Abstract Submitted
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Population Dynamics of Viral Inactivation[1] KRISTA FREEMAN, DONG LI, Carnegie Mellon University, MANJA BEHRENS, Lund University, KIRIL STRELETZKY, Cleveland State University, ULF OLSSON, Lund University, ALEX EVILEVITCH, Carnegie Mellon University — We have investigated the population dynamics of viral inactivation *in vitro* using time-resolved cryo electron microscopy combined with light and X-ray scattering techniques. Using bacteriophage λ as a model system for pressurized double-stranded DNA viruses, we found that virions incubated with their cell receptor eject their genome in a stochastic triggering process. The triggering of DNA ejection occurs in a non synchronized manner after the receptor addition, resulting in an exponential decay of the number of genome-filled viruses with time. We have explored the characteristic time constant of this triggering process at different temperatures, salt conditions, and packaged genome lengths. Furthermore, using the temperature dependence we determined an activation energy for DNA ejections. The dependences of the time constant and activation energy on internal DNA pressure, affected by salt conditions and encapsidated genome length, suggest that the triggering process is directly dependent on the conformational state of the encapsidated DNA. The results of this work provide insight into how the *in vivo* kinetics of the spread of viral infection are influenced by intra- and extra cellular environmental conditions.

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