Ivermectin for Colorectal Antitumor Properties

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STORY AT-A-GLANCE   -

> Ivermectin has anti-inflammatory, antitumor and antiviral properties; data show the drug influences the apoptosis and proliferation of colorectal cancer cells in the lab

> The potential use of Ivermectin in cancer treatment offers hope for less damaging Western medicine treatment as other interventions are invasive and injurious

> You may take several steps to help prevent colorectal cancers including eating more fiber, optimizing vitamin D, avoiding processed meat, maintaining a normal weight and controlling belly fat

> Researchers have demonstrated the probability that cancer is a metabolic disease controlled in part by dysfunctional mitochondria. You can optimize your mitochondrial health through cyclical nutritional ketosis, calorie restriction, meal timing, exercise and normalizing your iron level

Your colon, which is also known as the large intestine, plays an incredibly important role in your health. As part of the digestive tract, bacteria in the colon are responsible for the final breakdown of food material before it passes into the rectum and is excreted through the anus.[1]

New evidence published in Frontiers in Pharmacology show the antiparasitic medication ivermectin may have a new application in the treatment of colorectal cancer (CRC).[2] Researchers are hopeful this may have a positive impact on colon cancer deaths. Colon cancer is the third leading cancer diagnosis and third cause of cancer death in the U.S.[3]

According to data from the National Cancer Institute,[4] an estimated 149,500 new cases of colorectal cancer will be diagnosed in 2021 and an estimated 52,980 people will die. This represents 7.9% of all new cases of cancer diagnosed in 2021 and 8.7% of all cancer deaths.

There are modifiable risk factors associated with colorectal cancer.[5] For example, lifestyle factors over which you have control that reduce your risk of colorectal cancer include your diet, alcohol consumption, activity level, weight and history of smoking.

In 2015, the International Agency for Research on Cancer, an arm of the World Health Organization,[6] concluded that processed meat could cause colorectal cancer in humans and classified it as a Group 1 carcinogen. According to the WHO, this means:

> *"... there is convincing evidence that the agent causes cancer. In the case of processed meat, this classification is based on sufficient evidence from epidemiological studies that eating processed meat causes colorectal cancer."*

Ivermectin Shows Promise in Treatment of Colorectal Cancer

Wrongly vilified as a "livestock drug" by the media in the treatment of COVID-19 with "scant evidence it works,"[7] researchers have found a new use for this Nobel Prize-winning medication.[8] As the research team wrote in the published study, although CRC is the third most common cancer worldwide, it still lacks effective therapy.[9]

Past research has demonstrated that ivermectin also has anti-inflammatory, antitumor and antiviral properties. To test the influence ivermectin may have on colorectal cancer cells, the team used cancer cell lines SW480[10] and SW1116.[11] Both are epithelial cell lines from the large intestine in humans.

The researchers[12] used multiple tests to determine cell viability and apoptosis after exposure to ivermectin. They also measured reactive oxygen species levels and cell cycle. To explore the effect on proliferation, the researchers used different concentrations of ivermectin on the cultured cells and found cell viability decreased in a dose-dependent and time-dependent manner.

The ivermectin also altered cell morphology, demonstrating a decrease in cells after just 24 hours and a loss of their original shape. Cultured cells were also exposed to concentrations of ivermectin after which cell viability and apoptosis were measured. The researchers found an increase in apoptosis indicating a dose-dependent effect.

Additionally, the researchers measured the activity of Caspase-3 that plays a vital role initiating apoptosis. They found that ivermectin increases Caspase 3/7 activity in both cell lines in a dose-dependent manner.

This information supports past studies that have suggested ivermectin has anticancer activity against cancers of the digestive system, reproductive system, brain, respiratory system, hematological and breast. The researchers concluded the data demonstrated:[13]

> *"... ivermectin may regulate the expression of crucial molecules ... Therefore, current results indicate that Ivermectin might be a new potential anticancer drug for treating human colorectal cancer and other cancers."*

Current Colorectal Tumor Treatments Are Invasive and Damaging

The potential use of ivermectin in the treatment of colorectal cancer, or other cancers, offers great hope since current treatments are often invasive and damaging. Ivermectin has been prescribed successfully in humans for 40 years[14] with a known side effect profile. This includes drowsiness, headache, mild skin rash, nausea, diarrhea and dizziness.[15]

The American Cancer Society's[16] current recommendations for treatment of colorectal cancer are based on the stage of disease at diagnosis. The treatments can include surgery, chemotherapy, radiation and targeted therapies. Targeted drugs work differently from chemotherapy and have different side effects, which can include high blood pressure, fatigue, mouth sores, bleeding and low white blood counts.[17]

Unfortunately, these are the best treatments that Western medicine currently has to offer people with colorectal cancer. Following chemotherapy or ionizing radiation, it is

not uncommon to develop a secondary cancer after cellular damage from the treatment.[18]

For example, after chemotherapy, acute myelogenous leukemia is one of the most common types of cancer to develop. After radiation treatments, a solid tumor can develop near the margin of the irradiated field. Bone and soft tissue sarcomas are the most common.

Help Protect Your Gut Against Colon Cancer

There are several steps you can take to help protect yourself against colon cancer. Research published in Pharmaceutical Research[19] suggested that only 5% to 10% of all cancer cases are due to genetic defects, while the rest are linked to environment and lifestyle factors.

