



The Truth About Cancer, the Disease of Mitochondria - A Reprisal

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Abstract

Cancer is a devastating disease and in fact it's becoming one of the leading causes of death around the world. What's worse, the medical profession is largely ignorant of the fact that most cancers are rooted in metabolic and mitochondrial dysfunction, and hence the conventional prevention recommendations do little to nothing to quell the tide of cancer diagnoses. Some experts even suggest that over 90% of cancer cases are either preventable or treatable as cancer is really a mitochondrial metabolic disease, rooted in poor diet choices combined with a toxic lifestyle.

Keywords: Cancer; DNA; Oxygen

Introduction

It is still being figured out, why cancer rates all over the world are actually rising, and in spite the many research funds that are being spend and the man hours being invested in this search finding a cure, only now and then heralded new discoveries from the lay press suggesting a revolutionary kind of cancer treatment (which only later had to be abandoned because of severe side-effects)- a new kind of thinking has evolved that will give patients an option with a major chance of survival. So one should look at this disease from a totally different angle, not being the cause of "bad luck" or because of your genetic make-up. You may have the gene to get cancer but in order to be switched on there are outside factors, epigenetic causes, which have a much larger influence on the development this life-threatening disease. By viewing cancer as a metabolic disease, opposed to a disease of damaged DNA, which is a downstream effect of mitochondrial dysfunction- it gives us the power to control this dysfunction by carefully choosing foods and nutrients and employing strategies that help optimize the biochemical pathways that suppress cancer growth while simultaneously stimulating mechanisms to push it into remission. Dr. Thomas Seyfried, one of the leading academic researchers of nutritional interventions for cancer, suggests that the mechanism by which for instance a ketogenic diet manages cancer is far clearer and more readily understood than the way the ketogenic diet manages epileptic seizures [1]. This is ironic considering that it's barely recognized, let alone applied, within oncology circles, while it's been an accepted treatment for epilepsy since the 1920s. Experts believe that the ketogenic diet may be particularly beneficial for brain cancer [2,3]. This is underlined by case studies and patient data analyses which have found improvements in various types of brain cancer, including glioblastoma multiforme (GBM), the most common and aggressive form of brain cancer [4-6].

What however, are the real causes of this disease which is going rampant in the 21st Century? This question is not as far-fetched as it might sound and there are many different aggressors which may turn a cell into a cancerous cell. For instance:

1. The many oxygen radicals produced within our body from digesting the wrong food, the chemicals within the food like pesticides, glyphosate-(Roundup®, a herbicide used widely and crops are just laced with it even to make harvesting easier), the use of GMOs, as well as the consumption of BPA (bisphenol A) another endocrine disruptor.
2. The air pollution and toxins around us from car exhaust, coal mining, radioactive fallout (see Fukushima).
3. The daily use of cosmetics, fragrances, toiletries, and personal care products which are just loaded with toxic chemicals, being reabsorbed through your skin
4. The acidic environment the cell is faced with following repetitive excess sugar metabolism (glycolysis) making it more prone to develop into a cancer cell
5. Extended exposure to x-rays- the yearly advocated mammography is actually a hoax and only leads into more breast cancer
6. The extended exposure to the sun UV-A rays (do not forget UV-B rays are essential for Vit D synthesis within the skin) while most of the sunscreen lotions work like cancer enhancers letting through the UV-A rays.
7. Smoking as it has been found that already 1 cigarette results in the formation of 100.000 radicals

- 8. An imbalance within the delicate relation of the Th1-Th2 immune system, where an increase in Th2 results in a lesser activity of Th1, as it the job of the TH1 system among others, to eliminate tumor-cells.
- 9. The formation of nitrosamine from nitrites/nitrates within meat products
- 10. High insulin levels, which block the formation of the enzyme sirtuine (SIRT-1), necessary for the formation of new mitochondria, replacing old senescent ones which produce oxygen radicals at the cellular level.
- 11. The high glycemic load as glucose is a tumor promotor which is related to the kind of food you are eating.
- 12. A gut dysbiosis with an overpopulation of the bad bacteria resulting in local inflammation, a leaky gut and an activation of the immune system which by means of autoantibodies and a molecular mimicry now attacks myocardial cells.
- 13. Products with a high insulin growth factor (IGF-1) like milk and soft cheese from grain fed and not grass-fed cows with added antibiotics and/or hormones like the recombinant bovine growth factor, which will activate and promote tumor growth
- 14. A chronic infection within the gum, as the very bacteria get into the blood stream and later can be found within arterio-sclerotic plaques
- 15. Any kind of psychological problem not having been solved and which is being carried around for over the past 20 years.
- 16. Aside from deodorants with aluminum, recent data found that hair dye and hair straighteners increase a woman's risk of developing breast cancer, showing the risk disproportionately affected different groups of women.



