Nutrition and cancer:
A review of the evidence for an anti-cancer diet

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This article has 238 references.

FROM ABSTRACT:

It has been estimated that 30-40 percent of all cancers can be prevented by lifestyle and dietary measures alone.

Obesity, nutrient sparse foods such as concentrated sugars and refined flour products that contribute to impaired glucose metabolism (which leads to diabetes), low fiber intake, consumption of red meat, and imbalance of omega 3 and omega 6 fats all contribute to excess cancer risk.

Intake of flax seed, especially its lignan fraction, and abundant portions of fruits and vegetables will lower cancer risk.

Allium and cruciferous vegetables are especially beneficial, with broccoli sprouts being the densest source of sulforophane.

Protective elements in a cancer prevention diet include selenium, folic acid, vitamin B-12, vitamin D, chlorophyll, and antioxidants such as the carotenoids (alpha-carotene, beta-carotene, lycopene, lutein, cryptoxanthin).

Ascorbic acid has limited benefits orally, but could be very beneficial intravenously.

Supplementary use of oral digestive enzymes and probiotics also has merit as anticancer dietary measures.

When a diet is compiled according to the guidelines here it is likely that there would be at least a 60-70 percent decrease in breast, colorectal, and prostate cancers, and even a 40-50 percent decrease in lung cancer, along with similar reductions in cancers at other sites.

Such a diet would be conducive to preventing cancer and would favor recovery from cancer as well.

THIS AUTHOR ALSO NOTES:

Nutrition plays a major role in cancer.

It is "estimated by the American Institute for Cancer Research and the World Cancer Research Fund that 30-40 percent of all cancers can be prevented by appropriate diets, physical activity, and maintenance of appropriate body weight."

This article focuses on the dietary factors which increase the risk of cancer and on the dietary factors that add protective factors and reduce cancer risk.

OVERALL CONSUMPTION OF ENERGY (Calories)

"Eating too much food is one of the main risk factors for cancer."

Obesity increases the risks of malignancies.

Eating less food protects one from cancer.

Obesity has reached epidemic proportions in the United States; 64% of the adult population is overweight or obese."

Poor diet and physical inactivity is the second leading cause of death (400,000 per year) in the USA, and will likely overtake tobacco as the leading cause of death. **[Mokdad AH, Marks JS, Stroup DF, Gerberding JL: Actual causes of death in the United States, 2000. *JAMA,* 2004, 291:1238-1245.]**

"Significant positive associations were found between obesity and higher death rates for the following cancers: esophagus, colon and rectum, liver, gallbladder, pancreas, kidney, stomach (in men), prostate, breast, uterus, cervix, and ovary."

About 90,000 cancer deaths per year could be avoided if the adult population all maintained a normal weight.

"Clearly, obesity is a major risk factor for cancer."

CRON: Calorie Restriction with Optimal Nutrition.

The basic idea is to eat a reduced amount of food (about 70-80 % of the amount required to maintain "normal" body weight) while still consuming all of the necessary amounts of vitamins, minerals, and other necessary nutrients.

"This approach has a lot of scientific merit for being able to extend average life spans of many species of animals including rats, mice, fish, and possibly primates (currently being tested)."

"Along with this life span extension is a reduction in chronic diseases that are common to mankind." **[Hursting SD, Lavigne JA, Berrigan D, Perkins SN, Barrett JC: Calorie restriction, aging, and cancer prevention: mechanisms of action and applicability to humans. *Annu Rev Med* 2003].**

GLUCOSE METABOLISM

"Refined sugar is a high energy, low nutrient food—junk food."

"Unrefined sugar (honey, evaporated cane juice, etc) is also very concentrated and is likely to contribute to the same problems as refined sugar."

"Refined wheat flour products are lacking the wheat germ and bran, so they have 78% less fiber, an average of 74% less of the B vitamins and vitamin E, and 69% less of the minerals."

"Concentrated sugars and refined flour products make up a large portion of the carbohydrate intake in the average American diet."

"The glycemic index is an indication of the blood sugar response of the body to a standardized amount of carbohydrate in a food."

There is an association between a diet with a high glycemic load and cancer.

"Foods which contribute to hyperinsulinemia, such as refined sugar, foods containing refined sugar, and refined flour products should be avoided and eliminated from a cancer protective diet."

LOW FIBER

"Unrefined plant foods typically have an abundance of fiber."

"Dairy products, eggs, and meat all have this in common--they contain no fiber."

"Refined grain products also have most of the dietary fiber removed from them."

"So, a diet high in animal products and refined grains (a typical diet in the USA) is low in fiber."

Low fiber diets are associated with a variety of cancers.

"A threshold of about 5 daily servings of vegetables was needed to reduce cancer risk."

