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Virus competition and evolution at multiple scales

Viruses compete and are subject to natural selection at multiple levels: within-cell, within-host and within-population (of hosts). We examine how viruses can optimally exploit their hosts and how this behaviour may influence the most successful strategy at the between-host, or epidemiological level. I will present a fairly general way to consistently combine models of disease process and disease spread with the goal of understanding the net selection pressure on a model virus. The method is illustrated using two popular models at the within- and between-host levels.