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Cancer Prevention and Cancerogens

Huriye Şenay Kızıltan*

Department of Radiation Oncology, Bezmialem Vakif University, Turkey

***Corresponding author:** Huriye Şenay Kızıltan, Department of Radiation Oncology, Faculty of Medicine, Bezmialem Vakif University, Istanbul, Turkey; Email: huriye_kiziltan_7@hotmail.com

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CANCER

Cancer is the acquisition of cells the ability to overgrow. Carcinogens or mutations are most prominent causes of cancer. Despite so much of these mutations, about only 50-200 cancerous cells can develop each day. These cancer cells are consequently abolished successfully by the immune system. In the case of rapid progressing tumours, the tumour emerges in 5 years at the earliest. The tumour can gain the ability to grow exponentially within the period of months, only after it has reached a certain size. It is almost impossible to detect the tumour through investigations before it reaches a size of 1cm [1,2].

The most important group of oncogenic factors are viral oncogenes, growth factors, growth factor resembling insulin and retinoblastoma gene [1-3].

When P^{53}genedoes not work properly, the newly developed cancer cells cannot be killed. DNA might be damaged as a result of exposure to radiation and to viruses [2].

During periods of rapid growth, cells divide rapidly. Since these rapidly dividing cells are very susceptible, they are influenced easily by the external factors in such as fetus.

Cells can be in 4 different stages during their life cycle. Three of these stages are preparation phases for division. Cells are more stable in the G0 resting phase and in S phase, in which protein synthesis takes place. P^{34} gene stimulation, promotes the reproduction of cancer cells, while P^{53} has a reverse function [2,4].

Cells are most susceptible during the mitosis phase. Even the minor external factors may kill or damage the cells in this phase. Therefore children are significantly more susceptible to carcinogen substances [4].

The Role of Free Radicals

Oxygen is very important for our body. Oxygen enters into the cells and reacts with chemical substances and compounds. These oxidized substances are termed free radicals or free oxygen radicals [5].

If there were no free radicals, some chemical reactions would be absent and the chain would break, while energy is being produced through the burning of glucose with oxygen. These radicals kill the cancerous cells; meanwhile also killing the surrounding normal cells. Without these radicals, radiotherapy would be useless [5].

The Role of Enzymes which Antioxidant

Superoxide dismutase renders the superoxide radical non-injurious. Catalase enzyme decreases the formation of hydroxyl radicals Sulfhydryl proteins renders peroxide and hydroxyl radicals harmless [6].

Importance of Acid-base Balance

The pH value should be between 7.2 and 7.4. The probability to get cancer increases with the increasing acidity in the body. PH 7.2 indicates acidification, while 7.4 shows basic, i.e. alkaline balance. Substances that have the most acidifying effect on blood are sugary substances. Meat and meat products also acidify the blood. Fruits and vegetables, calcium, magnesium and potassium increase the alkalinity of blood by 80%, thereby protecting from cancer [7].

Inflammation

Approximately 30% of cancer cases were occurs due to inflammation. Colon cancers, kidney cancer and numerous other cancers develop on an inflammatory background [8]. However, at times, the inflammation gets so intense that even cancer cells cannot endure it and may die.

Obesity and Calorie intake

Sweet foods, bakery foods, milk and dairy products increase the fat tissue and are the most important causes of hormone sensitive cancers. Losing weight fast with the reasoning that fat tissues produce estrogen is very destructive. Losing weight fast is also damaging even if there is no risk of cancer [9-11]. If the body-mass index is 40% higher than it should be, the risk of cancer

rises by 50-60%. Risk of breast cancer increases 2 folds when there is a weight gain of more than 10kg during the period from menarche to menopause [12].

CARCINOGENS

Cancer causing external substances that we are exposed to are called carcinogen substances. Plenty of carcinogen substances are taken in through the environmental factors, principally through the diet [13]. Even vitamin A, vitamins group B, vitamin E taken from non-natural sources can sometimes accelerate the cancer [13].

Sugar, Insulin and Cancer

Rise in blood sugar increases insulin and insulin resistance ensues in course of time. Free IGF-1 level rises. This also may lead to cancer, through a mutagenic effect. Cancer may develop very easily in the pancreas gland due to over-enlargement [9,10]. Breast cancer is seen 5-6 folds more in women with insulin excess [12].

Importance of Xeno-estrogens, Meat and Milk on Cancer

There are natural estrogens known as beneficial estrogens. Another type of estrogens discovered recently and not fully known yet is the xeno estrogen [14]. Some of these are substances called herbicides, insect powders, plastic water bottles which increase the risk of breast cancer and other hormone sensitive cancers because xeno-estrogens acting just like the estrogen.

Sialic acid (N- Glycol neuraminic acid) found in red meat is a carcinogen. Xeno-estrogens that might cause cancer are abundant in meat, just as in milk. There are some publications stating the harmful effects of red meat in hormone induced cancers and in bowel cancers [15]. Risk of bladder cancer is increased in people eating bacon 5 times a week. Chicken meat is no more a low fat food as it used to be. Chickens get sick very quickly. Parasites reproduce easily in the intestines. Poultry farmers give some antibiotic type drugs to chickens in order to reduce deaths and increase the yield. These drugs make a poisonous effect and increase the risk of cancer in people consuming chicken egg and meat. Cancer rate is 52% higher in those eating chicken meat. Research has shown the presence of these drugs at high dosage in both the meat and eggs of chicken [16].

