巨大ウイルスの遺伝子獲得にはウイルス間の遺伝子移動が大きく寄与している
Gene transfer among viruses substantially contributes to gene gain of giant viruses

京都大学　化学研究所　バイオインフォマティクスセンター　　Junyi Wu

研究成果概要

Horizontal gene transfers (HGTs) integrate all forms of life and viruses into a vast network of gene flow, which facilitates the transmission of genes beyond vertical inheritance and enhances genomic evolution. HGT is known to occur between closely related viruses. We hypothesized that there is frequent HGT among nucleocytoviruses, a group of diverse but evolutionarily related DNA viruses encoding hundreds to thousands of genes. However, the frequency of viral HGT (vHGT) has not been systematically investigated for nucleocytoviruses. We reconciled over 4,700 gene trees with a robust viral species tree that contains 195 reference viral genomes mainly from cultivation as a reference to infer evolutionary events, including gene gains (gene duplication, origination, and vHGT) and losses. The inferred evolutionary scenarios revealed that the genomes of these viruses have undergone numerous gene gain and loss events, with vHGT representing 28% to 42% of gene gain events in each viral order. By integrating the evolutionary paths of multiple viruses, our data suggest that vHGT is crucial for nucleocytovirus evolution. The related paper is currently under review.