Figure 1

Here are some statistics to open your eyes as this is a disease that today will affect 1 out of 2 persons in their lifetime [7];

- 1. A hundred years ago cancer was responsible for only 3% of all deaths in the US. Today it's responsible for more than 30% of deaths (figure)

- 2. In 1930, 3000 people were dying in the US of heart disease. Already in 2005 heart attacks and strokes killed nearly 800,000 people, an increase far outstripping population growth, while in the meantime this number steadily has increased
- 3. 100 years ago less than 0.01% of the US population was affected by diabetes and prediabetes. Today nearly 40% of the population is affected by this condition, while at the same time the rates of obesity are soaring

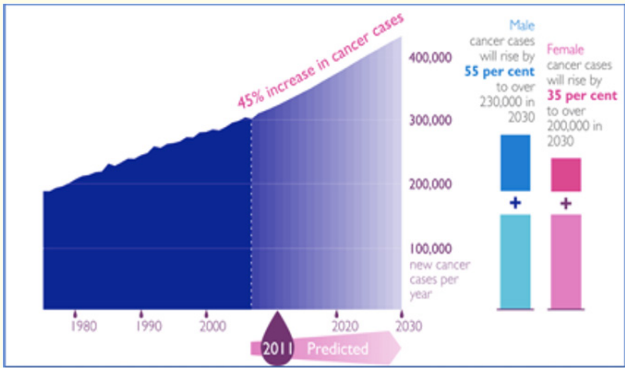


Figure 2: In spite the alleged increase in 5-year survival rate, worldwide the cancer rate is increasing (Source: WHO statistics).

Dr Samuel Milham, one of America's popular epidemiologists over the past 50 years, argues that the rapid and recent growth in radio frequency radiation from cell phones and cell phone towers, Wi-Fi and Wi-max systems, powerlines, broadband internet over power lines, and other personal electronic devices may prove to be mankind downfall resulting in an epidemic of disease and mortality (figure).

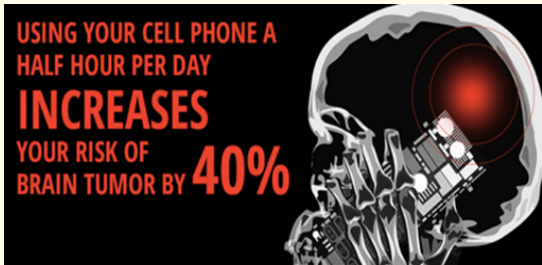


Figure 3

He lays out clearly the link between EMF exposure and most of the twentieth century diseases of civilization, including cancer; cardiovascular disease, diabetes, and suicide [8], stating that the 'War on Cancer' is a failure because people are missing one of the major carcinogens being EMF, plus the wrong diet, since sugary components in food feed all cancer cells. This is because cancerous cells gain their energy through the fermentation of sugar and there is an exceptionally high turnover to generate more energy than with the usual many times more efficient oxidative breakdown using oxygen. In addition, the sugar is no longer completely broken down to carbon dioxide, which is why some sugar degradation products are available as supplementary materials for proteins and fats avail-

able, which in turn accommodates the increased cell growth. And finally, the end product of lactic acid itself gives an advantage to the tumor cells. The acid drives the surrounding healthy cells into programmed cell death. At the same time, it dissolves the protective scaffolding that surrounds the cells in the tissue, which means that the cancer cells proliferate better.

