

Cancer Solution



Dr. Otto Warburg's Seminal Anti-Cancer Discovery

Ralph W. Moss, PhD, wrote about Warburg's seminal discovery in the *Townsend Letter* ("War on Cancer," May 2007). Otto Warburg, MD, PhD, has been referred to as the greatest biochemist of the twentieth century; the sheer number and magnitude of his discoveries qualify him as the most accomplished biochemist of all time. Despite the fact that much of his groundbreaking work on cancer has been overlooked by the large research institutes, no scientist or researcher has ever disproved the validity, correctness, or applicability of Warburg's important discoveries as they relate to the prevention and cure of cancer.

The Prime Cause of Cancer

We have become so accustomed to having almost every discovery in the battle to defeat cancer, after a time, be called into question that the following strains credibility. Otto Warburg discovered, then clearly and simply stated, that the prime cause of cancer is *oxygen deprivation at the cellular level*. "We find by experiment about 35% inhibition of oxygen respiration already suffices to bring about such a transformation during cell growth,"¹⁴ he stated at a 1966 conference of Nobel laureates in Lindau, Germany. "... Summarized in a few words, *the prime cause of cancer is the replacement of the respiration of oxygen in normal body cells by a fermentation of sugar*. Because no cancer cell exists, the respiration of which is intact, *it cannot be disputed that cancer could be prevented if the respiration of the body cells would be kept intact....* If it is so much decreased that the oxygen-transferring enzymes are no longer saturated with oxygen, respiration can decrease *irreversibly*, and *normal cells* can be *transformed* into *facultative anaerobes*" [italics added].¹⁴ It is that simple: with just one-third less cellular oxygen than normal, you contract cancer. Based on meticulous experiments that he and many others verified numerous times, Dr. Warburg discovered the prime cause of cancer is sustaining a 35% inhibition of cellular respiration.¹⁴ You won't feel the decreased cellular oxygenation, and

you won't know it is happening. Yet if cellular oxygen can be kept above this deprivation threshold, cancer cells will not be able to form.¹⁵

Exercise supplies additional oxygen to the blood; however, this doesn't address transfer of oxygen through the cell membrane. That's why elite athletes still develop cancer. Warburg stated: "To be sure, cancer development takes place even in the presence of free oxygen gas in the atmosphere, but this oxygen may not

penetrate in sufficient quantity into the growing body cells, or the respiratory apoenzymes of the growing body cells may not be saturated with the active groups." Warburg addressed the danger of impaired cellular oxygen transfer even in the presence of oxygen.

Dr. Warburg's discovery has been verified over and over again (never called into question), both as to how normal cells turn cancerous and in showing that cancer doesn't develop in highly oxygenated areas. Two American

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A Cancer Prevention Program Based on Warburg's Work

review by Jonathan Collin, MD

The Hidden Story of Cancer

by Brian Scott Peskin, Founder: Life-Systems Engineering Science, with Amid Habib, MD

Pinnacle Press, POB 56507, Houston, Texas 77256; www.BrianPeskin.com
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Nobel Prize-winner, Otto Warburg, MD, PhD, researched the metabolism of cancer in the first half of the twentieth century. His work is known in oncology as the Warburg theory: cancer cells function in an oxygen-deprived state and metabolically ferment sugar to lactic acid. Warburg established, through meticulous research, that while normal cells metabolize glucose by the enzymatic pathways of the Krebs cycle under normal oxygen conditions, cancer cells have irreversibly changed to a primitive state functioning with abnormally low cellular oxygen. The fermentation of sugar to lactic acid is favored in the anaerobic state, enabling the cancer cell to ferment sugar very rapidly and to produce prodigious quantities of energy for rapid reproduction. Although Warburg published this research in many papers in German medical and scientific journals that were translated into English, most scientists and physicians in Germany, the US, and worldwide did not pursue further research based on his discoveries. In 1960, Dr. Alan Aisenberg seriously criticized Warburg's work; that criticism effectively negated the significance of the anaerobic metabolism of cancer cells for future scientists and physicians. In *The Hidden Story of Cancer*, Brian Peskin studies Warburg's work in meticulous fashion, reviewing the important discussion in papers ignored and misinterpreted by Aisenberg and others. Peskin's review emphasizes the sound scientific basis of Warburg's research and argues convincingly that much of the cancer research in the ensuing years has been wasteful and off-track, because it has ignored Warburg's theory.

