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# NATURAL PRODUCTS FOR CANCER PREVENTION

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**OBJECTIVES:** *To review the clinical trial literature on the use and effects of natural products for cancer prevention.*

**DATA SOURCES:** *Clinical trials published in PubMed.*

**CONCLUSION:** *There is a growing body of literature on the use of natural products for cancer prevention. To date, few trials have demonstrated conclusive benefit. Current guidelines recommend against the use of natural products for cancer prevention.*

**IMPLICATIONS FOR NURSING PRACTICE:** *Clinicians should ask patients about their use of natural products and motivations for use. If patients are using natural products for cancer prevention, they should be counseled on the current guidelines, as well as their options for other cancer prevention strategies.*

**KEY WORDS:** *Cancer, cancer prevention, multivitamins, vitamins, botanicals, medicinal mushrooms, probiotics*

**I**NDIVIDUALS born in the United States today have a 41% lifetime risk of being diagnosed with cancer, a sobering statistic that has urged the health care community to

identify effective methods of cancer prevention.<sup>1</sup> Primary cancer prevention aims to reduce the risk of an individual developing cancer through the use of chemopreventive agents, the avoidance of exposure to environmental carcinogens, and the surgical removal of susceptible organs.<sup>2</sup> Secondary cancer prevention relies on early detection and screening measures to identify precancerous and/or early stage tumors that are often more responsive to treatment than later stage tumors. Tertiary cancer prevention, often referred to as *cancer control*, aims to reduce the risk of recurrence, reduce the risk of metastasis, prevent second primary cancers, and prevent other cancer-related complications. This article focuses on the use of natural products for primary cancer prevention. The article reviews the clinical trial evidence on the effectiveness of natural products for cancer prevention, including vitamins and minerals, botanicals, probiotics, and other agents of interest.

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The use of natural products has increased in the United States. In 2007, approximately 18% of American adults reported using natural products beyond a basic multivitamin.<sup>3</sup> Individuals use natural products for a variety of health reasons, including treating and preventing disease, maintaining health, and promoting wellness. The evidence for this use is mixed and individuals do not use natural products in isolation. Many people use multiple natural products simultaneously and also engage in other health-related behaviors, such as dietary changes, physical activity, and the use of medications to prevent and treat disease. Factors associated with the use of natural products include prior use of natural products, higher age, higher education, and higher income.<sup>4</sup> There is a common perception that natural products are safe because they are “natural,” but a natural product is not necessarily a safe product.<sup>5</sup>

Natural products are of particular interest as chemopreventive agents because of their potentially low toxicity profiles and potential effectiveness.<sup>6</sup> The National Center for Complementary and Alternative Medicine defines natural products as dietary supplements and include vitamins, minerals, probiotics, and herbal medicines.<sup>3</sup> The National Cancer Institute’s Office for Cancer Complementary and Alternative Medicine (OCCAM) uses slightly different terminology for dietary supplements used as chemopreventive agents, referring to them as nutritional therapeutics, which include an assortment of nutrients, non-nutrients, and bioactive food components.<sup>7</sup>

The efficacy of natural products as chemopreventive agents for primary and tertiary cancer prevention has not yet been established. Observational studies have suggested that various vitamins, minerals, and dietary components reduce the risk of developing specific cancers. However, clinical trials have not always supported these observations and/or the trials have not been conducted to test the efficacy of the natural products as chemopreventive agents. Current guidelines from the American Institute of Cancer Research, the American Cancer Society, and the Society for Integrative Oncology recommend against the use of dietary supplements for cancer prevention based on the current evidence.<sup>8-11</sup> Many patients are not aware of these guidelines, or disregard the guidelines and use natural products with the intention of cancer prevention based on reports in the popular press and/or preliminary evidence.

Health care providers face many challenges when counseling patients on the use of natural products for cancer prevention. First, patients underreport use to their health care providers.<sup>12</sup> Reasons for this may include perceiving a lack of support for their use or fear of stigma from providers. Second, many health care providers believe that they are not qualified or sufficiently knowledgeable to counsel patients on the use of natural products.<sup>13</sup> Third, quality assurance of natural products is important.<sup>14</sup> Because the natural product industry is not tightly regulated by the US Food and Drug Administration, it can be challenging for health care providers to know whether a specific natural product is of high quality or not. Fourth, the evidence does not exist regarding the appropriate formulation, dose, duration, and cancer type for natural products.

This review provides an overview of commonly used natural products for cancer prevention, including a summary of the clinical trial literature to date. It is important to note that many of the results presented are based on post-hoc analyses, and are not the primary study outcomes, which may limit the generalizability and accuracy of the findings.

## SUMMARY OF RESEARCH TO DATE

### *Vitamins and Minerals*

Clinical trials examining vitamins and minerals as chemopreventive agents are summarized in Table 1.

***Multivitamins and combinations.*** Multivitamins and combination vitamins are dietary supplements comprised of two or more single agents. They are commonly used to both improve the nutritional status among nutrient-deficient populations and to hyper-supplement nutrient-replete populations. The results of clinical trials examining the effects of multivitamins as chemoprevention agents remain mixed.

Intervention trials in Linxian, China showed the importance of multivitamin supplementation in nutrition-deficient populations to reduce the risk of esophageal, stomach, and other cancers.<sup>15</sup> The benefit of supplementation in nutrient-replete populations is not as clear. The Supplementation en Vitamines et Mineraux Antioxydants (SU.VI. MAX) Trial showed that multivitamin use by

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