

JEAN-EMMANUEL KOUADIO & QING WANG, Dept. of Computer Sciences, Mathematics and Engineering, Shepherd University, Shepherdstown, WV, 25443. A combinatorial anti-CTLA antibody and radiation therapy on metastatic lung cancer.

Cytotoxic T-lymphocyte antigen 4 (CTLA-4) is an inhibitory receptor that regulates T-cell activation and transmits signals that suppress T-cell activation and proliferation through the depletion of CD8+ T cells. Antibodies targeting CTLA-4 can selectively deplete regulatory T cells by antibody-mediated cellular cytotoxicity mechanisms. However, CTLA-4 as a single treatment is not effective for against immunogenic diseases like metastatic cancers. Radiation therapy (RT) on the other hand is a longstanding pillar of cancer treatment, historically utilized to treat a discrete target and provide local tumor control. Recent studies demonstrated that RT is synergistic with anti-CTLA antibody and enhanced systemic anti-tumor responses. In order to better understand the effect of the combination therapy, we developed an impulsive ODE model to describe the interaction between tumor cells and the immune system. The model variables were coupled with published experimental data. The objective of this study was to develop a predictive simulation platform to improve cancer management by manipulating dose and fractionation schedule of the combination therapy. *(Supported by NIH Grant P20GM103434 to the West Virginia IDeA Network for Biomedical Research Excellence)*