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Berry Fruits for Cancer Prevention: Current Status and Future Prospects

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Abstract

Overwhelming evidence suggests that edible small and soft-fleshed berry fruits may have beneficial effects against several types of human cancers. The anticancer potential of berries has been related, at least in part, to a multitude of bioactive phytochemicals that these colorful fruits contain, including polyphenols (flavonoids, proanthocyanidins, ellagitannins, gallotannins, phenolic acids), stilbenoids, lignans, and triterpenoids. Studies show that the anticancer effects of berry bioactives are partially mediated through their abilities to counteract, reduce, and also repair damage resulting from oxidative stress and inflammation. In addition, berry bioactives also regulate carcinogen and xenobiotic metabolizing enzymes, various transcription and growth factors, inflammatory cytokines, and subcellular signaling pathways of cancer cell proliferation, apoptosis, and tumor angiogenesis. Berry phytochemicals may also potentially sensitize tumor cells to chemotherapeutic agents by inhibiting pathways that lead to treatment resistance, and berry fruit consumption may provide protection from therapy-associated toxicities. Although a wide variety of berry fruits are consumed worldwide, this paper focuses on those commonly consumed in North America, namely, blackberries, black raspberries, blueberries, cranberries, red raspberries, and strawberries. In addition, a large body of studies on singly purified berry bioactives is available, but this paper focuses on studies of “whole berries” per se, that is, as berry extracts and purified fractions, juices, and freeze-dried powders. Potential mechanisms of anticancer action and bioavailability of berry phenolics, as well as gaps in knowledge and recommendations for future berry research, are also briefly discussed.

