Image Awareness
Wellness Institute
Cancer and Phytonutrients

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Introduction

Hippocrates observed a breast cancer which looked like a crab's claw and thus named the disease "cancer" which is the Latin word for crab. Cancer is basically a disease of the cells. Cancer develops when one of the 100 trilllion cells which make up the body stops obeying the rules which normally govern cell behavior.

Cancers are named for the tissues from which they originate. Carcinomas arise from the cells which form the linings of body organs. These are the most common types of cancers usually including cancers of the prostate, breast, lung, and colon. Cancers which arise from other tissues such as connective tissue are called sarcomas. The Greek word sarcoma means "flesh". Cancers which come from blood cells are known as leukemias or lymphomas.

One of the most important traits of cancer cells is their degree of differentiation. In other words, how closely do they resemble the cells of the tissue from which they originated. Poorly differentiated tumors bear little resemblance to the parent organ. Such tumors grow very rapidly and spread at a faster rate than well-differentiated cancer tissues. Such cancers are described as "aggressive."

One of the most problematic aspects of cancer is metastasis which is a situation in which cancer cells separate themselves from a tumor mass and spread to another part of the body to begin a new tumor. Normal body cells do not have this ability to move around, although old cells often fail to stick to their neighbors.

Gerald Dermer was one of the first to observe that there was an alteration in the cell membrane of cancer cells which contributed to their ability to move about. The membranes of cancer cells lose glycoproteins or proteins to which sugars are attached. The fewer the glycoproteins in the cancer cell membrane, the more aggressive the cancer tended to be.

Cultured Cancer Cells

Dermer believes that cancer researchers have missed the mark in understanding cancer because they study cancer cell lines grown in culture rather than studying the growth of cancers within the body.

Most cancers removed from an individual can not survive in a culture. Those which can adapt to life in culture become immortal cells, but they are different from most cancer cells growing within an individual.

Cancer is Latin for crab

Cell cultures are different from human cancers. The features of human cancers are fixed, but the features of cancer cell cultures change over time. Secondly, human cancer cells always show evidence of the differentiated function and structure of the organs from which they arose, but such is not the case with immortalized cell lines.

Cancers arise when the process of development of a cell is hindered by nutrient deficits or introduction of carcinogens. A good deal of evidence supports the notion that the development of cancer is an epigenetic phenomenon rather than a change of the DNA of cancer cells. In other words, genes are switched on or off, but are not added or destroyed. Dermer writes, "Cancer is the result of a breakdown in the signaling mechanisms that control the orderly activity of genes in developing cells."

One thing should be obvious from this description of cancer. Adequacy of nutrition for normal healthy development of rapidly growing cells is essential for prevention of cancer. Similarly, avoidance of toxic exposures which compromise normal development is important.

References:

Dermer, Gerald B., *The Immortal Cell*, Garden City, New York: Avery Publishing Company, 1994, 17-30, 82.

Phytonutrients

A large number of population-based studies have shown that individuals who consume five or more servings of fruits and vegetables have about half the risk of developing a wide variety of cancers. This raises the question of which fruits and vegetables are most cancer preventative and why is this so?

Anticancer fruits and vegetables work their magic by virtue of phytonutrients. Phytonutrients are chemicals produced by plants. A number of plant compounds inhibit cancer cell growth and some may actually kill cancer cells.

The protective effect of fruits and vegetables against cancer is based upon several different mechanisms. Firstly, they enhance elimination of carcinogens from the body. Secondly, they may inhibit inflammatory activity in the body. Thirdly, they may interfere with the activity of cancer cells as they seek to establish a blood supply for themselves. Fourthly, they may prevent the attachment of carcinogens to the DNA. Finally, they may have a direct toxic effect on cancer cells. The complexity of the actions of phytochemicals suggests that the overall benefit of these compounds will be a result of the synergistic effects of a variety of different compounds and the overall quantities of these substances found in the diet.

Many of the most effective anticancer compounds in fruits and vegetables are bitter, acrid, or astringent. Food producers have gone out of their way to remove these compounds from foods because consumers do not seek them out so they are not profitable. Thus selective breeding and debittering processes have greatly reduced the exposure of the average individual to plant sourced anti-cancer compounds. Many of these compounds have long been viewed as plant-based toxins.

We Eat the Wrong Foods

The take away from this should be that many of the most effective foods for prevention of cancer are the ones we are least likely to consume. The most commonly consumed vegetables in the Western diet including potatoes, carrots, lettuce, and tomato had little effect on the proliferation of cancer cells in the study conduced by Boivin. The one notable exception was the inhibition of prostate cancer cell growth by tomato. These vegetables account for 60% of the total vegetable intake in the United States. Almost one-third of vegetable intake in the United States is in the form of potatoes, and half of this potato intake is in the form of French fries.

