Global Stability Analysis of a Coupled Model for Healthy and Cancerous Cells Dynamics in Acute Myeloid Leukemia

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Abstract : The mathematical formulation of biomedical problems is an important phase to understand and predict the dynamic of the controlled population. In this paper we perform a stability analysis of a coupled model for healthy and cancerous cells dynamics in Acute Myeloid Leukemia, this represents our first aim. Second, we illustrate the effect of the interconnection between healthy and cancer cells. The PDE-based model is transformed to a nonlinear distributed state space model (delay system). For an equilibrium point of interest, necessary and sufficient conditions of global asymptotic stability are given. Thus, we came up to give necessary and sufficient conditions of global asymptotic stability of the origin and the healthy situation and control of the dynamics of normal hematopoietic stem cells and cancerous during myelode Acute leukemia. Simulation studies are given to illustrate the developed results.