Abstract

The application of Mathematical models in simulating processes that are biological in nature has been in effect for a long time. A great number of Mathematical, Computational, Engineering and Physical approaches have been administered to several aspects of development of Tumor, with a view of appreciating how cancer cell population responds to medical intervention. This research therefore considered a Mathematical model for the consequences of incubation and Chemotherapy on Tumor growth dynamics by formulating a deterministic S (susceptible), E (exposed), I (infectious), R (recovered) model using Delay differential equations. The Delay in this case accounted for the duration between the subjection of a cell to cancer virus and the onset of symptomatic disease. Reproduction number (R_0) of the model was ascertained using next generation matrix approach. The stability analysis of Cancer Free Equilibrium Point (CFEP) of the model was investigated. MATLAB computer program was used for numerical simulations to validate the analytic results. The investigation and analysis of the consequences of incubation and Chemotherapy on the stability of the equilibrium point was also done. This study of Tumor growth dynamics is significant in that it shall help establish the stage and the extent of cancer spread within the body cells. It shall also help develop a better drug administration procedure as well as providing mechanistic insights. Parameter values used were mostly estimated values. From the numerical analysis, our findings suggest that CFEP is stable when R_0 is 0.6667 otherwise unstable.