The differences between cancer and normal cells

Cancer cells show some fundamental differences in regard to normal cells:

1. They are only able to use glucose (and L-Glutamine) for growth; fats cannot be metabolized leading them into starvation.
2. They demonstrate a higher number of IGF-1 binding sites on their surface making it easier for sugar to get into the cytosol
3. They divide rapidly in an uncontrolled manner
4. They do not use mitochondria for energy production.
5. The preferential way of generating energy is through anaerobic glycolysis (without oxygen), resulting in the massive production of lactic acid.
6. While growing they break out of the formation of cells demonstrating uncontrolled and excessive growth
7. They invade the environment also with the help of lactic acid which dissolves the connecting tissue making it easier for tumor cells to invade
8. They metastasize into far away organs
9. No cancer cell looks like the other
10. They activate the metalloproteases, which are enzymes, leading into a degradation of the connective tissue with emancipation
11. They do not demonstrate apoptosis (programmed cell death); once supplied with sufficient energy they can live forever
12. They produce an enzyme by the name of nagalase which is like a mask, shielding them from the immune system (Th1) which otherwise would identify them as foreign and destroy them.

Moreover, scientists are now finding that mitochondrial dysfunction is at the core of virtually ALL diseases, placing mitochondrial function at the very center of just about any wellness or disease prevention program. The metabolic model of cancer is "based around energy and growth" and random chromosomal mutations are secondary. In this sense the metabolic by-products of sugar is a growing area of research, especially in cancer, in which lactic acid accumulates in the tumor microenvironment (TME) (figure). In this context mitochondria have been found to be indispensable in cellular waste management.

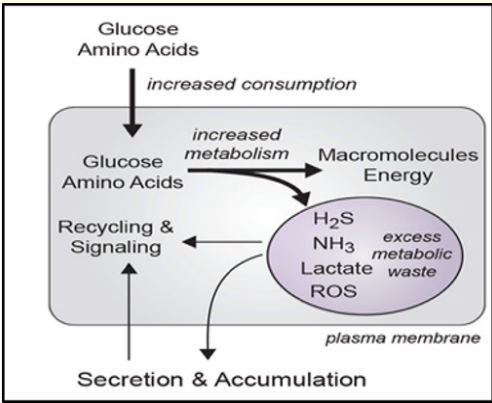


Figure 4: Waste accumulation in the microenvironment (especially lactate), leading into acidity and mitochondrial decay with functional deficits. Adapted from [9].

Also, the increased glucose uptake and accumulation of lactate, even under normoxic conditions (i.e. aerobic glycolysis or the Warburg effect [10], is a common feature of cancer cells (figure). This phenomenon clearly indicates that lactate is not a surrogate of tumor hypoxia but of carbohydrate metabolism.



Figure 5: The biochemist and medical doctor Prof. Dr. Otto, Heinrich Warburg (1883-1970) who made the ground-breaking connection of mitochondria and cancer development and their anaerobic metabolism using only glucose for their growth a theory which is now being recognized as a new way of thinking [11].

This divergence in mitochondrial use of food items for the generation of energy is only now being recognized as being one of the fundamental differences of cancer and normal cells. Humans and their mitochondria are designed to be able to access fat for fuel. It's really the reason why this species has taken over all parts of the world, whereas any other specie has never been able to do that. That's because we can cycle back and forth to having our mitochondria use fat for fuel or to use glucose for fuel. We're designed to shift very quickly, in 24-hour time periods in doing that. Nowadays we no longer have that metabolic flexibility since we've been constantly bombarding our mitochondria with overloads of glucose as a fuel, that really underlies most disease processes.

The presumption that mitochondria are the very turning point in cancer development, as originally stated by the biochemist Warburg [10], are underlined by the following:

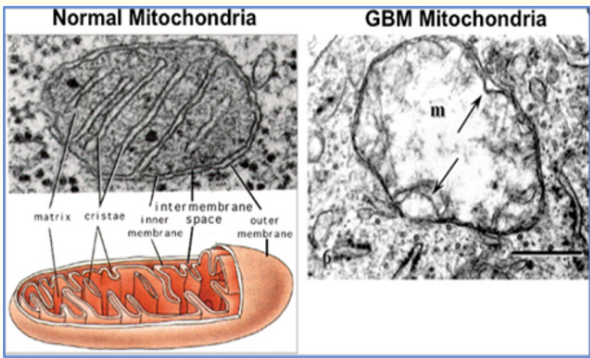


Figure 6: Example of normal mitochondria and one within a cancer cells demonstrating a disorganization in structure with a lack in cristae. Adapted from [1].

