Evolution and role of cancer biology and inhibition of metabolism and tumor development.

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Abstract

Cancer goes through a series of events called 'somatic evolution'. A central premise of Darwinian evolution is that the environment exerts pressure to select species that best fit the context of this particular microenvironment. Furthermore, the rate of evolution is proportional to both 1) the strength of environmental selection and the phenotypic variance of the selected population. It is noteworthy that the selective landscape continuously changes during cancer progression from carcinogenesis to local invasion to metastasis; this means that these phenotypes confer a selective advantage in the process of environmental selection. One of the most widely selected phenotypes for him is the aerobic glycolysis phenotype. H. Continued fermentation of glucose even when sufficient oxygen is present. The mechanism of this so-called "Warburg effect" has been well studied, and there are several models that explain how this happens at the molecular level. Further, it has been shown that inhibition of extracellular acidosis can inhibit metastasis and promote anti-tumor immunity.

Keywords: Carcinoma, Leukaemia, Cartilage, Fat, Muscle, Blood vessels.

Introduction

Cancer is an open, complex and adaptable system. They are open because there is free interaction between tumor and host. Complex because there are usually many components that interact through nonlinear dynamics. These components can change in time and space, so they are adaptive [1].

Complex adaptive systems are difficult to understand without mathematical models because nonlinear dynamics are counterintuitive. We argue that the same he can gain a similar understanding of cancer dynamics through three factors. Spatially and temporally well-defined data are generated primarily from images, computer models have been derived that account for some degree of probability, and the first principles of carcinogenesis and behavior are rooted in ecology and evolutionary biology. Importantly, as we and others have described, the Darwinian evolution of cancer involves the selection of phenotypically distinct cells through local ecology explained by the physical and biochemical microenvironment. It is necessary [2].

The physical microenvironment is a key component and an excellent example of the dynamics that exist within complex cancer systems. O2, glucose, and H+ levels in tumors affect both cancer cell survival and proliferation, and are influenced by tumor cell metabolism and complex interactions with blood vessels and other normal tissues. Importantly, as we and others have described, the Darwinian evolution of cancer involves the selection of phenotypically distinct cells through local ecology explained by the physical and biochemical microenvironment. It is necessary. Some of these basic evolutionary principles apply to cancer [3].

Carcinogenesis

The transition of cells from normal to cancer is a multistep, multipath process often referred to as 'somatic evolution'. This Darwinian dynamic is usually viewed as a continuum of mutations, as shown in the "bird gram". However, according to Equation1, we find that genetic alterations in populations are closely related to the underlying environmental characteristics of tumor-initiating tissues. For example, in breast cancer and other ductal tumors of the breast, the cells of origin line along the basement membrane but have large empty spaces where they can potentially proliferate. The spatial organization of locomotion directs subsequent evolution through altered microenvironment selection. Although abolition of anoikis allows new populations to grow into the lumen, duct anatomy and physiology pose other growth limitations [4,5].

Conclusions

The physiological microenvironment of nascent and clinically apparent primary and metastatic tumors is hostile: the pH is acidic, oxygen is variable, substrates are in short supply and there is an abundance of toxic reactive oxygen and reactive nitrogen species. These factors indisputably play a role in carcinogenesis and tumor progression, yet their exact roles and the mechanisms involved are only now beginning to be

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defined the Darwinian dynamics that govern cancer biology include complex interactions between the changing tumor genome/phenome and local environmental conditions that include normal mesenchymal cells, immune cells, as well as underlying concentrations of substrate, metabolites, and cell-products.

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