

Computation and **I**nformatics in **B**iology and **M**edicine Training Program

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Intracellular Auto-Amplification of Viral Genomes

As a member of the reoviridae family mammalian orthoreovirus (reovirus) has a dsRNA genome divided into 10 segments encoding 11 proteins. The virus particle consists of two icosahedral layers of protein commonly called the inner and outer capsid. During entry into the cell the outer capsid disassembles delivering a transcriptionally active particle, called the core, into the cytoplasm. Reovirus cores produce capped mRNA which serves as a template for protein production or progeny genome. The inner-capsid proteins and capped mRNA assemble into progeny core particles. Progeny core particles are also transcriptionally active and produce uncapped mRNA. It is believed that progeny cores produce 95% of the viral mRNA during an infection. Core transcription is shut-off by the assembly of the outer-capsid proteins onto it producing a new virus particle. Because progeny cores are transcriptionally active they may contribute to their own production, creating an auto-catalytic loop. Using a kinetic model of reovirus replication in the cell we examined the auto-catalytic loop. In addition, we used the model to examine two current questions about the reovirus life cycle. First, it has been reported that four reovirus genes are produced first and are required for the production of the other six. Second, it has been proposed that only the capped mRNA made by the entering particle can be used as genome template. The kinetic consequences of these two hypotheses are explored.

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4:00 p.m.

Room 1111
Biotechnology Center/Genetics
425 Henry Mall