Many other nutrients are co-variants with fiber, including folic acid.

RED MEAT

"Red meat has been implicated in colon and rectal cancer."

"A Medline search in February 2003 uncovered 26 reports of human studies investigating the link between diet and colon or colorectal cancer."
Red meat and processed meat is significantly associated with colorectal cancer.

OMEGA 3:OMEGA 6 RATIO IMBALANCE:

"Omega 3 fats (alpha-linolenic acid, EPA, DHA) have been shown in animal studies to be protect from cancer, while omega 6 fats (linoleic acid, arachidonic acid) have been found to be cancer promoting fats."

Treatment of breast cell cultures with N-3 fats (EPA or DHA) results in increased expression of cancer protection genes.

"Flax seed oil and DHA (from an algae source) both can be used to increase the intake of N-3 fat, with DHA being a more efficient, sure source."

Flax seed is an excellent source of dietary fiber, omega 3 fat (as alpha-linolenic acid), and lignans.

Flax seed is a more potent source of phytoestrogens than soy products.

Ground flax seed significantly reduces the incidence of a number of cancers.

"Ground flax seed may be a very beneficial food for men battling prostate cancer." **[The Key Is Ground Flax Seed]**

"A meta-analysis of nine cohort and case-control studies revealed an association between flax seed oil intake or high blood levels of alpha-linolenic acid and prostate cancer risk. It is quite likely that the lignans in flax seed are a major component of flax's anti-cancer effects so that flax oil without the lignans is not very beneficial." **[Extremely Important]**

FRUITS AND VEGETABLES

"One of the most important messages of modern nutrition research is that a diet rich in fruits and vegetables protects against cancer."

"The greatest message is that this same diet protects against almost all other diseases, too, including cardiovascular disease and diabetes." **[THE KEY]**

Vegetables, and particularly raw vegetables, are protective against most cancers.

"Allium vegetables (garlic, onion, leeks, and scallions) are particularly potent and have separately been found to be protective for stomach and colorectal cancers and prostate cancer."

There is a significant correlation between saturated fat intake and breast cancer.

CRUCIFEROUS VEGETABLES

"Cruciferous vegetables (broccoli, cauliflower, cabbage, Brussels sprouts) contain sulforophane, which has anti-cancer properties."

Sulforophane significantly reduces the incidences of many types of cancers.

"One sprout contains all of the sulforophane that is present in a full-grown broccoli plant. So, if sulforophane is especially cancer-protective, it would seem reasonable to include some broccoli sprouts in an anti-cancer diet."

SELENIUM

"Selenium is a mineral with anti-cancer properties."

Selenium helps enzymes to encourage cancerous cells to undergo apoptosis [suicide].

Selenium is a component of the antioxidant enzyme glutathione peroxidase.

Selenium improved the immune systems' ability to respond to infections.

Selenium causes the formation of natural killer immune cells.

Selenium inhibits prostaglandins that cause inflammation.

Selenium enhances male fertility by increased sperm motility.

Low selenium levels are a cancer risk.

"Good vegetarian sources of selenium are whole grains and legumes grown in selenium-rich soil in the western United States, brazil nuts (by far the most dense source of selenium), nutritional yeast, brewers yeast, and sunflower seeds."

CHLOROPHYLL

"All green plants also contain chlorophyll, the light-collecting molecule."

"Chlorophyll and its derivatives are very effective at binding polycyclic aromatic hydrocarbons (carcinogens largely from incomplete combustion of fuels), heterocyclic amines (generated when grilling foods), aflatoxin (a toxin from molds in foods which causes liver cancer), and other hydrophobic molecules."

"The chlorophyll-carcinogen complex is much harder for the body to absorb, so most of it is swept out with the feces".

The chlorophyll is quite chemoprotective, including when supplemented at 100 mg of chlorophyllin three times a day.

PROTECTIVE VITAMINS

VITAMIN B-12

Methylcobalamin, but not cyanocobalamin, help protect against cancer.

There is evidence showing that "vitamin B-12 is an important nutrient for genetic stability, DNA repair, carcinogenesis, and cancer therapy."

FOLIC ACID

"Folic acid is the dark green leafy vegetable vitamin. It has an integral role in DNA methylation and DNA synthesis."

Folic acid works in conjunction with vitamin B-6 and vitamin B-12.

"If insufficient folic acid is not available uracil is substituted for thymidine in DNA, which leads to DNA strand breakage."

"Alcohol is an antagonist of folate, so that drinking alcoholic beverages greatly magnifies the cancer risk of a low-folate diet."

"The cancer risk associated with low folate intake is probably higher for colon cancer than for breast cancer."

The "risk of cancer due to family history can be modified by high folate intake, so a prudent anti-cancer diet would be high in dark green leafy vegetables."