1. All cells require an energy source of adenosine triphosphate (ATP). They also require building materials that are either sourced locally or transported in normal cells convert glucose primarily into ATP and a little into maintenance.
2. Cancer cells do the opposite. There's a diversion of glucose away from ATP production to the building materials required for cell growth. The other building materials require protein and fatty acids and cancer steals those from its surroundings.
3. That invasion of surrounding tissue accounts for how cancer spreads and metastasizes. The driving force behind all of this is an oxygen-free radical production.
4. The free radical production then causes the DNA damage in a random fashion, and accounts for the wide variety of chromosomal abnormalities in each cancer cells.

Processed foods - a major cancer promoter in people

What however, drives this free radical production? Inflammation is a major driver, and our modern processed food diet is highly inflammatory (figure). Key culprits include polyunsaturated fats (PUFAs), trans fats and added sugar in all its forms, especially processed fructose (such as high-fructose corn syrup), as well as refined grains. In addition, artificial ingredients also promote inflammation.

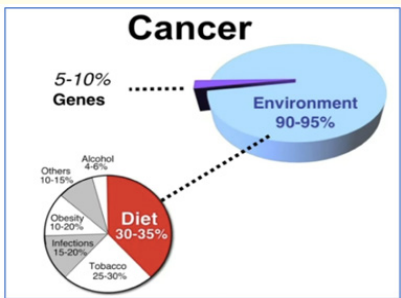


Figure 7: Environmental factors (epigenetics) contributing to the incidence of cancer in to-days world.

By reducing the amount of net carbs you eat, you will accomplish four things that will result in lowered inflammation and reduced stimulation of cancer growth. You will:

1. Lower your serum glucose level (table)
2. Reduce your mTOR level, the hormone that turns on cellular replication and growth
3. Reduce your insulin level, as cancer cells carry a lot of IGF-1 (insulin growth factor) binding sites
4. Lower your insulin growth factor-1 (IGF-1), a potent hormone that acts on your pituitary gland to induce metabolic and endocrine effects, including cell growth and replication. Elevated IGF-1 levels are associated with breast and other cancers).

Cancer loves sugar. Stop feeding it ! Ketones are what your body uses for fuel when it does not have sugar. Using fats instead of sugar starves the cancer !

Indeed, one of the basic reasons why a high-fat, low-net carb diet (nutritional ketosis) works so well is because it drives the inflammation down to almost ZERO. And when inflammation disappears, your body can heal. It's also important to remember that glucose inherently is a "dirty" fuel as it generates far more reactive oxygen species (ROS) and secondary free radicals than burning fat within the mitioch. But to burn fat, your cells must be healthy and normal. Cancer cells lack the metabolic flexibility to burn fat and this why a healthy high-fat diet appears to be such an effective anti-cancer strategy. When you switch from burning glucose as your primary fuel to burning fat for fuel, cancer cells really have to struggle to stay alive, as most of their mitochondria are dysfunctional and can't use oxygen effectively to burn fuel. At the same time, healthy cells are given an ideal and preferred fuel, which lowers oxidative damage and optimizes mitochondrial function. The sum effect is that healthy cells begin to thrive while cancer cells are starved.

Unhealthy fats, another promotor of cancer

When it comes to fat, it's really crucial to distinguish healthy from the unhealthy ones. The vast majority of fats people eat are actually very unhealthy. As a general rule, avoid all processed and bottled vegetable oils, which are typically high in damaged omega-6 fats. Also, be careful with olive oil. While healthy, up to 80 percent of commercial olive oils are actually adulterated with oxidized omega-6 vegetable oils, so make sure it's third party-certified as genuine. Another general rule: do not be afraid of naturally saturated fats! They're among the healthy ones. Sources of healthy fats you want to include more of in your diet include:

Ten lifestyle choices to prevent cancer

1. Try always to avoid eating GMOs (genetic modified organism) and processed foods whenever possible. Most conventional food contains artificial ingredients, pesticides, preservatives, additives, bleach, nitrates, toxic gluten, and hydrogenated oils, all of which can cause cancer.

