

Herpesvirus DNA packaging machinery

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Herpesviruses are infectious agents causing a number of human diseases, including two types of cancer. There are 8 human herpesviruses, all of them being pathogens. No vaccines are available against herpesviruses and current antiviral drugs are, in some cases, problematic because of their serious side effects. Herpesviruses are complex and highly evolved dsDNA viruses, some of them encoding more than 200 proteins. Despite belonging to 4 different families, all herpesviruses share a common morphology. Virions consist of large icosahedral capsids into which the genome is packaged. The packaging machinery includes a large portal particle, at one vertex of the capsid, and a terminase complex that cleaves the replicated DNA concatemer into unit genomes, while pushing them through the portal into preformed capsids. Thus, herpesviruses are evolutionary related to tail bacteriophages and share with them a similar packaging system.

Advances in our structural studies on both herpesvirus and bacteriophage packaging machines, using a combination of X-ray diffraction and cryo-EM techniques, will be presented. In addition, a structure-driven development of new antiviral compounds targeting the herpesvirus terminase will be presented.