Warburg's work remained theoretical, primarily because it could not be put into practice medically. If one assumed that the cancer cell's depressed state of respiration and lowered oxygen was fundamental to the transformation from a normal cell to a cancer cell, how could one maintain normal cell oxygenation? If a tumor cell's extraordinary fermentation of sugar to lactic acid was key to cancer cell proliferation, how could one stop

physicians conclusively proved this in 1953, and two more investigators confirmed this finding in 1955. Goldblatt and Cameron noted in the *Journal of Experimental Medicine* that once damage is too great to the cell, then no amount of oxygen will return the cell's respiration back to normal: it is forever doomed to a cancerous life.¹⁵ However, they confirmed that it is possible to prevent a "respiration impacted" precancerous cell from becoming permanently cancerous if

oxygen deficiency is stopped early enough. In 1955, Malmgren and Flanigan confirmed the oxygen/cancer cause in an ingenious experiment with tetanus spores.¹⁶ Consequently, prevention is the ultimate solution to conquering cancer.

Greater Oxygen Deprivation = Worse Prognosis

Articles in cancer journals confirm the decreased oxygen/increased cancer prognosis. "Tumor hypoxia

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[too little oxygen in the cell] *adversely affects the prognosis* of carcinoma of the head and neck" [italics added].¹⁷ "[A]nalysis showed *significantly lower survival and recurrence-free survival* for patients with a median pO₂ of ≤ 10 mmHg compared to those with better oxygenated tumors (median pO₂ > 10 mmHg). [M]edian pO₂ and the clinical stage according to the FIGO are *independent, highly significant predictors of survival and recurrence-free survival*" [italics added].¹⁸ "*Tumor oxygenation predicts* for the likelihood of distant *metastases* [cancer spreading] in human soft tissue sarcoma" [italics added].¹⁹ Greater cellular oxygen deprivation/hypoxia is directly correlated with a worse prognosis, shorter lifespan, and greater risk of metastases.

A New Hypothesis: Cancer Develops When Cell Membranes' Oxygenation Capability is Compromised

With Warburg's observations as the basis of this hypothesis, we posed the question of what could cause cells to become oxygen-deficient to the degree (35%) that they would become cancerous, and what dietary commonalities or deficiencies might have come to exist over the last 50 years that would predispose an ever-increasing number of people to develop cancer.

Cell Oxygenation and Essential Fatty Acids (EFAs)

We focused on the primary oxygen-absorption function of cells. The body requires special fats which, among other important functions, make it possible for sufficient oxygen to reach the cells via the cell membranes. These special fats are highly oxygen-absorbing entities called *essential fatty acids* (EFAs) and must be consumed daily, because the body can't manufacture them on its own. Consumption of two primary or "parent" forms of EFAs allow the body to make whatever EFA "derivatives" it needs from them. These two primary forms are parent omega-6, termed linoleic acid (LA), and parent omega-3, termed alpha-linolenic acid (ALA). Supplemental EFA-derivatives like EPA and DHA, though available, are not required because the body makes them as needed.

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the sugar fermentation process? Unfortunately, Warburg did not answer these questions, at least not in a practical matter, nor did other scientists or medical researchers. Peskin makes the bravado attempt to answer these questions in a manner suitable to a mathematician and literature reviewer, not as suitable to a physician or nutritionist.

Based on his review of the oncology and scientific literature, Peskin has discerned that tumor cell transformation takes place when essential fatty acids are deficient. His literature research has pinpointed that the deficiency of omega-3 and omega-6 fatty acids is critical to ensure that normal cells under depressed oxygen state transform into cancer cells. Furthermore, Peskin's literature hypothesis has determined that it is the relative deficiency of omega-6 fatty acids relative to omega-3 fatty acids that disrupts the cellular membranes, disabling the cellular oxygenation. Although most humans consume a sub-optimal supply of omega-3 and omega-6 fatty acids as part of the fats consumed daily, the high trans-fat composition of the diet substitutes for the necessary omega-3 and omega-6 fatty acids. Peskin hypothesizes that a program that routinely supplies unadulterated omega-6 and omega-3 fatty acids is obligatory to enable cell membrane stability required to ensure cellular oxygenation and prevention of anaerobic metabolism of sugar. This theory is not squeaky clean but is supported with many papers, which Peskin cites and reviews.

As much as I like the theory and practical program that Peskin proposes to prevent cancer, I am a little put off by his "scorch the earth" approach to other medical theories and approaches for preventing and treating cancer. His discussion nixes viral and genetic causation for cancer; he is critical of cigarette smoking being the cause of lung cancer. He dismisses fiber as well as dietary vegetables and fruits as being of any value in cancer prevention. He lambasts soy as an appropriate part of anyone's diet and is critical of fish oil supplements, as fish oil disrupts the necessary balance of omega-6 to omega-3 fatty acids. He also recommends an iron supplement for everyone, men included, without requiring a measurement of iron levels. While his criticism of differing approaches may be warranted, Peskin's writing tends to be arrogant, and the reader needs to overlook this hubris.

I spent much time reading and digesting Peskin's work, and I imagine I will revisit this material frequently in the future. I appreciate his discussion of the weaknesses that exist in many nutritional theories. *The Hidden Story of Cancer* is an important work for those who are unfamiliar with Warburg's theories. Its program deserves serious study by doctors and patients contemplating alternative cancer therapies.



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