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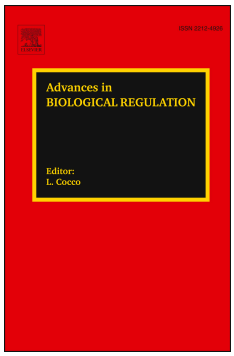

Nonessential Amino Acid Metabolism in Breast Cancer

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Nonessential Amino Acid Metabolism in Breast Cancer

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Abstract

Interest in studying cancer metabolism has risen in recent years, as it has become evident that the relationship between cancer and metabolic pathways could reveal novel biomarkers and therapeutic targets. Metabolic starvation therapy is particularly promising due to its low toxicity. Nonessential amino acids are promising metabolites for such therapy because they become essential in many tumor cells, including breast cancer cells. This review will focus on four nonessential amino acid metabolism pathways: glutamine-glutamate, serine-glycine, cysteine, and arginine-proline metabolism. Recent studies of these amino acids have revealed metabolic enzymes that have the potential to be effective as cancer therapy targets or biomarkers for response to metabolic starvation therapy. The review will also discuss features of nonessential amino acid metabolism that merit further investigation to determine their relevancy to breast cancer treatment.

Introduction

Breast cancer is the most frequently occurring cancer in women, and despite the development of new therapies there has been little decline in the mortality rate over the past decade (Siegel et al., 2015). This is partly due to the genetic diversity of breast cancers, such that there is no single therapy that is effective against all breast cancer