Research & Reviews: Journal of Microbiology and Biotechnology e-ISSN: 2320-3528

Cancer Metabolism: Inhibiting by Flavonoids *via* Influencing Redox State and Lipid Metabolism

Vincent Richards*

Department of Microbiology, University of Natural Resources and Life Sciences, Vienna, Austria

Opinion Article

Received: 24-Nov-2022, Manuscript No. JMB-22-84642; **Editor assigned:** 28-Nov-2022, PreQC No. JMB-22-84642(PQ); **Reviewed:** 12-Dec-2022, QC No. JMB-22-84642; **Revised:** 19-Dec-2022, Manuscript No. JMB-22-84642(R); **Published:** 26-Dec-2022, DOI: 10.4172/2320-3528.11.7.005.

***For Correspondence:** Vincent Richards, Department of Microbiology, University of Natural Resources and Life Sciences, Vienna, Austria

E-mail: brich.vint@gmail.com

DESCRIPTION

Cancer cells commonly undergo metabolic reprogramming during malignant transformation. To fulfil the higher nutritional needs required for improved cellular proliferation and development, cancer cells rewire their metabolism. The warburg effect, which refers to the tumors preference for aerobic glycolysis over oxidative phosphorylation is a well-researched phenomenon. The modification of signalling pathways that affect lipid metabolism, amino acid flow, synthesis, redox balance and the use of ketone bodies as an alternative fuel that promotes carcinogenesis are other significant aspects of metabolic metamorphosis. Plant phytochemicals called flavonoids, which are widely dispersed have a variety of positive impacts on human health by controlling the molecular cascades that are disrupted in diseased phenotypes.

Numerous flavonoids and their derivatives have been recognised as important modulators of cancer metabolism in recent research. By controlling fatty acid synthase or the transcription activity of sterol regulatory element-binding protein, flavonoids have an impact on lipid metabolism. They also affect redox balance by modulating nuclear factor-erythroid factor, amino acid flux and phosphoglycerate mutase synthesis in stromal cells to meet the energy requirements of epithelial cancer cells. A possible method to hasten cancer-related is to target essential enzymes and transporters with flavonoids, which alter the metabolic pathways of cancer cells. Malignant diseases continue to be one of the leading causes of mortality worldwide, with more than twenty eight million cases identified each year, despite significant advancements in cancer therapy over the past ten years.

The unchecked growth and proliferation of tumor cells is the primary characteristic of the multi-step process known as carcinogenesis. Cancer cells exhibit a variety of traits that aid in the progression of the disease such as invasiveness, the ability to evade apoptosis or the ability to stimulate angiogenesis. Supporting the increasing bioenergetic and biosynthetic requirements of multiplying cancer cells requires metabolic reprogramming. Additionally, altered cellular metabolism contributes to the resistance of cancer cells to chemotherapy. The warburg

effect is a well-known metabolic alteration linked to cancer that is characterised by increased glucose absorption and glucose metabolism. Additionally, the modification of metabolic pathways linked to lipid metabolism, ketone body use, amino acid metabolism and maintaining a redox state occurs in tandem with cancer cells adaptability to increased energy needs and proliferation. A sizable class of physiologically active polyphenols that are found in all plants present in flavonoids. These bioactive substances have a variety of positive effects on human health.

A series of biochemical procedures known as cellular metabolism are said to be in charge of producing energy and maintaining cell growth, because proliferating cells have a greater energy requirement, maintaining the redox balance and producing the biomass required for cancer growth. Metabolic reprogramming helps tumour cells meet these increased substrate requirements. The primary macronutrient that supports cell energy metabolism is glucose, which is also the most prevalent nutrient in blood circulation. The process of metabolic reprogramming in cancer cells starts with oxidative phosphorylation, which produces thirty six adenosine triphosphate molecules for every glucose molecule and progresses to aerobic glycolysis, which produces just two adenosine triphosphate molecules for every glucose molecule. One of the primary markers of metabolic reprogramming of cancer cells is dysregulation in lipid metabolism, which is typically seen in metabolic alterations of tumours defined by glutaminolysis and aerobic glycolysis. Lipids in lipid droplets are crucial signalling molecules and are designed for energy storage. Additionally, lipids serve as the fundamental components of cells and help to produce the permeability barrier in the bilayer of membranes.

The increased energy demand required for tumor growth and proliferation shows that, in addition to glucose, cancer cells use a wide variety of other fuels. Flavonoids are organic compounds with varying phenolic structures that can be found in a variety of fruits and vegetables. Flavonoids are divided into seven groups according to their chemical composition, degree of unsaturation and pattern of substitutions. These groups are flavones, isoflavonoids, flavanones, anthocyanidins, flavonols and chalcones. Due to enhanced proliferative activity, tumour cells use altered lipid metabolism to gain more energy and building blocks. Fatty acid synthase, which catalyses fatty acid production is crucial for lipid metabolism. Numerous non-glucose nutrients aid in the development of cancer cells as substitute fuels to meet the increased energetic and biosynthetic needs of cancer cells. A thorough understanding of flavonoids ability to influence tumour metabolism is anticipated to help develop cutting-edge therapeutic strategies to stop and suppress malignant transformation.