Calcium in the milk is poorly absorbed from the intestines. Calcium taken from vegetables, fruits and legumes is more readily absorbed from the intestines; thus, being more beneficial and sufficient also. What is more, dairy products contain xeno-estrogen and arachidonic acid, and may lead to cancers when consumed much. Normally, the proteolytic enzymes in milk disintegrate the growth hormone present in milk during digestion. These enzymes are destroyed during the pasteurization process. Hence, intact growth hormone passes into the blood [17,18].

Research on lung cancer disease progressed more rapidly in those who consume more than 1 glass. Probiotics are abundant in raw milk. Probiotics are beneficial microbes. They prevent the

damage of the other harmful microbes in the intestines and produce vitamin B12. In populations consuming raw milk, even 3-5 liters of milk daily do not lead to cancer [19].

Chlorinated and Fluorinated Water and Cancer

Chlorine added to the water destroys the structure of useful chemicals, and prevents us to benefit sufficiently from them. When we drink chlorinated water, chlorine forms trihalomethane compounds. A research conducted in US has found 60-70% higher dose of chlorinated compounds in the breasts of women with breast cancer than the normal, healthy breasts. Approximately 8-10% of bladder and rectum cancers occur due to chlorinated water. Since the holes of the skin, namely pores, are enlarged upon a hot shower, large amounts of chlorine can get into blood through the skin [20-22]. More cancer cases are encountered in people whose water is fluorinated. This has been shown by numerous studies [23-26].

Nitrates and nitrites

If farmers practice unconscious fertilization by their own, among the nitrogenous compounds depositing in the ground, nitrites and nitrates reach harmful levels. Vegetables, animals growing on this soil also contain abundant nitrites and nitrates. Such water is also water poisoned by nitrates. In addition, nitrites are used to prevent the spoilage of meat and meat products such as various types of sausages. Excess salt also increases the formation of nitrates [27].

Excessive Purification of Food

Purification of food causes loss of fibrous parts and antioxidants. When bran is removed from the wheat, 90% of substances protecting from cancer are lost. Consumption of high amounts of starch and refined sugar poses a risk for colon, pancreas and breast cancers in women [28].

Cancerous cells are transported from one place to another by small clots and settle their together with the clots. This is called metastasis. In addition, the adhered blood cells cannot leave sufficient oxygen in the tissues. This in turn reduces oxygen proportion, thereby accelerating cancer. Refined salt enhances the adhesion of red blood cells and clotting. Therefore, Himalaya salt or rock salt, natural sea salt should be used [27].

Fats and Cancer

Trans-fats, hydrogenised fats are very harmful. They displace cholesterol in the vessel wall [28,29].

Poly unsaturated fats are long chain unsaturated fats. When long chain fats are broken down for energy, a very high amount of energy is released; because each fatty acid contained is a separate source of energy. The excessive portion of the generated energy is again deposited as fats. Omega-3, which is a beneficial fatty acid, has also a long chain. Omega-6, the excess of which is detrimental, is also long chained. Both are essential for our body in certain amounts. Likewise, very long chain fats like palm oil consisting of palm tic acid, are only useful in certain amounts.

Excessive energy feeds cancer. In other words, polyunsaturated fats are also harmful in cancer, when consumed in large amounts. Sunflower oil is obtained through a hot-press process. The beneficial omega-6 fats it contains transform into detrimental omega-6 form during this process. But single unsaturated fats reduce the risk of cancer. No evidence was found that butter, suet or tail fat increase the risk of cancer, but daily doses should not exceed one table spoon [28,29].

Frying oil used in the fast-food chains contains more than 30% trans-fats. These fats are carcinogenic. When oil is boiled for 37 minutes, carcinogen substances start to form rapidly [29-34].

CLA is a conjugated linoleic acid obtained from a plant called safflower. This oil is used as fat dissolver and weight reducer. However, CLA was shown to cause fatty heart and fatty liver in the long term [33].

Canola oil is produced by reducing the proportion of erucic acid in colza oil. As with colza oil, canola oil also might cause degeneration, in other words disruption in the heart and in other cells (RO Vales).

Margarines were demonstrated to be substances with the structure of plastics. These do not raise cholesterol, but causes worse than that. They displace the beneficial fats in the body.

The cell membrane contains fatty acid and protein complex substances called phospholipids. The majority is comprised of saturated fats, and some are comprised of unsaturated omega-3 fatty acids. This proportion is much higher in the phospholipids in brain cells. Saturated fats make up 80% of the brain cell membranes. As for lungs, it was surprisingly seen that the cell membranes consist of 100% saturated fat. Therefore saturated fats are important in the prevention of lung and brain cancers, as well as in the diets of the cancer patients. Animal fats, coconut oil, palm kernel oil are examples of useful saturated fats [31].

Cigarettes and Cancer

There are over 4000 harmful chemical substances with carcinogenic effects in the cigarette. Polonium, carbon monoxide and ammonia are the most detrimental ones. When 30 cigarettes per day are smoked for 1 year, radiation as much as 300 chest x-rays taken is received. The probability of catching lung cancer rises by 4.6 folds in people smoking 1-9 cigarettes per day, by 16.6 folds in those who smoke more than 40 cigarettes a day [34-36].

Alcohol and Cancer

Impairs all the cells in the body. Alcohol has been shown to cause cancer through impairment of superficial cells in lips, esophagus, and larynx. It also increases the risk of liver and lung cancers. If cigarette is smoked also together with alcohol, risk of cancer is increased incrementally. Since plenty of nitrosamine would be produced in snacks consumed along with alcohol, we should definitely refrain from these. Alcohol can cause head and neck tumours, liver, biliary tract, esophagus, stomach, bowel and pancreas cancers [37-42].

Coffee and Cancer

More than half a tea spoon per day is harmful. Coffee may lead to cancers of bladder, pancreas and breast. There is also evidence that it is useful when consumed in small quantities [43].

