

# **Understanding Cancer's Metabolic Origins**

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*Synopsis: Key Take-Aways from September's BioBites*

This year, an estimated 1.95 million people in the United States will hear the words, "You have cancer." In fact, one in two men and one in three women will hear those words at some point in their lifetime. What's more, an estimated 609,000 people will die from cancer this year in the United States alone.

Everywhere we turn, we see cancer all around us. But are we looking at it through the right lens?

Our current cancer treatment model is to blast it with radiation, cut it out with surgery, or kill it with chemotherapy (and sometimes a combination of all three). This warfare mentality and battlefield approach to care is one-dimensional, limiting, and often erases human agency within the process. Could it be that we're looking at cancer all wrong? If we shift our gaze not too far back in cancer's history—just 100 years ago—we will find a unique discovery by Dr. Otto Warburg that is having a renewed focus among cancer patients and the scientific community.

What are the most common risk factors that contribute to the high rate of cancer we see today?

## **Nine Modifiable Risk Factors of Cancer**

There are nine ways in which we can reduce our risk of getting cancer. These are the "modifiable" risk factors.

1. Having a high body mass index (BMI)
2. Low fruit and vegetable intake
3. Physical inactivity
4. Smoking
5. Alcohol misuse
6. Unsafe sex
7. Urban air pollution
8. Indoor use of solid fuels
9. Contaminated injections

## **The Connection Between Risk Factors and Trauma**

Besides the nine modifiable risk factors listed above, there is a strong correlation between diseases we develop later in life and the traumas we experienced earlier in

life. Many studies have shown that the higher the score of adverse childhood experiences (ACE score), the more prone we are to chronic diseases including cancer.

- Trauma overwhelms a person's coping capacity and has long-term effects on functioning and well-being.
- Normal, protective responses to stress ("fight, flight, or freeze") are activated by the perception of threat/trauma/stress.
- Trauma is common. Between 55% and 90% of us have experienced at least one traumatic event, and on average nearly five traumatic events.
- The impact of trauma is often deep and life-shaping.
- Trauma can result in a wide range of responses including intense feelings of fear, loss of trust in others, decreased sense of personal safety, guilt, and shame.

All this does affect DNA mutation which is a recognized cause of cancer. Now that we have laid out the potential risk factors and some of the causes, we can talk about how cancer can develop.

### **Cancer Physiology and Cancer Progression**

The transformation of a normal cell to a tumor cell is linked to damaged DNA. It appears to be dependent on mutations in genes important in integrating extracellular and intracellular signals. In other words, the cell growth amount exceeds the cell death amount, called *apoptosis*.

Cancer can develop through gene mutation as well. Gene mutations may be inherited through gene-line mutations where they are present in egg or sperm (5 - 10%) or through somatic mutations where they are acquired (90 - 95%).

Cancers develop from initial mutations in a single cell, so they are by nature *monoclonal*. The growth from that single mutated cell in adult-onset cancers is typically very slow with a latency of 20 to 30 years. During this time a succession of genetic and epigenetic events is required for cancer to develop.

Those events can be greatly influenced by the following triggers: molecular mechanisms (a genetic disease resulting from mutations affecting genes that control normal cell function); host factors (heredity, hormones, immune mechanisms); environmental causes (chemicals, radiation, infectious agents); lifestyle (tobacco, diet, sexual); general environment (occupation, exposure to toxins, air, water, soil).

## Otto Warburg's Theory

The body is a large electromagnet that produces electrical fields. According to Nobel prize winner Dr. Otto Warburg, every cell has a voltage. The voltage varies depending on the health of a cell.

- A healthy cell has an electrical potential of  $-70$  to  $-90$  millivolts ( $mV$ )
- An aged cell has  $-50$   $mV$  to  $-35$   $mV$
- A cancer cell or an ill cell has  $-15$   $mV$

The appropriate cellular voltage of a cell should be around  $-70$   $mV$  as stated above to ensure a proper electrochemical "grid" that helps facilitate electron transfer and for cells to function properly at a normal rate. Electrons provide a negative charge and when there is not enough electron availability, chemical processes get stuck. In general, this happens at around  $-40$   $mV$  when we start to see pain, inflammation, and arthritis arising. Strikingly, cancer cells begin to thrive at a level of  $-15$   $mV$ .