VITAMIN D

"Vitamin D is produced primarily from the exposure of the skin to sunshine. Even casual exposure of the face, hands, and arms in the summer generates a large amount of vitamin D."

Standing on a sunny beach until a slight pinkness of the skin occurs is equivalent to a 20,000 IU oral dose of vitamin D2.

"It has been estimated that 1,000 IU per day is the minimal amount needed to maintain adequate levels of vitamin D in the absence of sunshine, and that up to 4,000 IU per day can be safely used with additional benefit." **[IMPORTANT]**

The active hormonal form of vitamin D has potent anti-cancer properties.

Sunshine derived vitamin D [25(OH)D] is converted into anti-cancer hormonal vitamin D [1,25(OH)2D] by prostate cells, colon tissue, breast, ovarian and cervical tissue, pancreatic tissue and lung cell.

Vitamin D has been shown to protect against prostate, pancreatic, colon, breast, ovary, bladder, esophageal, lung, rectal, stomach, endometrial, and renal cancer, as well as multiple myeloma, and non-Hodgkin's lymphoma.

ANTIOXIDANTS

ALPHA- and BETA-CAROTENE and other CAROTENOIDS

Carotenoids are colorful plant compounds.

"Beta-carotene may be a marker for intake of fruits and vegetables, but it does not have a powerful protective effect in isolated pharmacological doses. **[IMPORTANT]**

"There is a large body of literature that indicates that dietary carotenoids are cancer preventative."

The overall intake of carotenoids is more protective than a high intake of a single carotenoid. "So, a variety of fruits and vegetables is still a better anti-cancer strategy than just using a single vegetable high in a specific carotenoid."

"The richest source of alpha-carotene is carrots and carrot juice, with pumpkins and winter squash as a second most-dense source."

"The most common sources of beta-cryptoxanthin are citrus fruits and red sweet peppers."

LYCOPENE

Of the various carotenoids, lycopene is very protective for prostate cancer.

"The major dietary source of lycopene is tomatoes, with the lycopene in cooked tomatoes being more bioavailable than that in raw tomatoes."

Lycopene is found in tomatoes, tomato sauce, tomato juice, and pizza sauce.

"Lycopene or frequent tomato intake is associated with about a 30-40% decrease in risk of prostate cancer, especially advanced prostate cancer."

Supplementation with 30 mg/day of lycopene slowed the growth of prostate cancer.

VITAMIN C

Low blood levels of vitamin C are detrimental to health and vitamin C is correlated with overall good health and cancer prevention.

"Use of vitamin C for cancer therapy was popularized by Linus Pauling."

At high concentrations vitamin C is toxic to cancer cells.

Oral doses of vitamin C, even in multiple divided doses, are not as effective as intravenous administration. **[IMPORTANT]**

Intravenous vitamin C may be a very beneficial adjuvant therapy for cancer with no negative side effects when administered properly.

OTHER ANTIOXIDANTS

"Grape seed extract contains proanthocyanidin, which shows anti-carcinogenic properties.

Green tea contains a flavanol that inhibits cancer.

PROBIOTICS

"The bacteria that reside in the intestinal tract generally have a symbiotic relationship with their host."

"Beneficial bacteria produce natural antibiotics to keep pathogenic bugs in check (preventing diarrhea and infections) and produce some B vitamins in the small intestine where they can be utilized."

Beneficial bacteria help with food digestion by providing extra enzymes.

"Beneficial bacteria help strengthen the immune system right in the gut where much of the interaction between the outside world and the body goes on."

"Beneficial bacteria can help prevent food allergies."

Good bacteria help prevent cancer at various stages of development.

Good bacteria can improve mineral absorption.

"The balance of beneficial and potentially pathogenic bacteria in the gut is dependent on the diet."

"Vegetable fiber encourages the growth of beneficial bacteria."

Probiotics help prevent cancer, especially colon cancer, and even reverse cancer.

"Probiotics produce short chain fatty acids in the colon, which acidify the environment. Lower colon pH is associated with lower incidence of colon cancer."

Probiotic bacteria reduce the level of procarcinogenic enzymes.

ORAL DIGESTIVE ENZYMES

Many people diagnosed with cancer have digestion disorders.

"Impaired digestion will greatly hinder a nutritional approach to treating cancer. If the nutrients cannot be released from the food and taken up by the body."

Digestive enzyme supplements are used to ensure proper and adequate digestion of food.

Digestive enzymes improved the digestibility and bioaccessibility of proteins and carbohydrates in the lumen of the small intestine.

A strong anti-metastatic effect is seen with the use of proteolytic enzymes.

Digestive enzymes improve digestion and lessen the digestive burden on the body, leaving more reserves for disease eradication.

