Antitumor effects of curcumin: A lipid perspective

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Lipid metabolism plays an important role in cancer development due to the necessities of rapidly dividing cells to increase structural, energetic, and biosynthetic demands for cell proliferation. Basically, obesity, type 2 diabetes, and other related diseases, and cancer are associated with a common hyperactivated ?lipogenic state.? Recent evidence suggests that metabolic reprogramming and overproduction of enzymes involved in the synthesis of fatty acids are the new hallmarks of cancer, which occur in an early phase of tumorigenesis. As the first evidence to confirm dysregulated lipid metabolism in cancer cells, the overexpression of fatty acid synthase (FAS) was observed in breast cancer patients and demonstrated the role of FAS in cancer. Other enzymes of fatty acid synthesis have recently been found to be dysregulated in cancer, including ATP-dependent citrate lyase and acetyl-CoA carboxylase, which further underscores the connection of these metabolic pathways with cancer cell survival and proliferation. The degree of overexpression of lipogenic enzymes and elevated lipid utilization in tumors is closely associated with cancer progression. The question that arises is whether the progression of cancer can be suppressed, or at least decelerated, by modulating gene expression related to fatty acid metabolism. Curcumin, due to its effects on the regulation of lipogenic enzymes, might be able to suppress, or even cause regression of tumor growth. This review discusses recent evidence concerning the important role of lipogenic enzymes in the metabolism of cancer cells and whether the inhibitory effects of curcumin on lipogenic enzymes is therapeutically efficacious. © 2019 Wiley

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curcumin

enzyme

lipid

metabolism

tumor

3 hydroxy 3 methylglutaryl coenzyme A

adenosine triphosphate citrate synthase

carnitine palmitoyltransferase I

cholesterol acyltransferase

curcumin

fatty acid synthase

lipid

liver X receptor

protein

scd1 protein

sterol o acyltransferase 1

unclassified drug

antineoplastic activity

cancer cell

cancer therapy

drug effect

enzyme inhibition

evidence based practice

human

lipid metabolism

lipogenesis

malignant neoplasm

nonhuman

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Review