Carcinogenic Substances Generated upon Faulty Cooking and Storage of Foods

The best method for most of the foods is storing in the refrigerator. Storing in steel containers is the best. You may also use thick glass containers; these are also durable in the freezer because they are manufactured as heat resistant in the oven.

The ratio of perfluoro-octanoic acid, a carcinogenic substance, is high in Teflon [44,45]. Plastic cups, metal clips of the tea bags are also harmful. Cooking foods or storing hot foods in aluminum foils are also harmful. This might lead to Alzheimer and cancer [46]. Plastic cups and containers, stapled tea bags, aluminiumfolio, car boy waters (especially the thin ones) are affected more by cold and heat and release the carcinogen substances out. Plastic containers at temperatures higher than 70^0C, somewhat dissolve and exert carcinogenic effect. A carcinogen substance named phosgene is used in plastic carboys. Carcinogen substances liberate when water is kept inside for a long time. Use in the freezers is also harmful [47].

Foods should not be cooked very rapidly. Cooking temperatures above 160^0C are very harmful. Foods both lose their nutritional value, and cancer protective substances are destroyed. In addition, glassy carcinogen substances such as acrylic are formed around them. When foods rich in protein and fat, such as meat, are cooked on barbecue or in smoke, more carcinogen substances enter into the body than that taken with smoking [48].

When foods are cooked rapidly or on barbecue, heterocyclic aromatic amines (**HAA**), polycyclic aromatic hydrocarbons (**PAH**), and nitrous om pounds (**NOB**) are formed. HAA are formed during frying, grilling or roasting the foods. PAH are generated during grilling and fumigation; whereas NOB are formed when foods are pickled or treated with salt, nitrates and nitrites. These are powerful carcinogen substances.

Heterocyclic Aromatic Acids (HAA)

HAA might lead to digestive system cancers, and hormone sensitive cancers. Therefore, foods should be cooked with boiling or scalding methods. Over done meats also increase the colon cancer risk by 6.5 folds.

Polycyclic Aromatic Hydrocarbons (PAH)

PAH are formed by cooking the meat on the flame the most. Fat dripping down on the coal combines with the smoke and enters into the meat. The most powerful is benzpyren, which is a very powerful carcinogenic [48].

Coalin fact, is one of the most important carcinogen substances leading to cancer. Especially smoke is an important carbon source. Forty folds more carcinogen substance are formed in smoked foods.

In brine foods and in pickles nitrous compounds are produced a lot as a result of excessive salt and long duration of storage [49]. These might cause digestive system cancers. This is one of the most important causes that oesophagus and stomach cancers are more frequently encountered in the Far East. Hot food also highly increases the risk of oesophagus cancer. The ratio of these types of cancer decreased recently, consequent to the use of refrigerators and freezers in the Far East.

Moulds and Cancer

Especially aflatoxin is a powerful carcinogenic which significantly increases the of risk liver cancer [50]. There fore consuming foods that were kept for long duration and moistened food is detrimental. It is mostly found in flaked red pepper, peanuts, and in dried vegetables. Drying premises have been established to reduce the ratio of aflatoxin.

Sweeteners used Instead of Sugar

Saccharine was a sweetener used long before. After it was demonstrated to cause bladder cancer, other sweeteners have become famous. In fact aspartame, the agent widely used nowadays, is also very harmful. It also contains methyl alcohol, a lethal poison contained in the methylated spirit. It was shown to cause hyperactivity syndrome, seizures and brain tumours, blood cancer, lymphoma in children; and complaints such as depression, tiredness, and even vision disorders in adults. As par tame does not cause a rise in blood sugar. However it causes worse than that. Aspartame is perceived as sugar in the brain. When the brain is alarmed that sugar has come in, insulin rises. Insulin lowers the blood sugar. Blood sugar drops since there is no sugar entering the body yet. Insulin resistance develops easily in people who frequently consume aspartame foods. This condition is among the causes of many chronic diseases and cancer [51-54].

Corn syrup is added into many convenience foods as sweetener. It includes high amounts of fructose within the contents Most of fructose is converted into glucose within a short time. It has blood acidifying properties [55].

Honey, and fruits like grape, date, and apricot also provide plenty of glucose. However, since the glucose is taken in together with cancer killing chemicals by the cancer cells, the tumour might decrease [3,55].

Natural chemicals contained in foods

Carbohydrates, proteins, fats, minerals and vitamins are absolutely essential substances for life. Natural chemicals, a subgroup of chemicals without nutritive value, are a wide group, differing in number from food to food. The ground, water and air polluted by the wastes of these substances carry carcinogen substances. The vegetables produced in this environment also contain such compounds [51,52].

The petroleum derivative benzene may lead to leukemia, lung, stomach and intestinal system cancers. Arcenic, bisether, chrome, hematite, nickel, asbestos scan cause lung mesothelioma. Whitewash obtained from white soilis widely used in Anatolia; and this white wash is rich in asbestos. When stayed inside the house for long, it might lead to cancer, affecting through the respiratory tract. No damage was shown through the oral way. Vinyl chloride might cause angiomaandangio sarcoma, aromatic amines might cause bladder cancer, sarcoma and leukemia. People working in cadmium and brass coating processes in which the cadmium metal is used, and people who are exposed to these are more prone to develop prostatic cancer than the others [51-53].

Workers in the production for ganicdyes, especially aniline, might develop bladder (urinary bladder) cancer. Cancers of the lung, bladder (urinary bladder), oesophagus, and stomach were seen with aluminum products. Beryllium can lead to lung cancer. Leukaemia, paranasal sinus tumours, bladder, stomach, and intestinal system tumours were seen in those dealing with shoe production. Cancers of the skin, lung and bladder were reported to be frequent with coalsmoke, cancers of there aspiratory system, leukemia, stomach and intestinal system with iron powder [56].