WHOLE DIET STUDIES

"A diet-based cancer therapy, the Gerson Therapy, was used to treat melanoma cancer. The five-year survival rates from their therapy compared very favorably to conventional therapy reported in the medical literature, especially for more advanced stages of melanoma."

A salad vegetable diet is associated with a significantly lower risk of breast cancer, about 35-61% lower.

The "western" diet, with its "higher intakes of red meat and processed meats, sweets and desserts, French fries, and refined grains, was associated with a 46% increase relative risk of colon cancer."

CONCLUSIONS

This anticancer diet would have:

1) Adequate, but not excessive calories.
2) 10 or more servings of vegetables a day, including cruciferous and allium vegetables; vegetable juice could meet part of this goal.
3) 4 or more servings of fruits a day that are high in fiber.
4) No refined sugar.
5) No refined flour.
6) Low in total fat, but containing necessary essential fatty acids.
7) No red meat.
8) A balanced ratio of omega 3 and omega 6 fats and would include DHA.
9) Flax seed as a source of phytoestrogens.
10) Supplemented with ~200 µg/day selenium.
11) Supplemented with 1,000 µg/day methylcobalamin (B-12).
12) Very rich in folic acid (from dark green vegetables).
13) Adequate sunshine to get vitamin D, or use 1,000 IU/day supplement.
14) Very rich in antioxidants and phytochemicals from fruits and vegetables, including alpha-carotene, beta-carotene, beta-cryptoxanthin, vitamin C and vitamin E (from foods).
15) Very rich in chlorophyll.
16) Supplemented with beneficial probiotics.
17) Supplemented with oral digestive enzymes.

With such a diet, "certainly cancer prevention would be possible, and cancer reversal in some cases is quite likely.

KEY POINTS FROM DAN MURPHY

1) Nutrition plays a major role in cancer.

2) 30-70% of all cancers can be prevented by lifestyle and dietary measures alone.

3) The major factors that increase cancer risk are:
3A)) Obesity.
3B)) Refined carbohydrates because they are high in calories but low in nutrients.
3C)) Low fiber intake
3D)) Consumption of red meat
3E)) Imbalance of omega 3 and omega 6 fats.

4) Vitamin C works best for cancer prevention if it is used intravenously.

5) Eating too much food is one of the main risk factors for cancer. Eating less food protects one from cancer.

6) 64% of the adult US population is overweight or obese.

7) Poor diet and physical inactivity is the second leading cause of death (400,000 per year) in the USA, and will likely overtake tobacco as the leading cause of death.

8) About 90,000 cancer deaths per year could be avoided if the adult population all maintained a normal weight.

8) Refined sugar is a high energy, low nutrient food—junk food.

9) Unrefined sugar (honey, evaporated cane juice, etc) is also very concentrated and is likely to contribute to the same problems as refined sugar.

10) There is an association between a diet with a high glycemic load and cancer.

11) Dairy products, eggs, and meat all contain no fiber. Low fiber diets are associated with a variety of cancers.

12) A threshold of about 5 daily servings of vegetables per day is needed to reduce cancer risk.

13) Red meat and processed meat is significantly associated with colorectal cancer.

14) Omega 3 fats (alpha-linolenic acid, EPA, DHA) protect from cancer, while omega 6 fats (linoleic acid, arachidonic acid) promote cancer.

15) Ground flax seed significantly reduces the incidence of a number of cancers.

16) A diet rich in fruits and vegetables protects against cancer.

17) A diet rich in fruits and vegetables also protects against almost all other diseases, too, including cardiovascular disease and diabetes.

18) There is a significant correlation between saturated fat intake and breast cancer.

19) Low selenium levels are a cancer risk because selenium is a mineral with anti-cancer properties.

20) All green plants also contain chlorophyll, and chlorophyll is very chemoprotective.

21) The B vitamins folic acid, B6 and B12 (methylcobalamin, not cyanocobalamin), work together to help protect against cancer.

22) Vitamin D has potent anti-cancer properties, and most adults should by supplementing it at 1000 IU per day.

23) Dietary carotenoids are cancer preventative.

24) The carotenoid lycopene is very protective for prostate cancer, and its best natural source is in cooked tomatoes cooked tomatoes.
[I have a different reference that says watermelon is better].

25) Vitamin C is correlated with overall good health and cancer prevention.

26) Good gut bacteria [which can be destroyed by antibiotics] produce natural antibiotics, improve digestion, strengthen the immune system, help prevent food allergies, improve mineral absorption, and help prevent cancer.

27) Good gut bacteria c an be promoted with probiotic, and help prevent and reverse cancer, especially colon cancer.

28) Many people with cancer have digestion disorders that are improved with digestive enzymes.