

DALLAS GIANNINY, ZHIJUN WANG, QING WANG, Department of Computer Sciences, Mathematics, and Engineering, Shepherd University, Shepherdstown, WV, 25443, and DAVID J. KLINKE, Department of Chemical Engineering, and Dept. of Microbiology, Immunology & Cell Biology, West Virginia University, Morgantown, WV, 26506. Treatment strategy for responders in a combinatorial OXP and IL12 therapy based on a calibrated cancer model.

When used in combination, the chemotherapy drug Oxaliplatin (OXP) and interleukin-12 (IL-12) have shown to be effective in eliminating pre-existing liver metastatic colorectal cancer in a murine model. To explore the effects of various treatment strategies on tumor control, we conducted simulation experiments based on a calibrated mathematical model using ordinary differential equations (ODEs). The experiments presented in this work focused on treatment effects of a group of responders who survived two treatment cycles of combined OXP and IL12 therapy and responded well to the third treatment cycle using the same treatment protocol. Our model simulations suggest that it may be possible for responders to reduce the strength of IL-12 in the current combination therapy with minimal impact on efficacy and in addition, increased OXP dose in the combination treatment results in reduced tumor burden for responders. Furthermore, our model demonstrates diminishing returns beyond four treatment cycles. The results of this model could provide potential directions for researchers to construct more efficient and effective treatment regimens for human patients with metastatic colorectal cancer. This project was supported by NIH Grant P20GM103434 to the West Virginia IDeA Network for Biomedical Research Excellence.