

BRENDAN JARRELL#, VASILE STADNITCHII, ZHIJUN WANG, and QING WANG, DAVID J. KLINKE. Department of Computer Sciences, Mathematics, and Engineering, Shepherd University, Shepherdstown, WV, 25443, Department of Chemical Engineering, and Dept. of Microbiology, Immunology & Cell Biology, West Virginia University, Morgantown, WV, 26506. **Sensitivity of parameters in an immuno-chemotherapy model to treat colorectal cancer.**

Colorectal cancer is a common, yet deadly disease that provokes an estimated 200,000 new U.S. cases per year. In a recently released study, research was done on lab mice to assess the effect of OXP and IL-12 on liver-implanted colon cancer cells. In the study's findings, the OXP and IL-12 were proven to enhance the immunosuppressive response of the body to tumor cells. The goal of this project was to determine sensitivity of parameters of an impulsive ODE model whose parameters were calibrated against experimental results in the study. We assessed the effect that manipulation of parameters taken during the initial experiment would have on tumor growth, concentration of interferon gamma, and the ratio of T-effector to T-regulatory cells when compared to this original control group. Variables were manipulated by powers of  $100^*$ ,  $10^*$ ,  $0.1^*$ ,  $0.01^*$  and  $0.001^*$  and differences were observed using graphs of solutions of the model. We found that eight (out of forty eight) parameters, including T-effector death rate due to OXP ( $kd_2$ ), tumor cell natural death rate ( $kd_{10}$ ), rate constant for OXP flow from blood to the tumor ( $c_{23}$ ); constant in tumor logistic growth [reciprocal of tumor carrying capacity] ( $r_1$ ), OXP natural decay rate constant ( $kd_4$ ), tumor cell proliferation rate ( $kp_4$ ), rate constant for OXP flow from blood to lymph nodes ( $c_{21}$ ), and OXP saturation rate [in tumor] ( $g_{15}$ ), are sensitive to tumor growth and other important factors. The project was supported by NIH Grant P20GM103434 to the West Virginia IDeA Network for Biomedical Research Excellence.