Image Awareness
Wellness Institute
Combating Cancer

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Introduction

One of the most frequent questions I am asked is what can be done to prevent cancer and to fight cancer. This newsletter will focus on lifestyle changes that work to prevent cancer and can help combat it when a cancer is being medically treated.

To successfully address cancer one must consider how to enhance immune function, how to reduce inflammation in the body, how to prevent cancers from recuiting a blood supply, how to deprive cancer cells of glucose, and how to preserve the health of the mitochondria where energy is produced in the cells by avoiding exposure to toxins.

Immune Enhancement

One of the most virulent strains of cancer used by researchers is sarcoma 180 or S180. When injected into mice these cancer cells form a tumor mass that doubles every 10 hours. Fluids build up in the abdomen and the animals usually survive less than a month.

The mystery began in 1999 when researcher Liya Qin injected mouse number 6 with 200,000 cancer cells. The mouse did not get cancer. Thinking she had failed to inject the mouse she repeated the process with 400,000 cancer cells. The mouse still refused to develop cancer. Determined to give the mouse cancer the experiment was repeated giving the mouse 2,000,000 cancer cells. The mouse still refused to get cancer.

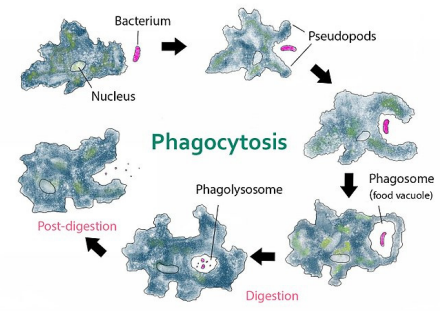
This experiment led to the discovery of SR/CR mice. CR stands for "complete resistance" to cancer, while SR stands for "spontaneous regression." In the latter situation cancer would appear then spontaneously go away.

Qin's boss would later inject that mouse with 200,000,000 cancer cells only to find that that mouse had an immune system that could more effectively fight cancer than the average mouse.

Mouse 6 was bred and half of his grandchildren had this enhanced ability to fight cancer. Researchers actually injected a quantity of cancer equal to 10% of the body weight of the animals and their immune systems would destroy all the cancer cells.

As the mice aged the mice did develop tumors. The effectiveness of the immune system declined with age. However, these remarkable mice had immune systems that awakened to fight the tumors after about two weeks.

The secret proved to be the body's natural killer cells (NK).



They release chemical weapons capable of killing cancer cells.

Work with organ transplants suggests that many individuals may have microtumors or small tumors which the immune system keeps in check so they are not harmful. When patients receive a transplanted kidney or other organ with these small tumors, problems can result. These patients are put on immune suppressing drugs to prevent rejection of the transplanted organ. This same immune suppression can activate these small tumors leading to cancer growths and death of the recipient of the transplanted organ.

Many individuals may have small in size "dormant" tumors kept in check by the immune system. When the immune system is compromised these tumors can flare up and become dangerous.

Natural Killer Cells

Natural killer cells are important for keeping tumors in check. Studies of older people have shown a decline in activity of these cells with deficiencies of zinc and selenium. In women, folic acid, CoQ10 and vitamin E also appear important for natural killer cells. Reducing fat intake can significantly increase the numbers and activity of natural killer cells.

Those with unregulated blood sugar such as diabetics and prediabetics have lower natural killer cell activity. Cheraskin demonstrated in the 1970's

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that loads of sugar could impair functioning of the white blood cells for hours after consumption of the sugar.

Sanchez and associates found that sugars did not decrease numbers of white blood cells, but substantially decreased their activity for up to 5 hours after sugar was consumed. On the other hand, fasting for 24-60 hours substantially increased the activity of white blood cells

An article by Greve and associates begins, "A high dietary intake of carotenoids has been found to be inversely related to the risk of many types of cancer. In laboratory animals the development of tumors can be slowed down, prevented, or reversed by carotenoid administration." Cruciferous compounds and polyphenols also have the ability to enhance natural killer cell activity.

