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**METABOLIC REPROGRAMMING IN PROSTATE CANCER: THE SIGNATURE OF CELLULAR TRANSFORMATION WITH CLINICAL IMPLICATIONS**

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Cancer, a multifaceted and exceptionally complex disease, originates from disrupted biological circuits and control mechanisms, giving rise to a wide range of inter- and intra-type variations, elaborate mutational landscapes, and multifactorial genetic and phenotypic anomalies. The sustainability of malignancies relies heavily on their aptitude to obtain sufficient resources, adapt to changing microenvironment, and strategically rewire their metabolic architecture. The excessive energy demands imposed by uncontrolled proliferation present significant challenges to cellular biochemistry, forcing cancer cells to undergo substantial reorganization of signaling pathways and transcriptional networks. These adjustments cater to the distinctive anabolic prerequisites of neoplastic growth and contribute to the unique rearrangements observed in tumor metabolism. A notable degree of variability exists within and across diverse cancer entities concerning substrate utilization and pathway reprogramming, highlighting the inadequacy of a uniform metabolic blueprint in accurately portraying the intricacies of cancer-driven metabolic alternations. Prostate cancer ranks as the second most frequently diagnosed malignancy in the male demographic, with an estimated 1.4 million cases and a consequential toll of 375000 deaths reported globally in 2020. Driven by these statistics, contemporary urologic oncology is experiencing a surge in research interest aimed at comprehensively understanding the metabolic reprogramming inherent in prostate neoplasia. These investigations delve deeply into the regulatory machinery behind cancer-related metabolic alterations and their profound ramifications on disease initiation and progression. Unveiling the unique metabolic circuitry governing this malignancy holds vast potential for pioneering advances in both scientific and clinical realms, offering avenues for more precise risk assessment and the discovery of novel biomarkers and therapeutic targets. Such research endeavors offer the prospect of fundamentally reshaping the landscape of diagnostic and management strategies for this intricate and heterogeneous urooncological condition.

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