**Nutrition’s Effect on Cancer**

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**Many associate cancers with being caused by a genetic alteration that is then uncontrollably reproduced leading to an extensive mass of altered cells in the body. Looking at the mechanisms of cancer growth and initiation shows different mechanisms may be affecting cancer growth in people. In particular, dietary intake shows to play large if not more detrimental role in cancer growth in humans. What was once known to be a genetic mutation may in fact be able to be prevented or treated simply by alterations to dietary intake. This aspect on cancer initiation, progression, and suppression is relatively new and more research needs to be conducted to understand its correlation, if any with dietary protein type and intake amounts.**

**Introduction**

Cancer is a common concern among most individuals these days. Many chemicals that we are surrounded by are known carcinogens or not yet known carcinogens. They are in the air we breathe, on the food we eat, clothes we wear, overall the potential to come across a carcinogen is endless. Cancer is not only caused by carcinogens, but can be passed down from generation to generation through genetics. It can also be obtained by voluntarily daily activities performed by humans such as smoking cigarettes, tanning in tanning beds or out in the sun are some activities to name a few. Some feel it is out of their control whether they will get cancer or not, and intensive research is continuously being conducted to determine whether we can help it to get cancer, and more particular, certain kinds of cancer an individual might be predisposed to. There is not one prevention method or medication that will prevent everyone from getting cancer, and there is even greater amount of research being conducted on treating people with cancer. This subject of research is quite more extensive due to cancers differing in how they were obtained, how fast it spreads in the body, the particular organ or part of the body affected by cancer, and the type of cancer. Initial treatments include trying to remove the part of the body affected by the mutated genes depending on the size that the mutated cells have covered and if the organ or body part can handle having a portion removed from it and being able to still function. Other times the cancer spreads too rapidly, or the individual may not have known that they had cancer until it has progressed too far to be physically removed. This is where types of medication or treatment may be a more aggressive option in an attempt to stop cancer growth. The main treatments currently being used includes radiation or chemotherapy, or a combination of both depending on the cancer. Both radiation and chemotherapy are not 100% affective at inhibiting cancer growth and are extremely hard on the body. This is why extensive research is continuing to be done in order to find less detrimental alternatives. This review will discuss a preventive method and potential treatment method for cancer.

**Recent Progress**

Research is still being conducted on influence of food intake on likelihood to get cancer. This paper looked over studies also being done on if food affects cancer and what about the food caused the cancer and led to the conclusion that certain types of protein did have an effect on preventing and treating cancer. Since then other studies have been conducted that have also had similar results. One study in particular looked at ovarian cancer and if the source of protein ingested had any effect on cancer growth. It was concluded that protein sourced from plants had a negative effect on ovarian cancer growth, while animal protein had a positive correlation with ovarian cancer growth (Taha *et al.* 2018). These results while coinciding with the original paper on the topic of overall effect of amount of protein intake and correlation between cancer growth and suppression, it also delve into more specifics on the source of protein and its effects on growth and suppression. This helps lead future research to be studied to determine if effects are similar on other types of cancer, and so forth.

**Discussion**

The results uncovered by the original paper demonstrate that protein intake can have a dramatic effect on cancer growth and suppression. Cancer initiation is dependent on enzymatic activation of a carcinogen that will, in turn, lead to the formation of a mutated cell. The cell will then undergo mitosis and divide and replicate, passing on its mutated genes. Nutrient intake was shown to play a role in changing the concentration and activity of the enzyme that has been linked to activating these carcinogens. Protein also plays a role within cancer production as most mutations alter the genes that encode for creating proteins. (Campbell, 2017)

 One factor of protein consumption that was looked at was the amount of protein ingested and if there was a correlation with promoting or inhibiting cancer growth. When fed the lower adequate amount of protein needed for normal body functions was able to inhibit cancer initiation to mice exposed to a strong carcinogen, aflatoxin, which is known to cause mutations. This aspect of protein consumption shows that the nutrient composition may play a large role in cancer initiation or inhibition. Another aspect of protein consumption was the free radical association with consumption. An increase in protein consumption beyond the daily requirement showed an increase in oxygen free radical production, free radical consumption has been linked with aiding in cancer growth. This result then causes one to ask, how important are genes in causing cancer growth, and is it as important as it has been displayed by the medical world.

 One particular type of protein that was highlighted was animal protein. An increase in animal protein beyond the daily requirement for the mice studied showed greater cancer growth as compared to mice that were only given the lowest daily requirement of protein. This study also recorded that even if the level of cancer was advanced in the mice, switching to a low animal protein diet showed a suppression of cancer growth even though the cancer was more widespread than if cancer was initially onset. (Campbell, 2017) Protein plays a major role in cancer independent of size, age of affected, maturation of cancer, etc. as shown by the study.

 While this study was very informative on the mechanisms of the direct way that the amount of animal protein intake cause alters chemical pathways to increase cancer growth, it fails to mention different sources of protein. This is important as there are multiple avenues for obtaining dietary protein that may or may not cause similar effects on cancer growth. This paper put more of an emphasis also on stating that nutrition or dietary intake had a more important role on determining whether someone was to get cancer than from genetic mutations. It had a fair amount of data referring to the roles of genetics and nutrition on cancer, but more research needs to be conducted on this statement, as the genetic role of cancer has been the main correlation over a vast period of time**.**

**References**

[References here. Include all authors and titles of the references. Layout example provided below.]

Taha Ahmed, et al. The Effect of Dietary Protein on the Development of Ovarian Cancer. Published May 8, 2018. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5963616/>.

Campbell, Colin. Cancer Prevention and Treatment by Wholistic Nutrition. Published October 2017. <http://www.jnsci.org/files/article/2017/e448.pdf>.