



Can a Low-Carbohydrate Diet Prevent or Treat Cancer?

Several lines of evidence point to the idea that restricting dietary carbohydrates may have beneficial effects in the prevention or treatment of cancer.

Cell cultures

Scientists often grow human or animal cells in lab dishes in order to study their reactions to various stimuli, such as nutrients or drugs. Cell cultures give us reliable information on how cells work, and their relative cheapness and short time frame of experiments make them a great resource, but since they don't represent a whole organism animal or human, results must be cautiously interpreted.

In cell culture, [increased uptake of sugar \(glucose\) increased important pathways linked to initiation of cancer and growth of cancer](#) cells. Reduction of glucose uptake in cancer cells suppressed cancer-promoting pathways.

This makes sense due to the Warburg effect, which was discovered nearly 100 years ago by Otto Warburg. Cancer cells preferentially use glucose for energy in a process called anaerobic glycolysis. The [PET scan](#), used to detect cancer, makes use of this effect by looking at tissues with increased glucose uptake, thus detecting cancer.

Curiously, Warburg's original hypothesis that aerobic glycolysis itself could be the "origin of cancer cells" had not been proven directly. Our findings provide a hitherto-undescribed direct role of increased aerobic glycolysis in inducing the cancer phenotype, in which increased glycolytic activity regulates the canonical

oncogenic pathways dynamically and reciprocally. These results may provide additional evidence for how hyperglycemia in diseases such as obesity and diabetes could provide a microenvironment that results in higher risk of some cancers. Additionally, our findings may explain how small molecules, such as metformin (used for treatment of diabetes and known to lower blood glucose levels), decrease the risk and mortality of several types of cancers.

Animal studies

In mice, [a low-carbohydrate, high-protein diet slows tumor growth and prevents cancer initiation](#). Mice that were implanted with tumor cells and fed the low-carbohydrate diet had slower tumor growth, and lower blood glucose and insulin. In mice bred for higher rates of spontaneous cancer, tumor incidence and insulin were lower on the low-carb diet.

Of interest, adding celecoxib, an anti-inflammatory drug, to a low-carbohydrate diet, [markedly reduces metastasis](#). This may be for the same reasons that [aspirin use is associated with less cancer](#).

[A very low-carbohydrate ketogenic diet increases lifespan in mice](#). Among the changes noted in the mice fed the ketogenic diet was much lower tumor incidence; either the absence of carbohydrate in the diet, or the presence of [ketones](#), meant less cancer.

Humans

Cancer has consistently been reported as rare to non-existent in peoples living in accordance with their traditional lifestyles, including [Africans, American Indians, and Eskimos](#). Modern hunter-gatherer peoples eat far fewer carbohydrates, from 20 to 40% of calories, than do modern Americans, who eat 50% of calories as carbohydrates, on average. Hunter-gatherers also don't eat highly processed carbohydrates, such as flour and sugar, which have been suggested to be uniquely involved in promoting cancer.

Insulin and IGF-1 (insulin-like growth factor) promote cancer, and [a Western diet with high intake of refined carbohydrates, of the kind that promotes high blood sugar, in turn promotes insulin and IGF-1 signaling](#).

[Obesity and diabetes are both associated with higher rates of cancer](#), and both obesity and diabetes are also associated with diets high in refined carbohydrates and sugar.

Thus, there are several reasons to think that a diet high in refined carbohydrates and/or sugar could promote cancer in humans.

Do low-carbohydrate (ketogenic) diets benefit cancer patients? This topic has engendered lots of controversy, with one side claiming that they could work wonders, the other side claiming a lack of solid evidence.

[A review of human and animal studies on the ketogenic diet](#) and cancer found:

The majority of animal studies (72%) yielded evidence for an anti-tumor effect of KDs. Evidential support for such effects in humans was weak and limited to individual cases, but a probabilistic argument shows that the available data strengthen the belief in the anti-tumor effect hypothesis at least for some individuals. Evidence for pro-tumor effects was lacking completely.

Good evidence in animal studies, weak evidence in humans, and no evidence of a pro-cancer effect.

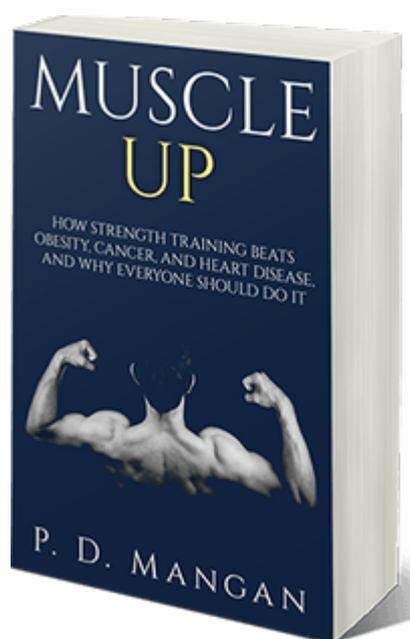
Conclusion: A good case, but more evidence needed

If the reports of low to non-existent cancer among peoples living a traditional lifestyle without Western foods holds true, then that gives us reason to believe in the refined carbohydrate and cancer hypothesis. (I say “if”, because many of the reports are older and non-systematic, but still a phenomenon remarked upon by many doctors who lived among these peoples.)

Animal studies are another brick in the evidence wall, but of course rodents aren't humans.

The fact that cancer cells feed on glucose, and that insulin promotes cancer growth, lead to the belief that cutting dietary carbohydrates can only help prevent or treat cancer. Certainly, there's no evidence that cutting carbohydrates is harmful in that respect – or indeed, in any other respect.

PS: For more on how to live longer and healthier with strength training, and avoid cancer the same way, see my book, [Muscle Up](#).



PPS: [Check out my Supplements Buying Guide for Men.](#)