Those with a concern for consuming a diet which will help prevent cancer must focus not only on consuming adequate servings of fruits and vegetables, but must also focus on particular foods and food groups with high anticancer properties if one is to be successful.

There is still a lot to learn about how phytonutrients function in relationship to cancer cells. Dramatic differences in the ability to inhibit cancer have been observed with different food extracts. For example, "radish extract...completely abolished the proliferation of stomach and breast cancer cells but had no inhibitory effect on tumour cells of lung, pancreas, brain and kidney origin." Yellow bell pepper and tomato were effective only against prostate cancer cell lines. Nutrient variety and nutrient density are important factors to consider in a cancer preventative diet.

References:

Boivin, Dominique, et al., Antiproliferative and antioxidant activities of common vegetables: A comparative study, *Food Chemistry* 112(2009): 374-380.

Drewnowski, Adam and Gomez-Carneros, Carmen, Bitter taste, phytonutrients, and the consumer: a review 1'2'3, *Am J Clin Nutr,* Dec. 2000; 72(6):1424-1435.

Allium Family

A study by Dominique Boivin and associates published in 2008 found that the cruciferous and allium families of vegetables inhibited the proliferation of 8 different cancer cell lines. Extracts from more commonly consumed vegetables were much less effective.

The researchers wrote, "In fact, among all the vegetables tested in this study, the extract from garlic was by far the strongest inhibitor of tumour cell proliferation with complete growth inhibition of all tested cell lines. Leek, immature (green) and mature (yellow) onions were also highly inhibitory against most cell lines..."

The antiproliferative effect of these vegetables was specific to cancerous cells and had little effect on normal cells. The anti-cancer effect was also not solely dependent upon the antioxidant properties of the vegetables. The researchers concluded, "the inclusion of cruciferous and allium vegetables in the diet is essential for effective dietary-based chemopreventive strategies."

Oommen and associates have shown that allicin causes cancer cells to commit suicide. Hirsch and associates observed that pure allicin exhibits an antiproliferative effect on cancer cells, while its precursor, alliin does not.

Allicin is released in garlic when it is crushed and allowed to sit for a

while. The enzyme which creates allicin is destroyed by heat. To obtain maximum allicin value from garlic crush or mince the garlic, set it aside, and allow it to stand for 10 minutes before using it in cooking.

The benefits of the allium family of vegetables is not limited to garlic. Onion oil has also been shown to have a dose dependent inhibitory activity against cancer cells. Dose dependency is an important concept when discussing the anticancer effects of fruits and vegetables. It simply means that the greater the consumption of the anticancer compounds in the foods the greater the inhibitory effect against cancer development.

A study by Sidney Belman found that onion oil was more inhibitory of tumor formation than was garlic oil. Quercetin is an antioxidant flavonoid with anticarcinogenic properties found in onions. Quercetin from onions was found to be three times more available from onions than from apples, another excellent source of the nutrient. Even low dose intake of quercetin can inhibit cancer cell development. Quercetin may be particularly helpful against chemically induced cancers.

References:

Boivin, Dominique, et al., Antiproliferative and antioxidant activities of common vegetables: A comparative study, *Food Chemistry* 112(2009): 374-380.

Oommen, Suby, et al., Allicin (from garlic) induces caspase-mediated apoptosis in cancer cells, *European Journal of Pharmacology,* February 2004; 485(1-3):97-103.

Song, Kun, et al., The influence of heating on the anticancer properties of garlic, *The Journal of Nutrition*, 131; 2001, 1054S-1057S.

Hirsch, Karen, et al., Effect of purified allicin, the major ingrediet of freshly crushed garlic, on cancer cell proliferation, *Nutrition and Cancer*, 2000;38(2):245-254.

Belman, Sidney, Onion and garlic oils inhibit tumor promotion, *Carcinogenesis*, 1983;4(8):1063-1065.

Hollman, Peter C.H., et al., Bioavailability of the dietary antioxidant flavonol quercetin in man, *Cancer Letters*, March 1997; 114(1-2):139-140.

Jeong, Jae-Hoon, et al., Effects of low dose quercetin: Cancer cell-specific inhibition of cell cycle progression, *J Cell Miochem*, Jan 1,2009; 106(1):73-82.

Murakami, Akira, et al., Multitargeted cancer prevention by quercetin, *Cancer Letters*, October 8, 2008; 269(2):315-325.