Fluidity and Immune Function

The fluidity of the cell membrane is important for immune function. One study demonstrated that supplementation with carotenoids increased lymphocyte proliferation by 37% in 20 days and enhanced the activity of natural killer cells by over 20%. Carotenoids and other antioxidants prevent the high quality oils in the membranes of immune cells from oxidizing decreasing fluidity and impairing immune activity.

Two important factors in overall immune competence are the quality of the oils in the diet and the range of antioxidants to protect those oils. The oils should be highly fluid and also anti-imflammatory. The most important antioxidants are those that protect lipid membranes such as carotenoids and vitamin E.

Years ago I learned that lead hardens or tans cell membranes impairing fluidity. Lead poisoned cells have difficulty moving through capillaries. Immune cells with hardened cell membranes have difficulty reproducing more immune cells as well as having difficulty moving to the site of where work in the body needs to be done.

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Inflammation

Inflammation is a nonspecific response to cell damage. Normally when there is an overproduction of cells a process called apoptosis or cell suicide is triggered. Apoptosis is turned off by inflammation. One wants cells to proliferate with tissue damage so healing can take place. Cancer cells take advantage of the inflammaotory process to prevent apoptosis and to disarm cells that might attack the cancer. The larger a tumor becomes the more inflammation it causes and the more aggressive the cancer becomes. Cancers are more likely to develop where inflammation is constant as in infection with Hepatitis B, H pylori infection (ulcers), and ulcerative colitis.

Researchers have identified several inflammatory molecules including nuclear factor-kappaB or NF-Kappa B, interleukin 6, and tumor necrosis factor as contributing to the development and growth of cancers. Blocking these compounds robs cancer cells of immortality and inhibits the spread of cancer--metastases.

The body has a means of turning off the inflammatory response when it is no longer needed or is becoming harmful. The key factors which bring an end to the inflammatory response are called resolvins and protectins. These substances are derived from the omega-3 fats EPA and DHA.

One of the primary dietary sources of inflammatory compounds is consumption of a fat called arachidonic acid. This fat initiates an inflammatory cascade in the body and also increases the risk of blood clots. In one study injection of arachidonic acid into rabbits caused death of the animals in minutes due to blood clots.

It was long thought that the omega-3 fatty acids reduced inflammation and the risk of cancer by reducing levels of arachidonic acid within cell membranes. The omega-3 fats do this, but a fuller understanding is that they are the precursors to inflammation reducing resolvins and protectins. Resolution of inflammation in the body is an active process, not a passive one. Adequate quantities of both EPA and DHA are necessary for the full complement of anti-inflammatory compounds to be produced resulting in the resolution of an inflammatory response. Each of these fats results in a different family of inflammation resolving compounds.

Another common source of inflammation is the high fat, high sugar diet common to many individuals. Campbell points out that such a diet

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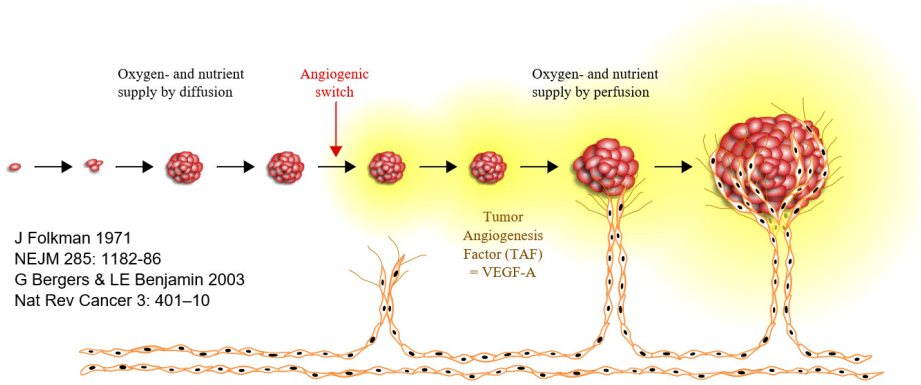

for one month increases internally produced toxins (referred to as endotoxins) by 71% leading to inflammation throughout the body. Much of this inflammation is associated with lipopolysaccharides (LPS), substances released into the digestive tract by harmful bacteria as they die.

