# Keto and Cancer

Cancer. The word alone evokes deep angst and helplessness. But what if we possess a way to supplement cancer treatment simply through our dietary choices? While researchers support the ketogenic diet (KD) in treating epilepsy, diabetes, and Alzheimer's disease, new evidence shows its promise as an effective adjunct to cancer therapy.

## What Is Keto?

The ketogenic diet is a nutritional therapy that emphasizes a high-fat, moderate-protein, and low-carbohydrate intake. Ordinarily, the body uses carbohydrates as the primary fuel source. When we minimize carbs, glucose stores deplete. The brain cannot tolerate interruptions in fuel supply, so it triggers the liver to produce ketones from fatty acids as an alternative energy source.

Providers use several variations of KD, typically recommending daily dietary intake within the ranges of 65-85% fat, 15-30% protein, and 5-10% carbohydrates.

## KD and Cancer

### Cancer Metabolism

Both normal and cancer cells switch back and forth between using sugar and fatty acids, depending on the availability of glucose. This process prevents us from dying between meals when our blood sugars drop. Tumor cells strongly prefer carbohydrates and thrive on higher sugar intake, providing the energy required for growth and metastasis.

According to the Warburg hypothesis, tumor cells also thrive in a low-oxygen environment, resulting in dysfunctional mitochondria replacing normal energy production with fermentation. Metabolites (products of metabolism) known as reactive oxygen species (ROS) then build up. ROS are strongly associated with cell mutation and cancer.

### Impact of Keto on Cancer

KD creates a hostile environment for tumors through several avenues:

- Starving cancer through reduced glucose availability
- Starving cancer through cancer's inability to utilize ketone bodies or fatty acids
- Promoting cell death through the reduction of ROS
- Promoting cell death as ketones increase oxidative stress in cancer cells

Additionally, KD improves inflammation, reducing the need for anti-inflammatory medications such as dexamethasone, which can increase blood glucose and promote tumor growth.

### Indirect Benefits

Research shows KD promotes many health benefits that indirectly impact cancer, including improved:

- Body composition, particularly the reduction of inflammatory (visceral) fat
- Insulin signaling
- Inflammation (C-reactive protein) with diet adherence for longer than 12 weeks
- Social and emotional function
- Sleep and energy

Research considers KD safe, with lab tests revealing no associated liver or kidney damage. Also, studies support efficacy with a daily intake of 2-4% carbohydrates, 16-18% protein, and 80-85% fat.

## Limitations

While KD remains promising, further research needs to address several concerns. Unfortunately, while many believe achieving ketosis rests only on the ability to control carb intake, sleep, exercise intensity, and stress also impact it. For cancer patients, tumor metabolism and treatments may also impact ketosis. Moreover, research lacks standardization of recommended dietary ratios, an essential piece in choosing the most effective treatment plan.

## Share the Message

KD complements cancer therapies by creating a hostile environment that directly impacts cancer metabolism, growth, and spread. KD improves inflammation, body composition, and insulin signaling, enhancing the body's ability to fight. In addition, KD improves mood, sleep, and energy, encouraging the weary cancer patient to press on.

If you love someone battling cancer, please share the benefits of KD so that they may present the research to their oncology team.

## References

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