Physical Carcinogens

Radiation exerts a physical effect. There are various types of radiation. The ones we know most are mobile telephone base stations, mobile telephones and computers. However, we receive more radiation from hair dryers [3, 57].

Ionizing electromagnetic radiation is rather used for therapeutic purposes. Secondary cancers might develop an average of 10 years after treatment. X-rays employed for diagnostic purposes, if a certain dose is exceeded, damage the tissues and can prepare the ground for leukemia, thyroid cancer, tumours of brain and bone tumour [3,57]. Radon gas is a radioactive substance naturally found in ground and rocks. It is one of the most important causes of lung cancer.

Ionizing electromagnetic radiation is of mainly three types. The radiation with gamma rays and x-rays is particular radiation (alpha, proton, beta, neutron, pimeson, argon, neon etc.). With ionization, biological DNA damage occurs as a result of chemical changes and cancer might occur as a result of genetic changes. The most important causative factor for skin cancer is the ultraviolet radiation in the sun. It has been finalized that mobile telephones and especially GSM stations are carcinogenic. Cable equipment and powerhouses emit electromagnetic energy, and these are also hazardous. Babies and children suffer the most from low intensity radiation [3,57].

Solarium

World Health Organization has reported that solarium increases skin cancer by 75 folds especially among young people. The risk of melanoma increases in particular [58].

Hair dryers

May lead to cancer more than the mobile telephones [57].

Excessive Light Related Decreasing Melatonin

Breast cancer was shown to be more frequent in women working at night. Excessive stress and noise exhibit similar effects. Melatonin hormone is secreted at night [59].

Viruses and Bacteria

Ebstein Barr virus may lead to naso pharynx (nasal cavity) cancer and lymphoma, HIV virus can cause Kaposi and lymphoma, HTLV can cause lymphoma and some types of leukemia, HPV (Papilloma virus) herpes virus can lead to cervix (Colum) cancer, Hepatitis B, hepatitis C viruses may lead to liver cancer. Helicobacter pylorus is one of the most important factors in stomach cancer and lymphoma [59].

Hormones

Estrogen and progesterone increase the risk of breast cancer. Early menarche (menstruation) and late menopause, and obesity rises the estrogen levels and prepares the grounds for breast cancer that might occur after menopause. Estrogen hormone also plays a role in the cancer of endometrium. Progesterone, on the contrary, has a protective effect here. A direct cancer formative effect of testosterone has been shown clearly in prostate cancer [60-62].

In iodine efficiency and in some diseases where thyroid gland cannot produce adequate thyroxin hormone, thyroid cancer may develop as a consequence of excessive TSH hormone secreted from the hypothesis gland [62,63].

Tumours of the bone may develop with the excessively released growth hormone (somatotropin, GH), especially during the rapid growth periods of children [64].

CANCER PREVENTION

For all types of cancer, risk of cancer can be diminished an average of 30-40% with an adequate diet and exercise [64].

Vegetables, Fruits and Grains contain Anti-carcinogen Substances

Antioxidants such as vitamin A, beta carotene, selenium, vitamin E and vitamin C protect the body against cancer [65-68].

In order that the antioxidants be effective in the body, an enzyme called alphalipoicacidis required [69]. Foods of animal origin such as kidney, heart and liver are rich in alpha lipoid acid. Spinach, broccoli and tomato are also rich. Vitamin C also functions at the disposal of alphalipoic acid.

Minerals as selenium and zinc enhance the immune system [66,70].

It is possible to prevent cancer by taking advantage of the detoxification, antioxidant, antibiotic, anti diabetic, and anti-inflammatory effects of the foods. Sulphurous compounds, phenolic compounds, flavonoids, monoter penes, vitamins and minerals may protect our body against cancer through these effects.

Sulphurous Compounds and Vitamins

Di-allyl-sulphide, indols, tiocyanates, glucosynates are very important sulphurous compounds in the prevention of cancer. Beta carotenes, lycopene, lutein, vitamins C, E, and B vitamin D, selenium, coenzyme Q 10, carnitine, quarcetine, ellagic acid, thymoquinon, brome lain have cancer protective effects through diverse mechanisms [71-83]. Vitamin D was shown to decrease the cancer risk in breast, ovarian, prostate and bowels by 50% [78,84-86]. 1000 IU per day Vitamin D corresponds to 25mg Vitamin D.

Omega-3, Alpha and Gamma Linoleic acid

Among the unsaturated fats, alpha and gamma linoleic acids, and omega-3 are anti-carcinogens [28,29,87]. Omega3 can be of vegetable or animal origin. Of the animal source food, the best source of omega-3 is fish oil, and of the vegetable sources, the best are purslane and linseed. Recently, favorable results against cancer were obtained with gamma tocopherol which is abundant in pine nutandse same, and with gama linoleic acid which is abundant in primrose [28,29,87].

The Role of Fiber

Fiber is formed of fibrous structures such as cellulose, hemi-cellulose, pectin and lignin which are not completely digested in the digestive system. Colon polyps were observed to diminish in those consuming fibrous foods. It is sufficient to get 25g of fiber per day. Fibrous foods dilute the faces, thus ratio of bacteria and toxins is reduced. The fibers also reduce the cholesterol absorption since the sterns they contain resemble cholesterol. Short chain fatty acids enhance apoptosis in the epithelium cells of the colon and rectum [28,29,87-89].

Freezers

The frequency of stomach cancer decreased by more than 60% after the manufacture of freezers [89].