Olives and olive oil (third party-certified authentic)	Coconut fat and coconut oil	Butter made from raw grass-fed organic milk, and cacao butter
Raw nuts, such as, macadamia pecans, and seeds like black sesame, cumin, pumpkin, and hemp seeds	Organic and pastured egg yolk	Avocados
Meat from grass-fed animals	Lard, tallow, butter and ghee	Animal-based omega-3 fats such as krill oil

Table 1

2. The herbicide glyphosate is a dangerous chemical, which is sprayed on crops ! This is because genetically modified crops are the tip of the iceberg when it comes to Roundup® use in agriculture. Unfortunately, many crops that are “traditionally grown” are also saturated with the chemical, whose main ingredient (glyphosate) is listed by the World Health Organization as a probable carcinogen and has been linked to a wide variety of other serious health concerns [12]. Why would farmers use Roundup™ on non-GMO crops? The chemical is used to desiccate (dry) certain crops before harvest. When Roundup™ is used as a desiccating agent on crops, it’s applied liberally right before harvest. This causes crops to ripen faster and more evenly, but the chemicals are quickly absorbed into the food with no time for dissipation. Instead, crops harvested with Roundup™ come to the market drenched in glyphosate.

3. Never put personal care products on your skin, hair, lips, or nails that contain chemicals. Look for organic products that tell you specifically, on the label, they DO NOT contain parabens, coal tar dyes, talc, PEGs (polyethylene glycols), petroleum-based chemicals, phthalates, or triclosan, a cancerous disinfectant.

4. Never burn or spray products in your home that contain chemicals, like cheap candles or the most popular air fresheners. Buy organic candles and make your own air freshener with filtered water, rubbing alcohol (as carrier), and natural essential oils for wonderful fragrances. It's an easy formula! You only need to go buy a spray bottle.

5. Avoid all vaccines and flu shots, as most of them contain mercury, aluminum, MSG, and formaldehyde (aside from kidney cells of monkeys or cells from the umbilical cord of babies; fig.). Just check the CDC website. There are so many hoax diseases out there and you actually can build natural immunity by eating organic food and taking herbal tinctures. Check out turmeric, oil of oregano, and garlic and most of all know that vitamin C is a potent virus killer-you only would have to choose a high enough dose (5.000 - 10.000 mg)!

6. If possible do not drink water from the tap, as it usually contains sodium fluoride, chlorine and other people's medications. Chemicals like bleach cause bladder cancer and pancreatic cancer. Buy a good water filter and never look back! Not only are people dumping unused and outdated prescription meds down the sewage system, the pills they take also remain stable, even after passing through their bodies. With nearly half of men and women now taking prescription drugs on a regular basis, significant amounts are destined to remain active, ultimately resurfacing in tap water. As more people in-
- crease their intake of pharmaceuticals, the amount left over in the water supply will only increase, adversely affecting others who choose not to take them. antidepressants, blood pressure and diabetes medications, anticonvulsants, oral contraceptives. Hormone replacement therapy drugs, chemotherapy drugs, antibiotics, heart medications and even codeine are all showing up in the water supplies of cities. Antidepressants, painkillers, and statins are among the most popular prescribed medications and these all have known side effects. While some may argue that the concentrations are so minuscule that they will not affect the body, a study has clearly demonstrated otherwise that a mixture of drugs at ng/L levels can inhibit cells proliferation by affecting their physiology and morphology [13].

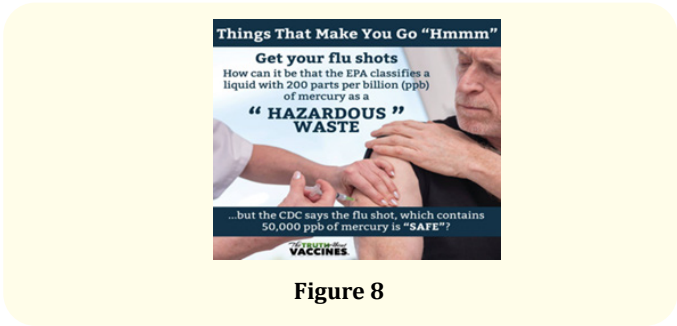
7. Avoid almost all white foods because they are bleached: including white bread, white pasta, white flour, white sugar, white rice (except basmati). The reason that flour is the worst choice (plus its baked goods) is that it is stripped from its natural germ, which contains the vital compounds of grain to sprout. This leads into a much faster rise in blood glucose levels affecting insulin. The process of milling is actually not of advantage as it breaks up the starch into small pieces making it easier for the digestive enzymes to convert it into glucose. This also goes for so called integral flours, where fiber is added in order to compensate for the previous loss however, resulting in the same kind of insulin release. Starving rats would never touch white, milled flour !