In order to survive, normal cells use oxygen via the Krebs cycle. The Krebs cycle is an eight-step chemical process that takes place in the matrix of mitochondria under aerobic conditions.

Mitochondria makes over 90% of the body's energy in the form of adenosine triphosphate (ATP). ATP releases energy when it is broken down. This energy is vital to sustain life and support healthy organ function. The body's main energy consumers are: the brain, muscles, liver, kidneys, gastrointestinal tract, heart, and lungs.

Warburg discovered that cancer cells were low in oxygen due to a change in cellular respiration that occurred from using oxygen to using the fermentation of sugar. **Prolonged exposure to toxins, especially in combination with cells which have not been properly nourished, oxygenated, hydrated, and cleansed is a primary cause of cancer.** Over time the stress and inflammation that result from toxins leads to a dysfunction in the cellular mitochondria. Cancer cells then revert to a more primitive form of respiration (sugar fermentation), refuse to die, multiply, and actually form a protective barrier.

The Warburg hypothesis, sometimes known as the Warburg theory of cancer, postulates that the driver of tumor growth is an insufficient cellular respiration caused by insult to mitochondria. The term **Warburg Effect** describes the observation that cancer cells exhibit glucose fermentation and can live and

develop, even in the absence of oxygen. Tumor tissues metabolize approximately tenfold more glucose to lactate in a given time than normal tissues. That is, cancer cells function well in anaerobic conditions by fermentation of glucose to lactate. Not only that, depriving the cancer cells of a fermentable carbohydrate (sugar) will starve them to death.

All this to say that a primary cause of cancer is the replacement of the respiration of oxygen (oxidation of sugar) in normal body cells by fermentation of sugar in cancer cells. In every case, during the cancer development, the oxygen respiration always falls, fermentation appears, and the highly differentiated cells are transformed into fermenting anaerobes, which have lost all their body functions and retain only the now-useless property of growth and replication. Thus, when respiration disappears, life does not disappear, but the meaning of life disappears, and what remains are growing masses that eventually destroy the body in which they grow.

### **What can we do about it?**

Your food choices are essential! The primary goal is to minimize the release of insulin. Cancer cells absorb insulin at four times the rate of healthy cells. So, we must focus on “whole” foods, eat plenty of colors, and prioritize eating micronutrients. We must eat a proper balance of carbs, proteins, and fats. Cancer cells can’t metabolize fat.

Next, cancer treatment must minimally include the following therapies: adding electrons to the body; increasing oxygen to support the cells; addressing nervous system regulation; and adding sufficient minerals to the body.

In addition, we must focus on other ways to support the body to create an environment where the cancer cells do not become problematic.

Such practices include:

- Detoxifying from exposed carcinogens
- Addressing fears, negative emotions, and past traumas
- Enhancing cell-to-cell communication through extracellular matrix cleansing
- Improving terrain (miasm, temperament, constitution)
- Removing promoters such as environmental toxins, dietary issues, toxic emotional stressors
- Supporting DNA repair
- Controlling inflammation

- Optimizing BMI
- Using combinations of natural therapies
- Supporting balanced immune function
- Detoxing from chemotherapy and radiation treatments
- Preventing the recurrence or new cancer formation

Remember, cancer is just a word, it's not a sentence. There are many things that you can do yourself to assist the body in fighting or preventing cancer's formation.

**Resources:**

<https://drdicksonthom.com/>

<https://thetruthaboutcancer.com/mitochondria-function-reduce-cancer-risk/>

<https://www.sciencedirect.com/science/article/pii/S0092867412002358>

[https://youtu.be/1w0\\_kazbb\\_U?feature=shared](https://youtu.be/1w0_kazbb_U?feature=shared)

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