Regular Sleep

Regular sleep enhances the immune system. It increases melatonin levels and maintains the hormonal balance. Therefore, one goes to bed before 22.00 at night and wakes up before 08.00 in the morning. Research has shown that regular sleep is protective in cancer [90].

Oxygen and Exercise

Oxygen kills the cancer cells. Living in the pine forests and taking walks oxygenate the blood, protect from cancer, and facilitate the treatment of cancer patients [91]. Oxygen radicals that are

formed during this process kill the cancerous cells. Fat tissues dissolve, thereby diminishing the hormone receptors and hormone levels [92].

Reducing Calories

Calorie restriction was shown to be effective in so many types of cancer, with cancers of the colon and digestive system, and hormone sensitive cancers being in the first place, through various studies [9-11].

Selenium prevents the occurrence of many types of cancer, principally the cancer of oesophagus [69].

Most of the anticancer agents that are useful in cancer is made of complex carbohydrates. Complex carbohydrates are found most in the husks of grains [93].

On the other hand, a significant decline is observed in the risk of lung cancer in individuals taking beta carotene naturally from vegetables or fruits as a food. Starting from this, it was concluded to be more beneficial to consume the plants as a whole without decomposition or purification. Because substances enhancing the activity of useful chemicals and substances alleviating the activity of detrimental chemicals are all together, thus the maximum benefit can be gained.

Probiotics

Fermented dairy products as yogurt and kefi rare rich in probiotics. These synthesize vitamin K, biotin and niacinin the intestines and strengthen the immune system [94].

As a result of enhanced digestion, they reduce the deposition of detrimental wastes in the intestines. As the consequence of enhanced immune system, these substances are both protective in cancer and have a delaying effect on the progression of the disease.

Antioxidants

Antioxidants protect the normal cells, while causing the diseased cells such as cancer cells die through apoptosis. Vitamin C, beta carotene, Vitamin E, sulphorafen, lycopene, anthocyanins, zinc, phosphorus, superoxide dismutase, epigallocathecin, eugenol, glabridin and quercetinare some of these antioxidants [71,95-98].

Immune system protectors and apoptotics

Apoptosis is the process of killing faulty cells, occurring with the contribution and under the supervision of P^{53} gene. The most known chemical compounds of external origin in this area are Eugenol, thymoquinon, bromelain, ourolopein, monoterpenes and phenolic compounds [81-83,95-98].

Cancer prevention is a very broad topic. Information given here is a very short summary of the subject. We just intended to touch upon the most important ones.

References

1. Epstein SS. Unlabeled milk from cows treated with biosynthetic growth hormones: a case of regulatory abdication. International Journal of Health Services. 1996; 26: 173-185.
2. Giaime E, Sunyach C, Herrant M, Grosso S, Auberger P, et al. Caspase-3-derived C-terminal product of synphilin-1 displays antiapoptotic function via modulation of the p53-dependent cell death pathway. J Biol Chem. 2006; 281: 11515-11522.
3. Kızıltan HŞ, Kanser, belirtiler, korunmave Tedavi yolları, Elitkültüryayınevi. 2010; 368: 13-14.
4. Cooper GM. The Eukaryotic Cell Cycle. The cell: a molecular approach (2nd ed.) Washington, D.C: ASM Press. 2000.
5. Herzberg. "The spectra and structures of simple free radicals". 1971.
6. Kundu SC, Willson RL. Thiyol (sulfhydryl/thiol) free radical reactions, vitamins, beta-carotene, and superoxide dismutase in oxidative stress: design and interpretation of enzymatic studies. Methods Enzymol. 1995; 251: 69-81.
7. Canadian Cancer Society. An alkaline diet and cancer. 2012.
8. Balkwill F, Mantovani A. Inflammation and cancer: back to Virchow? Lancet. 2001; 357: 539-545.
9. Kuska B. Calories and cancer: can we starve our way to health? J Natl Cancer Inst. 2000; 92: 1466-1469.
10. Winick M. Calories and cancer. Hematol Oncol Clin North Am.1991; 5: 1-6.
11. Calle EE, Rodriguez C, Walker-Thurmond K, Thun MJ. Overweight, obesity, and mortality from cancer in a prospectively studied cohort of U.S. adults. N Eng J Med. 2001; 348: 1623-1624.
12. Goodwin PJ, Ennis M, Trudea ME. "Prognostic Effects of Circulating Insulin-Like Growth Factor Binding Proteins (IGFBPS) 1 and 3 in Operable Breast Cancer," December 6-9, Program and Abstracts of the 23rd Annual San Antonio Breast Cancer Symposium Abstract #118, San Antonio, TX. 2000.
13. Demetrakopoulos GE, Brennan MF. Tumoricidal potential of nutritional manipulations. Cancer Res.1982; 42: 756s-765s.
14. Fernandez SV, Russo J. Estrogen and Xenoestrogens in Breast Cancer, Toxicol Pathol. 2010; 38:110-122.
15. Michaud DS, Holick CN, Giovannucci E, Stampfer MJ. Meat intake and bladder cancer risk in 2 prospective cohort studies. Am J Clin Nutr. 2006; 84: 1177-1183.
16. Richman EL, Stampfer MJ, Paciorek A, Broering JM, Carroll PR, et al. Intakes of meat, fish, poultry, and eggs and risk of prostate cancer progression. Am J Clin Nutr. 2010; 91: 712-721.
17. Epstein, Samuel S. Potential public health hazards of biosynthetic milk hormones. International Journal of Health Services. 1990; 20: 73-84.
18. Mepham, TB, Schofield PN, Zumkeller W, Cotterill AM. Safety of milk from cows treated with bovine somatotrophin. The Lancet. 1994; 344: 197-198.
19. Wigertz K1, Svensson UK, Jerstad M. Folate and folate- binding protein content in dairy products. J Dairy Res. 1997; 64: 239-252.
20. Koivusalo M, Pukkala E, Vartiainen T, Jaakkola JJ, Hakulinen T. Drinking water chlorination and cancer-a historical cohort study in Finland. Cancer Causes Control. 1997; 8: 192-200.
21. Doyle TJ, Zheng W, Cerhan JR, Hong CP, Sellers TA, et al. The association of drinking water source and chlorination by-products with cancer incidence among postmenopausal women in Iowa: a prospective cohort study. Am J Public Health. 1997; 87: 1168-1176.
22. Cantor KP, Hoover R, Hartge P, Mason TJ, Silverman DT, et al. Bladder cancer, drinking water source, and tap water consumption: a case-control study. J Natl Cancer Inst. 1987; 79: 1269-1279.
23. Yiamouyiannis J, Burk D. Fluoridation and cancer, age-dependence of cancer mortality related to artificial fluoridation. Fluoride. 1977; 10: 102-124.
24. Waldbott GL. The fluoride-cancer controversy. Fluoride. 1977; 10: 95-101.
25. Lee J. Fluoridation and osteosarcoma. Fluoride. 1993; 26: 79-82.
26. Takahashi K, Akinawa K, Narita K. Regression analysis of cancer incidence rates and water fluorides in the USA based on IACR/IARC (WHO) data (1978-1992) International Agency for Research on Cancer. J. Epidemiol. 2001; 11:170-179.
27. Tsugane S, Sasazuki S, Kobayashi M, Sasaki S Salt. Salted food intake and subsequent risk of gastric cancer among middle-aged Japanese men and women. Br J Cancer. 2004; 90: 128-134.
28. Walker AR. Colon cancer and diet, with special reference to intakes of fat and fiber. Am J Clin Nutr. 1976; 29: 1417-1426.