Cruciferous Vegetables

Cruciferous vegetables have a potent inhibitory effect on most cancer cell lines tested. This effect has been traced to glucosinolates which are converted to isothiocyanates. Kale and Brussels sprouts contain very large quantities of glucosinolates and are among the most effective cruciferous vegetables in inhibiting cancer cell growth.

These vegetables help reduce risk of cancer by reducing production of substances which can trigger cancer development as well as by triggering cell suicide (apoptosis) of cancer cells.

The cruciferous vegetables with the greatest effectiveness in cancer prevention include Brussel sprouts, kale, cabbage, curly cabbage, cauliflower and broccoli.

One concern with cruciferous vegetables is their activity as goitrogenic agents. In other words, they block iodine uptake and can suppress thyroid function when consumed to excess.

Boiling significantly reduces the levels of anticancer compounds in cruciferous vegetables, while steaming or stir fry does not. Overcooking of Brussels sprouts results in the formation of a strong odour and flavor which some find undesirable.

Significant quantities of the anticancer compounds in cruciferous vegetables can be lost between the time of harvest and the point of retail sale. Losses of up to 80% can occur. One study concluded, "we can conclude that a long exportation and distribution would significantly reduce the levels of health-promoting compounds of broccoli...In general, our results were worse than we anticipated." Sadly, these researchers found that the broccoli could look just fine even though the majority of the beneficial nutrients were lost within a ten day period.

Detox Powerhouses

To understand the mechanism of action of the anticancer compounds in cruciferous vegetables one must understand the means by which the liver deals with carcinogenic substances. Detoxification take place in two steps. Phase one makes chemicals more soluble but also more toxic. Phase two removes these toxic chemicals from the body. The compounds in cruciferous vegetables can decrease the activity of phase one detoxification or increase the rate of phase two activity, and some cruciferous compounds can accomplish both of these tasks. Cruciferous vegetables are detox powerhouses slowing down the production of carcinogenic substances in the body and speeding their removal from the tissues.

References:

http://en.wikipedia.org/wiki/Isothiocyanate

http://en.wikipedia.org/wiki/Brussels_sprout

Vallejo, Fernando, et al., Health-promoting compounds in broccoli as influenced by refrigerated transport and retail sale period, *Journal of Agricultural and Food Chemistry*, 2003;51(10):3029-3034.

Hecht, Stephen S., Chemoprevention of cancer by isothiocyanates, modifiers of carcinogen metabolism, *J. Nutr.*, March 1, 1999; 129(3):768S-774S..

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LEAFY GREENS

Leafy greens possess anticancer properties and are also high in antioxidants. Studies have shown that red forms of kale and lettuce have substantially greater antioxidant value than green forms. The outer leaves of lettuce which are exposed to the sun and elements possess much greater antioxidant content than the inner leaves.

Kale, a cruciferous vegetable, is the king of the leafy greens. Kale is one of the few cultivated foods which meets or exceeds the nutritional value of wild greens. Unfortunately, the Environmental Working Group's "Dirty Dozen" tagged kale and collard greens as often being tainted with unusually hazardous pesticides.

REFERENCES:

http://www.ewg.org/foodnews/

Ozgen, S., Effect of leaf position on the distribution of phytochemicals and antioxidant capacity among green and red lettuce cultivars, *SJAR*, 2011;9(3):801-809.

Robinson, Jo, *Eating on the Wild Side*, New York: Little, Brown and Company, 2013, 168-170.

SOYBEAN

Those who consume large quantities of soy appear to have lower incidence of a number of cancers. Prostate and breast cancers in the United States are 4 to 10 times more common than they are in southeast Asia where soy consumption is much higher. Americans eat less than 3 grams of soy a day while Chinese eat 10 grams per day and those in Japan and Taiwan consume 30-50 grams a day. Risk of these cancers rises to equal that of Americans within one generation of moving to the United States.

A recent study may shed some light on the ability of soy to reduce cancer risk. A powerful new anticancer protein called lunasin has been isolated from the soybean. Lunasin selectively kills cells being transformed or newly transformed into cancer cells. The substance appears to prevent the development of cancer, but does not affect established cancer cells or normal cells. The effect is epigenetic. Lunasin alters the manner in which the DNA expresses itself.

Soybeans also contain genestein which has weak estrogenic activity and acts as an antiestrogen. Genestein also inhibits the activation of the genes for tyrosine kinases, a necessary step in the development of cancer.

REFERENCES:

de Lumen, Ben o., Lunasin: A cancer-preventative soy peptide, *Nutrition Reviews*, January 2005, 63(1):16-21.

Messina, Mark J., et al., Soy intake and cancer risk: A review of the in vitro and in vivo data, *Nutrition and Cancer*, 1994;21(2):113-131.

http://en.wikipedia.org/wiki/Tyrosine_kinase

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