FINDING THE SELECTIVE FORCES THAT LEAD TO THE COEVOLUTION OF THE INFLUENZA VIRUS AND THE HUMAN IMMUNE SYSTEM

David B. Owen (Matthew Linton)
Department of Biology

Influenza viruses evolve in an extremely rapid manner. The human immune system has a complex defense mechanism that shields the body from undetected infection. But how have these two competitors affected each other's evolution? Here, we will analyze the evolutionary patterns of both influenza and the immune system. We propose an integrated approach involving the highly polymorphic RNA polymerase, the population bottleneck result of the 1918 pandemic, and numerous other phenomena that have an effect on this coevolution. By using modern research literature and detailed examinations of the immune systems' major histocompatibility complexes, we will identify those interacting selective forces involved in this continuing evolution of host versus parasite. Our findings, although widespread, all give evidence for the continual existence of balancing selection. This mode of natural selection prevents fixation of either species by maintaining an increasing frequency of intermediate alleles and diversity, thereby allowing the influenza virus and human immune system to continually evolve and coexist.