

---

**PHILIP GREENSPOON**, University of Toronto

*Parasite transmission among relatives halts Red Queen dynamics*

The theory that coevolving hosts and parasites create a fluctuating selective environment for one another (i.e., produce Red Queen dynamics) has deep roots in evolutionary biology; yet, empirical evidence for Red Queen dynamics remains scarce. Fluctuating coevolutionary dynamics underpin the Red Queen Hypothesis for the evolution of sex, as well as hypotheses explaining the persistence of genetic variation under sexual selection, local parasite adaptation, the evolution of mutation rate and the evolution of non-random mating. Coevolutionary models that exhibit Red Queen dynamics typically assume that hosts and parasites encounter one another randomly. However, if related individuals aggregate into family groups or are clustered spatially, related hosts will be more likely to encounter parasites transmitted by genetically similar individuals. Using a model that incorporates familial parasite transmission, we show that a slight degree of familial parasite transmission is sufficient to halt coevolutionary fluctuations. Our results predict that evidence for Red Queen dynamics, and its evolutionary consequences, are most likely to be found in biological systems in which hosts and parasites mix mainly at random, and are less likely to be found in systems with familial aggregation. This presents a challenge to the Red Queen Hypothesis and other hypotheses that depend on coevolutionary cycling.