The researchers estimated that of the environmental and lifestyle factors that contribute to cancer related deaths, nearly 30% are due to tobacco, 35% are related to diet and 20% are related to infections. The remaining 15% can be due to lack of physical activity, stress and environmental pollutants. Some of the lifestyle factors that can help reduce your risk colon cancer include:

Eating more fiber — Dietary fiber is associated with a reduced risk of colorectal cancer, specifically colorectal adenomas and distal colon cancer.[20] By eating more whole foods, such as fruits and vegetables, you'll naturally be eating more fiber from the best source.

Optimizing your vitamin D level — A vitamin D deficiency is a risk factor for colorectal cancer.[21] One study[22] showed people with higher blood levels of vitamin D were less likely to develop colorectal tumors. It's important to monitor your vitamin D levels to ensure you stay within a healthy range.[23]

Avoiding processed meats — These include pastrami, ham, bacon, pepperoni, hot dogs, some sausages and hamburgers preserved with salt or chemical additives.

The nitrates found in processed meats are frequently converted into nitrosamine,[24] which are clearly associated with an increased risk of certain cancers.

Exercising — There is evidence that regular exercise can significantly impact and reduce your risk of colon cancer.[25,26,27] Exercise helps drive down insulin levels and it has also been suggested that apoptosis is triggered by exercise.[28] Exercise also improves circulation of immune cells which improves the efficiency of your immune system.

Maintaining a normal weight and control belly fat — According to one NIH study,[29] obesity is more closely associated with colon cancer than diet. Hyperinsulinemia, which occurs in type 2 diabetes, and linked to obesity, is an important factor in the development of colon cancer.[30]

According to the National Cancer Institute,[31] results from the NHANES in 2011 to 2014 nearly 70% of people in the U.S. over 20 were overweight or obese. It's not just how much weight you carry, but where it's carried. One study[32] showed that visceral fat has a positive association with the prevalence of colorectal cancers. The prevalence increased significantly as the measurement of visceral fat increased.

Limiting alcohol and eliminating smoking — Although smoking is more frequently associated with lung cancer, research has shown there is a link between smoking tobacco and a greater risk of colon cancer.[33] Data published in 2020,[34] demonstrated a dose-dependent relationship between cigarette smoking and CRC.

Alcohol intake is also associated with a higher risk of colorectal cancers. One study[35] found a differentiation between the types of alcohol and the effect on the colon and rectum. Another published in 2018,[36] found the relationship between excess alcohol intake was linked not only to the alcohol but also to the predisposition to a poor diet low in fiber.

Eating garlic — There is evidence demonstrating garlic can kill cancer cells in vitro. Several studies have analyzed the effects that dietary garlic may have on the

development of colorectal cancer. One study[37] did not find a significant reduction in risk.

A second published in January 2020,[38] did find evidence that garlic could reduce the risk of CRC. One study[39] published in the Asia Pacific Journal of Clinical Oncology revealed the odds of getting CRC were 79% lower in those who a diet high in allium vegetables, which include garlic, leeks and onions.

Optimizing Mitochondrial Health Lowers Metabolic Disease Risk

In 2016, Thomas Seyfried, Ph.D., was the recipient of my Game Changer Award for his work on cancer as a metabolic disease. Later, his work was heavily featured in Travis Christofferson's excellent book "Tripping Over the Truth: The Metabolic Theory of Cancer."

In November 2018,[40] Dr Peter Attia, who focuses interviewed Seyfried in a detailed discussion about why cancer cells grow and how conventional medicine has it mostly wrong when it comes to treatment. During the interview Seyfried talked about important principles in cancer treatment including biopsies, surgical intervention, radiation and chemotherapy.

As I have discussed in the past,[41] Seyfried and others have shown cancer is primarily a metabolic disease and that normal mitochondria can suppress cancer growth. In other words, for cancer cells to proliferate, they must have dysfunctional mitochondria. Seyfried's research demonstrates cancer can be managed when you move from using glucose and glutamine for fuel to primarily ketone bodies in a ketogenic diet.

The take-home message from Seyfried's work is keeping your mitochondria healthy significantly reduces the risk for any type of cancer. By primarily avoiding toxic environmental factors and implementing healthy lifestyle strategies you can reduce the risk of mitochondrial dysfunction. This is the sole focus of the program detailed in my book "Fat for Fuel." Topping my list of strategies to optimize mitochondrial health are:

- **Cyclical nutritional ketosis** — The divergence from an ancestral diet, including the prevalence of processed and unnatural foods replete with added sugars, net carbs and industrial fats, is responsible for most of the damage to your mitochondria. A foundational strategy to optimize health is to eat the right fuel.

- **Calorie restriction** — By limiting the amount of fuel available to your body, you reduce mitochondrial free radical production. Calorie restriction is consistently shown to have many therapeutic benefits.

- **Meal timing** — When you eat late in the evening, your body stores the energy instead of using it. This creates a buildup of ATP and ultimately an excessive amount of free radical formation.

- **Normalizing your iron level** — High levels of iron enhances oxidation and creates reactive oxygen species and free radicals. Contrary to popular belief, excess iron is more prevalent in the population than iron deficiency. Fortunately, this is very easy to address.

  Simply checking your iron level with a serum ferritin test will reveal if your level is high. You can correct high levels by donating blood two or three times a year to maintain a healthy level.

- **Exercise** — In addition to the evidence discussed above related to colorectal cancer, exercise also upregulates PCG1 alpha and Nrf2. These are genes that promote mitochondrial efficiency, helping them to grow and divide if actively. Simply put, by increasing the energy demand on yourself during physical activity, it signals your body to create more mitochondria to meet the energy demand.

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