1065-34-177 **Jianjun Paul Tian*** (jptian@math.wm.edu), 121 Jones Hall, Mathematics Department, College of William and Mary, Williamsburg, VA 23187. *The Replicability of Oncolytic Virus: Defining Conditions in Tumor Virotherapy.* Preliminary report.

The replicability of an oncolytic virus is measured by its burst size. The burst size is the number of new viruses coming out from a lysis of an infected tumor cell. Some clinical evidences show that the burst size of an oncolytic virus is a defining parameter for the success of virotherapy. This article analyzes a basic mathematical model that includes burst size for oncolytic virotherapy. The analysis of the model shows that there are two threshold values of the burst size: below the first threshold, the tumor always grows to its maximum (carrying capacity) size; while passing this threshold, there is a locally stable positive equilibrium solution appearing through transcritical bifurcation; while above the second threshold, there exits one or three families of periodic solutions rising from Hopf bifurcations. The study suggests that the tumor load can drop to a undetectable level either during the oscillation or when the burst size is large enough. (Received September 12, 2010)