8. Avoid artificial sweeteners - mainly aspartame, cyclamate, sucralose (Splenda®), and sorbitol. These are known to cause irritable bowels and migraines, which are just first signs your body is rejecting them. Later comes cancer. Quit them all NOW!

9. If possible, avoid prescription medications, as most are chemical based, turn the cell environment acidic, result in the formation of oxygen radicals, thus enabling cancer cells to develop and spread easily. Nearly every medication out there simply relieves the symptoms of malfunctioning temporarily but they never cure. Don't fall for the tricks conventional pharma sells out by making you believe that their drug is the best in alleviating the problem.

10. Turn down the time you are exposed to EMF (electro-magnetic frequencies); although they are all around us you can reduce the exposure by not using the cellular phone that often or making phone calls by using an air tube between you and the phone. Especially make sure that you are not exposed to WiFi during the night time.

11. It became evident that eating either baking goods or items fried in the pan results in higher AGE concentrations than food that is boiled (table).



And to round things up, here is a list of food items showing their respective glycotoxin activity of AGEs, i. e. the product that comes with barbecuing, grilling, roasting, baking, frying, sautéing, broiling, searing, and toasting (table). These cooking methods may make food taste, smell, and look good, but they may raise your intake of AGEs to potentially harmful levels [14]. The sad fact is, that dry heat increases the amount of AGEs by 10 – 100 times the levels of uncooked foods and since they interact with the RAG receptor in the endothelial lining, they induce inflammation via the NF-κB (nuclear factor kappa-light-chain-enhancer of activated B cells), which is a protein complex that controls transcription of DNA, and cytokine release resulting in inflammation.

Meat, egg and fish dishes; their glycotoxic activity within the amino acid lysin following different cooking methods	KU/100g
Fried bacon in the pan for 5 min	91.577
Soy burger	67.437
Barbecued chicken with skin	18.520
Fried chicken for 20 min	9.722
Pork bacon in microwave oven, 2min	9.023
Chicken nuggets from fast food chain	8.627
Chicken grilled, 15 min	8.299
Big Mac® hamburger	7.801
Home-made (beef) hamburger	7.479
Roastbeef	6.071
Chicken roasted in barbecue sauce	4.768
Tofo grilled	4.701
Salmon grilled in olive oil	4.334
Shrimps fried	4.328
Stewed chicken raw in steam for 1 hr	3.329
Pork bacon roasted in balsamic	3.334
Veal stewed	2.858
Fried eggs	2.749
Roastbeef in casserole	2.657
Lamb boiled for 30 min	1.218
Atlantic salmon boiled for 7min	1.801
Tuna in oil	1.740
Lamb cooked	1.218
Tuna fresh, cooked for 25 min	919
Fisch cooked at 80°C	761
Salmon smoked	572
Omelet fried in butter 13 min	507
Tofu raw	488
Tuna, natural conservation	45
Omelet fried in olive oil	337
Omelet fried in margarine 8 min	163
Boiled eggs	90
Omelet fried at low temperature, 11 min	90

Table 2: The difference in accumulation of oxygen radical formation (AGEs) of the amino acid lysin after different cooking methods. Note: using frying or charcoal barbecuing results in a higher concentration of AGEs.
Adapted from [15].

Conclusion

We all have moved away from the time of our ancestors, eating the wrong diet, living in an environment, which is filled with dirty electricity, and striving for a life which is only filled with the intention to make a lot of money. This is against our very basic needs which we had adapted to over the last 100.000 years of our existence. In addition, there is this pressure at work, the pressure with children and sports activities, the pressure with fitting into our social environment, and everything else life throws at us. And one of the first things we tend to do away with is getting adequate sleep. So, it's no wonder, when jeopardizing these basic laws which are inside of all of us, which disrupts the balance of energy and the body reacts in order to defend himself with the kind of weapons that were given to him in former times fighting off viruses, bacteria, parasites and even tumor cells by inducing an autoimmune reaction that eventually may lead into a disease like cancer. So, the common failings of drugs in cancer therapy is obvious, however, there are research studies and authoritative voices telling us that natural foods contain bioactive compounds (like ursolic acid in holy basil, lycopene in tomatoes, turmeric/curcumin, resveratrol in grape skin, EGCG in green tea, Vit D3, gingerols in ginger, piperine in black pepper, sulphoraphanes in cabbage) that can help destroy cancer cells.

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