Low fat, low sugar meals and probiotic supplementation offer the promise of reducing levels of these internally produced toxins reducing inflammation and the risk of diabetes and cancer.

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Angiogenesis

Angiogenesis refers to the genesis or creation of blood vessels to nourish cancer cells. Cancer cells are hungry cells and cutting off the blood supply to a tumor is a major roadblock to the development of the cancer.

The term angiogenesis was coined by a medical officer in the U.S Navy in the 1960's named Judah Folkman, M.D. In attempting to preserve stocks of fresh blood for surgery for months on board nuclear aircraft carriers he discovered that cancer cells could barely survive without a blood supply, but they could not grow into tumors unless they could create or recruit blood vessels to supply oxygen and nutrients and to carry away waste products.

Folkman's theory received the same type of reception as that of other great medical pioneers before him. He published his work in the *New England Journal of Medicine* in 1971. He was afraid that other competing labs would copy his research program. John Enders, a Nobel laureate in medicine, told Folkman, "You are totally protected against intellectual theft. Nobody will believe you!"

Enders was right. Folkman was treated as a charlatan and he even lost his position as head of the surgery department at Children's Hospital.

Folkman's theory was developed through painstaking research. He concluded that microtumors cannot grow into dangerous cancers unless they can create a new network of blood vessels to feed themselves. They do this by producing a compound called angiogenin that forces blood vessels to grow toward the cancer cells and produce more blood vessels.

Metastases, cancer cells that spread to new locations, must also recruit blood vessels to be viable. Large primary tumors inhibit the growth of secondary tumors by producing angiostatin which blocks the formation of blood vessels to nourish these remote cancers or metastases. This is why secondary tumors often start growing when a primary tumor is removed.

Michael O'Reilly, a researcher in Folkman's lab eventually isolated angiostatin from mouse urine and demonstrated it could protect mice from developing lung cancer. After 20 years of scorn, the successful research was published in the journal *Cell* in 1994.

Pharmaceutical firms have attempted to develop drugs that function like angiostatin, but results have been largely unsuccessful with serious side-effects as well.

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https://commons.wikimedia.org/wiki/File:Tumor_angiogenesis.svg

Some Applications

Growth Inhibitors

Numerous studies have been done on foods, juices, and extracts that inhibit cancer growth. Among the most inhibitory of cancer growth in some studies are allium vegetables (garlic, leeks, scallions, and onions. Cruciferous vegetables (broccoli, brussels sprouts, cabbage and cauliflower) are also very powerful. The catechins in green tea are one of the most potent inhibitors of angiogenesis. Similar inhibitory compounds have been found in edible berries and pomegranates. A number of carotenoids have also been shown to inhibit cancer growth.

Omega-3 Fats

Fish are generally a good source of anti-inflammatory omega-3 fatty acids including EPA and DHA.

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Generally, farmed fish have lower levels than wild caught fish.

It is important to realize that the type of fat accumulating in the body of an animal or human being is dependent upon the diet. Diets high in corn tend to result in production of inflammatory fat.

Glycemic Index and Load

There is a listing of the glycemic index and glycemic load of different foods under the "Tools" tab at www.imageawareness.com. Sugars feed cancer. At a minimum glycemic load of foods should be below 11 and gycemic index should be below 55.

Sugar Intake

Abnormalities of blood sugar metabolism and total intake of sugars are both related to increased risk of cancer. Intake of sugar in liquid form as with sodas is a major risk. One study by Li and associates concludes, "Our findings suggest the consumption of sugary beverages may increase the risk and mortality of cancer..."

A review of the relationship between diabetes and cancer concluded in one study with the observation that "Epidemiologic evidence suggests that individuals with diabetes are at significantly higher risk for many forms of cancer..."

Cell Damage

To minimize risk of cancer it is important to consume pure drinking water and consume foods as free as possible of chemicals. It is worthwhile taking a look at the Environmental Working Group's Dirty Dozen and Clean Fifteen listings of foods. This serves as a guide to which foods should be organic and which pose little risk if conventionally grown.

The only way to be assured of safe drinking water is to obtain a purification or distillation unit at the tap. Chlorine alone is associated with increased risk of bladder cancer.

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