Toward Individualizing Cancer Treatment: Oncolytic Viruses Combined with Dendritic Cell Injections

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Oncolytic viruses kill tumor cells by selectively replicating inside of them until they lyse. More recently, OVs have been enhanced to mediate the cellular release of chemicals that attract immune system cells to tumors, causing a further attack on cancer cells. OVs also show a supra-linear effect when used in combination with other immunostimulatory therapies, such as dendritic cell vaccines (DC). Here, I discuss our efforts to determine best treatment regimens for treating cancer with OVs in combination with DCs. First, I will describe the ordinary differential equations model we built to understand the underlying dynamics of the combination treatment based on optimizing treatment for the average subject (using murine data) [2, 3]. I will then describe our more recent work, which explains how we can reduce the original model to a smaller model (less parameters and variables) that is more tractable, while keeping the goodness of fit to the data and providing similar predictions [1]. The increased tractability of the system allows for future determination of optimal treatment strategies for individual subjects, in addition to predicting optimal treatments over population averages.

References

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