29. Wolk A, Bergstrom ER, Hunter D, , Willett W, Ljung H, et al. A prospective study of association of monounsaturated fat and other types of fat with risk of breast cancer. Arch Int Med. 1998; 158: 41-45.

30. “Trans fat: Avoid this cholesterol double whammy”. Mayo Foundation for Medical Education and Research (**MFMER**). Retrieved. 2007.

31. Mary G. Enig. Scientific Editor of Wise Traditions as well as the author of Know Your Fats: The Complete Primer for Understanding the Nutrition of Fats, Oils, and Cholesterol, Bethesda Press, May. 2000.

32. National Institute of Health. “Omega-3 fatty acids, fish oil, alpha-linolenic acid”. 2006.

33. Risérus U, Basu S, Jovinge S, Fredrikson GN, Arnlöv J, et al. “Supplementation With Conjugated Linoleic Acid Causes Isomer-Dependent Oxidative Stress and Elevated CReactive Protein”. American Heart Association Journals. 2002; 106: 1925-1929.

34. Santos MS. Journal of Radioanalytical and Nuclear Chemistry. 1994: 182.

35. Chester. Envıronmental Science and Techn-A.C.Peres, G.Hiromot VII 1987296. Batarekh and Tehrani, J.ofRadioanaly. Nucl Chem Lett. 1985: 117-175.

36. T Karal. Appl RadIsot. 1996: 47.

37. Altieri A, Garavello W, Bosetti C, Gallus S, Vecchia CL. Alcohol consumption and risk of laryngeal cancer. Oral Oncol. 2005.

38. Randi G, Altieri A, Gallus S, Franceschi S, Negri E, et al. History of cirrhosis and risk of digestive tract neoplasms. Ann Oncol. 2005; 16: 1551-1555.

39. Morita M, Oyama T, Kagawa N, Nakata S, Ono K, et al. Expression of aldehyde dehydrogenase 2 in the normal esophageal epithelium and alcohol consumption in patients with esophageal cancer. Front Biosci. 2005; 10: 2319-2324.

40. Chang ET, Hedelin M, Adami HO, Gronberg H, Balter KA. Alcohol drinking and risk of localized versus advanced and sporadic versus familial prostate cancer in Sweden. Cancer Causes Control. 2005; 16: 275-284.

41. Voigt MD. Alcohol in hepato cellular cancer. Clin Liver Dis. 2005; 9: 151-169.

42. Dumitrescu RG, Shields PG. The etiology of alcohol induced breast cancer. Alcohol. 2005; 35: 213-235.

43. Zhou Y, Tian C, Jia C. A dose-response meta analysis of coffee consumption and bladder cancer. Prev Med. 2012; 55: 14-22.

44. Vieira V, Hoffman K, Fletcher T. Assessing the Spatial Distribution of Perfluorooctanoic Acid Exposure Via Public Drinking Water Pipes Using Geographic Information Systems. Environ Health Toxicol. 2013; 28: e2013009.

45. Vieira VM, Hoffman K, Shin HM, Weinberg JM, Webster TF, et al. Perfluorooctanoic acid exposure and cancer outcomes in a contaminated community: a geographic analysis. Environ Health Perspect. 2013; 121: 318-323.

46. Darbre PD, Pugazhendhi D, Mannello F. Aluminium and human breast diseases. Inorg Biochem. 2011; 105: 1484-1488.

47. Gift JS, McGaughy R, Singh DV, Sonawane B. Health assessment of phosgene: approaches for derivation of reference concentration. Regul Toxicol Pharmacol. 2008; 51: 98-107.

48. Jamin EL, Riu A, Douki T, Debrauwer L, Cravedi JP, et al. Combined genotoxic effects of a polycyclic aromatic hydrocarbon (B(a) P) and an heterocyclic amine (PhIP) in relation to colorectal carcinogenesis. PLoS One. 2013; 8: e58591.

