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DIET, NUTRITION AND PREVENTION OF CANCER

Food as an important factor in cancer incidence. Food is an important factor in determining cancer incidence in many countries and regions [11]. Food components relevant to cancer development can be divided into macro- and microcomponents. The former tends to act indirectly. The latter usually has a clearly defined action, for example as genotoxic agents. Food can have both positive (carcinogenic) and negative (preventive) effects [8].

Total calory intake appears to have a strong positive influence on cancer incidence. Carcinogenic plant alkaloids, mycotoxins and other food contaminants frequently enter our bodies. Heat-cooking generates genotoxicants, including aromatic hydrocarbons (via combustion) and heterocyclic amines (HCAs) through reactions involving creatin(in)e, sugar and amino acids in meat. HCAs are relatively newcomers as food genotoxicants and can produce breast, colon and prostate cancers in rodents.

Food habits are also very important in cancer risk as dietary factors are responsible for a third of all cancers [9]. A diet rich in sugar and saturated fat as well as processed meat products is considered to be a cancer promoting diet. To the contrary, a diet rich in vegetables and fruit is generally associated with reduction in the risk of many types of cancer [6]. Mediterranean diet (lots of vegetables, fruit, fish, olives and olive oil, nuts, seeds, herbs, spices and whole grain foods) has consistently been shown to be beneficial in preventing cardiovascular disease as well as cancer.

While epidemiological studies indicate association of the consumption of vegetable and fruit with decreased risk for many types of cancer, data from well-designed, cohort or interventional studies failed to demonstrate the impact of reduced fat intake on postmenopausal breast cancer risk as well as no association between colon cancer and the consumption of fruit and vegetables in men and women [1, 7].

Anticancer food-related components. There are three crucial characteristics of innovative anticancer agents relate to their capability in killing cancer cells resistant to pro-apoptotic stimuli (such as metastatic cancer cells), killing cancer cells through non-apoptotic-mediated cell death pathway, and actually impairing the biological behaviour of CSCs [2]. The majority of food-related components that are beneficial to human health are of natural origin; some of them display anticancer effects. However, the diet profiles of people from Africa, North America, South America, Asia, Australia, and Eastern, Western, North and South Europe markedly differ [5].

There are thousands food-related components of natural origin that can more or less impair cancer progression, and these components can originate from plants, macroscopic mushrooms, insects, and terrestrial (other than insects) and marine invertebrates. From more than a gross picture, diets based on a high consumption of “plants” (vegetables and fruits), fish and insects and a low consumption of alcohol and mammalian fat apparently lead to a lower cancer incidence than diets based on a weak consumption of plants and a high consumption of red meal, mammalian fat and alcohol [4].

Population studies have shown that high intake of dietary lycopene is inversely associated with the incidence of certain types of cancers. Epidemiological studies show an inverse association between dietary soy consumption and the risk of prostate, breast, and endometrial cancers. Genistein is the most active and abundant isoflavone in soybeans with activity against a variety of cancer cells as associated with anti-oxidant, anti-inflammatory, anti-viral and anti-bacterial activities [10].

Recommendations for cancer prevention. The US National Centre for Complementary and Integrative Health (NCCIH)’s programs and organization incorporate three long-range goals that are to advance the science and practice of symptom management, to develop effective, practical, personalized strategies for promoting health and well-being and to enable better evidence-based decision making regarding complementary and integrative health approaches and their integration

into healthcare and health promotion.

Improved food, better life styles and developments in the functional food industry are all crucial to cancer prevention [12]. However, while no significant decrease in the cancer risk a difference in cardiovascular risk was noted with a prudent diet that involved eating more vegetables and less fat [3]. Therefore, we need to carry out better designed and better controlled studies with different end points. Notably, increased body mass index and obesity and lack of regular physical activity have been associated with increased cancer risk for most cancers [13].

Conclusions

Healthy nutrition, physical activity and lack of stress are the three most important components of health. Modification of food habits may prevent many cancers and result in a healthier population and significant savings in healthcare expenditures. Potential anticancer effects of food-related components should be further researched in clinical trials on different models for their effectiveness and toxicological documentation. Furthermore, extensive research work should be carried out on these components to evaluate their possible applications, toxicological and particular genotoxic profile against a wide range of cancer in both either in-vitro or in-vivo.

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