

A Review of Metabolic Targets of Anticancer Nutrients and Nutraceuticals in Pre-Clinical Models of Triple-Negative Breast Cancer

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Triple-negative breast cancer (TNBC) is a subtype of breast cancer that is notoriously aggressive and has poorer outcomes as compared to other breast cancer subtypes. Due to a lack of targeted therapies, TNBC is often treated with chemotherapeutics as opposed to hormone therapy or other targeted therapies available to individuals with estrogen receptor positive (ER+) breast cancers. Because of the lack of treatment options for TNBC, other therapeutic avenues are being explored. Metabolic reprogramming, a hallmark of cancer, provides potential opportunities to target cancer cells more specifically, increasing efficacy and reducing side effects. Nutrients serve a significant role in metabolic processes involved in DNA transcription, protein folding, and function as co-factors in enzyme activity, and may provide novel strategies to target cancer cell metabolism in TNBC. This article reviews studies that have investigated how nutrients/nutraceuticals target metabolic processes in TNBC cells alone or in combination with existing drugs to exert anticancer effects. These agents have been shown to cause perturbations in many metabolic processes related to glucose metabolism, fatty acid metabolism, as well as autophagy and oxidative stress-related metabolism. With this information, we present the potential of nutrients as metabolism-directed anti-cancer agents and the potential for using these agents alone or in cocktails as a new direction for TNBC therapy.¹