49. Lau HY, Leung CM, Chan YH, Lee AW, Kwong DL, et al. Secular trends of salted fish consumption and nasopharyngeal carcinoma: a multi-jurisdiction ecological study in 8 regions from 3 continents. BMC Cancer. 2013; 13: 298.

50. Chittmittrapap S, Chieochansin T, Chaiteerakij R, Treeprasertsuk S, Klaikaew N, et al. Prevalence of aflatoxin induced p53 mutation at codon 249 (R249s) in hepatocellular carcinoma patients with and without hepatitis B surface antigen (**HBsAg**). Asian Pac J Cancer Prev. 2013; 14: 7675-7679.

51. Dr. Bengü. Baykan Erdin Karsinojenlerlistesi Sağlık Bakanlığı Kanserle SavaşDairesi.

52. Goldsmith, F., Occupational Safety And Health; The Control And Prevention Of Work-Related Hazads, Human Sciences. 1982.

53. Türkdoğan MK, Kilicel F, Kara K, Tuncer I, Uygan I. Heavy metals in soil, vegetables and fruits in the endemic upper gastrointestinal cancer region of Turkey. Environ Toxicol Pharmacol. 2003; 13: 175-179.

54. Soffritti M, Belpoggi F, Esposti DD, Lambertini L. Aspartame induces lymphomas and leukaemias in rats. Eur J Oncol. 2005; 10: 107-116.

55. White JS. Challenging the fructose hypothesis: new perspectives on fructose consumption and metabolism. Adv Nutr. 2013; 4: 246-256.

56. Ramanakumar AV, Parent M., Richardson L, Siemiatycki J. Exposures in painting-related occupations and risk of lung cancer among men: results from two case-control studies in Montreal. Occup Environ Med. 2011; 68: 44-51.

57. “IARC classifies radiofrequency electromagnetic fields as possibly carcinogenic to humans”. World Health Organization.

58. Marit BV, Hans-Olov A, Eiliv L, Bruce KA, Weiderpass E, et al. Exposure and Melanoma Risk: Effects of Age, Pigmentary Characteristics, and Nevi Cancer Epidemiol Biomarkers Prev. 2010; 19: 111-120.

59. Parsonnet. Microbes and malignancy: infection as a cause of human cancers. Oxford: Oxford University Press. Julie. 1999.

60. Ross RK, Pike MC, Coetzee GA, Reichardt JK, Yu MC, et al. Androgen metabolism and prostate cancer: establishing a model of genetic susceptibility. Cancer Res. 1998; 58: 4497-4504.

61. Henderson BE, Ross RK, Bernstein L. Estrogens as a cause of human cancer: the Richard and Hinda Rosenthal Foundation award lecture. Cancer Res. 1988; 48: 246-253.

62. Son HY, Nishikawa A, Kanki K, Okazaki K, Kitamura Y, et al. Synergistic interaction between excess caffeine and deficient iodine on the promotion of thyroid carcinogenesis in rats pretreated with N-bis (2-hydroxypropyl) nitrosamine. Cancer Sci. 2003; 94: 334-337.

63. Yang R, Hoang BH, Kubo T, Kawano H, Chou A, et al. Over-expression of parathyroid hormone Type 1 receptor confers an aggressive phenotype in osteosarcoma. Int J Cancer. 2007; 121: 943-954.

64. Wetherilt H Beslenmevekanser, Etkin Mekanizmalar, enerji ve makro besin ogeleri, Gıda sanayi. 1991; 22: 34-42.

65. Wang Z, Joshi AM, Ohnaka K, Morita M, Toyomura K, et al. Dietary intakes of retinol, carotenes, vitamin C, and vitamin E and colorectal cancer risk: the Fukuoka colorectal cancer study. utr Cancer. 2012; 64: 798-805.

66. Nicastro HL, Dunn BK. Selenium and prostate cancer prevention: insights from the selenium and vitamin E cancer prevention trial (**SELECT**). Nutrients. 2013; 5: 1122-1148.

67. Kristal AR, Till CA, Song X, Tangen CM, Goodman PJ, et al. Plasma Vitamin D and Prostate Cancer Risk; Results from the Selenium and Vitamin E Cancer Prevention Trial. Cancer Epidemiol Biomarkers Prev. 2014.

68. Padayatty SJ, Katz A, Wang Y, Eck P, Kwon O, et al. Vitamin C as an antioxidant: evaluation of its role in disease prevention. J Am Coll Nutr. 2003; 22: 18-35.

69. Yoo TH, Lee JH, Chun HS, Chi SG. α - Lipoic acid prevents p53 degradation in colon cancer cells by blocking NF-κB induction of RPS6KA4. Anticancer Drugs. 2013.

70. Maremanda KP, Khan S, Jena G. Zinc protects cyclophosphamide-induced testicular damage in rat: involvement of metallothionein, tesmin and Nrf2. Biochem Biophys Res Commun. 2014; 445: 591-596.

71. Peng X, Xie G, Wang Z, Lin H, Zhou T, et al. SKLB-163, a new benzothiazole-2-thiol derivative, exhibits potent anticancer activity by affecting RhoGDI/JNK-1 signaling pathway. Cell Death Dis. 2014; 5: e1143.

72. Isothiocyanates and freeze-dried strawberries as inhibitors of esophageal cancer. Toxicological Sciences. 1999; 52.

73. Bleul T, Rühl R, Bulashevska S, Karakhanova S, Werner J, et al. Reduced retinoids and retinoid receptors’ expression in pancreatic cancer: A link to patient survival. Mol Carcinog. 2014.

