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*Cell Cycle Significance in the Evolutionary Dynamics of Cancer*

Proliferation has known as one of the main building blocks of almost any evolutionary mechanism in living species. More specifically, during cell replication, each cell undergoes various phases within the cell cycle. The average time of successful divisions and the frequency of cells within each of the cell cycle phases determine their fitness within a population. In continuation to recent researches on the role of various cell-cycle-compartments in the evolution of biological systems, we suggest a general framework which highlights the significance of cell cycle in a heterogeneous system. More precisely, we investigate how the cell cycle mechanism may affect the dynamics of malignancy in such a system. We find the speed of initiation/progression of malignancy and its survival rate in diverse cell-cycle phases. Our findings may provide a better understanding of malignancy development in infectious diseases and different types of cancer where various phenotypes behave differently during mitosis and replication. This research may also affect current treatment schedules in order to provide more intense therapies.