

Mathematical modeling of prostate cancer from an ecological perspective

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As our understanding of cancer has developed, it has become apparent that adopting an evolutionary perspective is critical. This framework conceptualizes the host as an ecosystem in which the tumor cells have obtained a number of selective advantages for rapid growth and survival. Approaching cancer from this perspective gives an inclination to the adaptation of successful ecological modeling techniques to cancers. Specifically, we utilize the theory of ecological stoichiometry in order to understand the tumor-host interactions for prostate cancer. There is a wealth of clinical and experimental evidence supporting the hypothesis that low-androgen environments may aid in the development of so-called androgen-independent tumor cells. Through mathematical models, we aim to investigate this hypothesis and provide insight into the relationship between androgen levels, nutrient availability, and the evolution of tumors cells within the prostate.