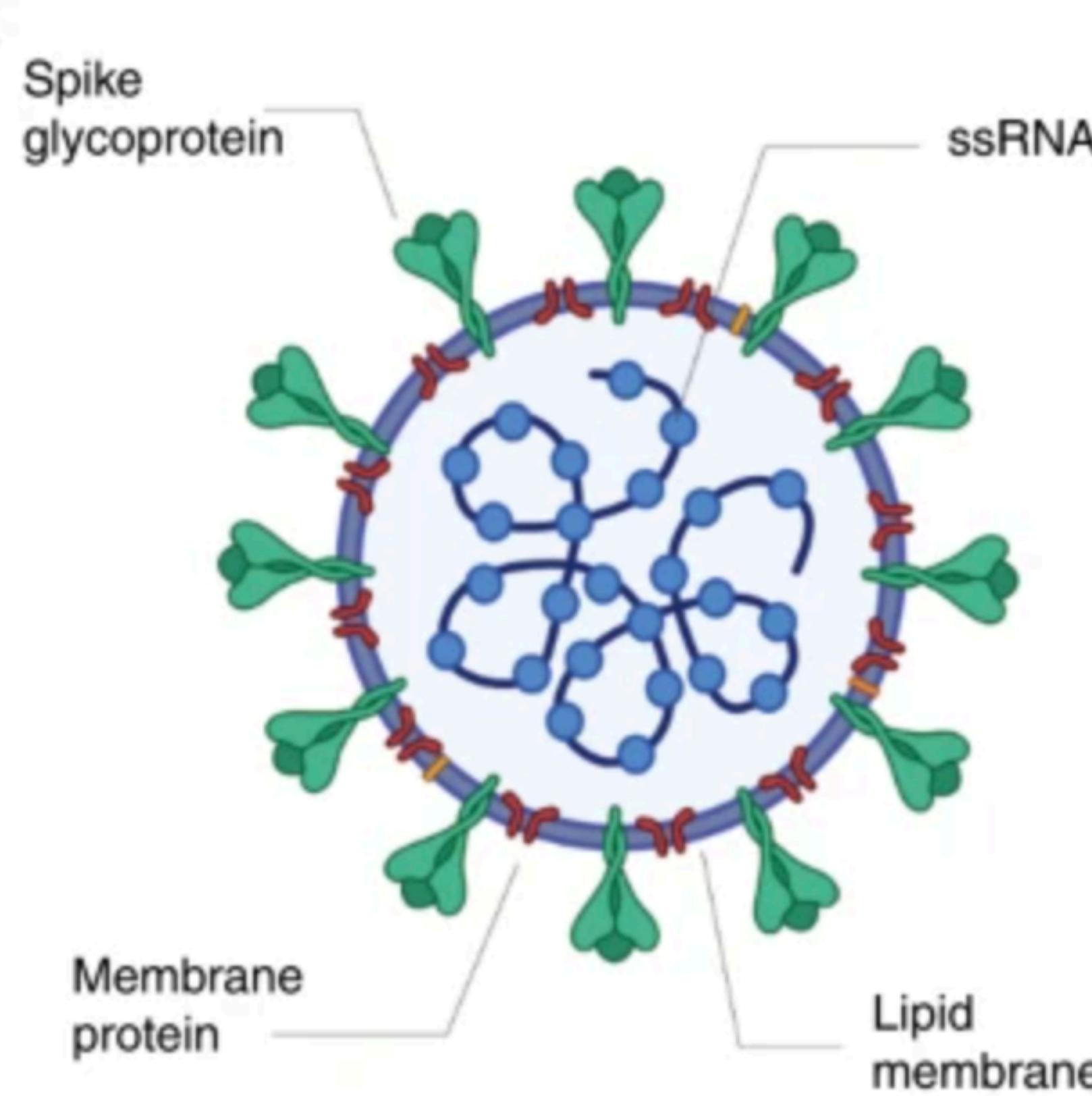
$$\eta_{opt} = \sqrt{\omega\eta_0}$$

$$\beta_{opt} = \beta_0 \frac{\sqrt{\eta_0}}{\sqrt{\omega} + \sqrt{\eta_0}}$$

# Coevolution







# Coevolution