74. Jatoi A, Burch P, Hillman D, Vanyo JM, Dakhil S, et al. A tomato-based, lycopene-containing intervention for androgen-independent prostate cancer: results of a Phase II study from the North Central Cancer Treatment Group. Urology. 2007; 69: 289-294.

75. Zaini RG, Brandt K, Clench MR, Le Maitre CL. Effects of bioactive compounds from carrots (Daucuscarota L.), polyacetylenes, beta-carotene and lutein on human lymphoid leukemia cells. Anticancer Agents Med Chem. 2012; 12: 640-652.

76. Bunik VI, Tylicki A, Lukashev NV. Thiamindiphosphate- dependent enzymes: from enzymology to metabolic regulation, drug design and disease models. FEBS J. 2013; 280: 6412-6442.

77. Garland CF, Comstock GW, Garland FC, Helsing KJ, Shaw EK, et al. Serum 25-hydroxyvitamin D and colon cancer: eight-year prospective study. Lancet. 1989; 2: 1176-1178.

78. Garrido-Maraver J, Cordero MD, Oropesa-Avila M, Vega AF, de la Mata M, et al. Clinical ap Kanserdenplications of coenzyme Q10. Front Biosci (Landmark Ed). 2014; 19: 619-633.

79. Ginzinger W, Egger A, Mühlgassner G, Arion VB, Jakupec MA, et al. Water-soluble cationic derivatives of indirubin, the active anticancer component from Indigo naturalis. Carniten Cancer Chem Biodivers. 2012; 9: 2175-2185.

80. Sudan S, Rupasinghe HP. Quercetin-3-O-glucoside Induces Human DNA Topoisomerase II Inhibition, Cell Cycle Arrest and Apoptosis in Hepatocellular Carcinoma Cells. Anticancer Res. 2014; 34: 1691-1699.

81. Seeram NP. *In vitro* antiproliferative, apoptotic and antioxidant activities of punicalagin, ellagic acid and a total pomegranate tannin extract are enhanced in combination with other polyphenols as found in pomegranate juice. Centre for Human Nutrition, David Geffen School of Medicine, Uv. Of Calirognia, Los Angeles, CA, USA. J Nutr. Biochem. 2005; 16: 360-367.

82. Sutton KM, Greenshields AL, Hoskin DW. Thymoquinone, A Bioactive Component of Black Caraway Seeds, Causes G1 Phase Cell Cycle Arrest and Apoptosis in Triple-Negative Breast Cancer Cells with Mutant p53. Nutr Cancer. 2014; 66: 408-418.

83. Pillai K, Ehteda A, Akhter J, Chua TC, Morris DL. Anticancer effect of bromelain with and without cisplatin or 5-FU on malignant peritoneal mesothelioma cells. Anticancer Drugs. 2014; 25: 150-160.

84. Majewski S, Kutner A, Jablonska S. Vitamin D analogs in cutaneous malignancies. Curr Pharm Des. 2000; 6: 829-838.

85. Feldman D, Skowronski RJ, Peehl DM. Vitamin D and prostate cancer. Advances in Experimental and Medical Biology. 1995; 375: 53-63.

86. Guyton KZ, Kensler TW, Posner GH. Cancer chemoprevention using natural vitamin D and synthetic analogs. Annual Review of Pharmacology and Toxicology. 2001; 41: 421-442.

87. Cui R, Liu ZQ, Xu Q. Blood α-Tocopherol, γ-Tocopherol Levels and Risk of Prostate Cancer: A Meta-Analysis of Prospective Studies. PLoS One. 2014; 9: e93044.

88. Liu Y, Colditz GA, Cotterchio M, Boucher BA, Kreiger N. Adolescent dietary fiber, vegetable fat, veg66 etable protein, and nut intakes and breast cancer risk. Breast Cancer Res Treat. 2014.

89. Stoner GD. Foodstuffs for preventing cancer: the preclinical and clinical development of berries. Cancer Prev Res (Phila). 2009; 2: 187-194.

90. Matthews EE, Berger AM, Schmiege SJ, Cook PF, Mc Carthy MS, et al. Cognitive Behavioral Therapy for Insomnia Outcomes in Women After Primary Breast Cancer Treatment: A Randomized, Controlled Trial. OncolNurs Forum. 2014: A1-A13.

91. Lu J, Tan M, Cai Q. The Warburg effect in tumor progression: Mitochondrial oxidative metabolism as an anti-metastasis mechanism. Cancer Lett. 2014.

92. Shephard RJ, Futcher R. Physical activity and cancer: How may protection be maximized? Crit Rev Oncog. 1997; 8: 219-272.

93. Jacques D. Best food sources for complex carbohydrates, in Sports Nutrition. 2013.

94. Farmer RE, Shahani KM, Reddy GV. Inhibitory effect of yoghurt components upon the proliferation of as cites tumor cells. J Dairy Sci. 1987; 58: 787-788.

95. Marie Fine AM. Oligomeric Proanthocyanidin Complexes: History, Structure, and Phytopharmaceutical Applications Altern Med Rev. 2000; 5: 144-151.

96. Elizabeth Jeffery. Maximizing The Anti-Cancer Power Of Broccoli Science Daily-University of Illinois. 2005.

97. Asmana Ningrum R. Human Interferon Alpha-2b: A Therapeutic Protein for Cancer Treatment. Scientific a (Cairo). 2014: 970315.

98. Andreadou I, Sigala F, Iliodromitis EK, Papaefthimiou M, Sigalas C, et al. Acute doxorubicin cardiotoxicity is successfully treated with the phytochemical oleuropein through suppression of oxidative and nitrosative stress. 2007; 42: 549-558.