



Dr. Otto Warburg

For his discovery of the nature and mode of action of the respiratory enzyme, the Nobel Prize was awarded to Otto Heinrich Warburg in 1931. This discovery opened up new ways in the fields of cellular metabolism and cellular respiration. He showed, among other things, that cancerous cells can live and develop, even in the absence of oxygen.

Source: Otto Warburg Biography on Nobelprize.org

Warburg's discovery has opened up new ways in the fields of cellular metabolism and cellular respiration. He has shown, among other things, that cancerous cells can live and develop, even in the absence of oxygen. "But, even for cancer. There is only one primary cause. Summarized in a few words, the 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."

Source: The Origin of Cancer Cells

Dr. Otto Warburg received the Nobel prize in 1931 for the discovery that unlike all other cells in the human body, cancer cells do not breathe oxygen. Cancer cells are anaerobic, which means that they derive their energy without needing oxygen. It turns out that cancer cells cannot survive in the presence of high levels of oxygen. One appealing line of treatment therefore is to increase the body's levels of oxygen. At first this seems in contrast the fact that active oxygen molecules (free radicals) are what cause cancer and degeneration in the first place. The evidence is good however that oxygen helps.

Excerpts from The Prime Cause and Prevention of Cancer – An Amazing Speech

By Dr. Otto Warburg lecture delivered to Nobel Laureates on June 30, 1966 at Lindau, Lake Constance, Germany

There are prime and secondary causes of diseases. For example, the prime cause of the plague is the plague bacillus, but secondary causes of the plague are filth, rats, and the fleas that transfer the plague bacillus from rats to man. By the prime cause of a disease, I mean one that is found in every case of the disease.

Cancer, above all other diseases, has countless secondary causes. Almost anything can cause cancer. But, even for cancer, there is only one prime cause. The prime

cause of cancer is the replacement of the respiration of oxygen (oxidation of sugar) in normal body cells **by fermentation of sugar**.

All normal body cells meet their energy needs by respiration of oxygen, whereas cancer cells meet their energy needs in great part by fermentation. All normal body cells are thus obligate aerobes, whereas all cancer cells are partial anaerobes. From the standpoint of the physics and chemistry of life this difference between normal and cancer cells is so great that one can scarcely picture a greater difference. Oxygen gas, the donor of energy in plants and animals, is dethroned in the cancer cells and replaced by the energy yielding reaction of the lowest living forms, namely the fermentation of sugar.

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 machines that destroy the body in which they grow.

All carcinogens impair respiration directly or indirectly by deranging capillary circulation, a statement that is proven by the fact that no cancer cell exists without exhibiting impaired respiration. Of course, respiration cannot be repaired if it is impaired at the same time by a carcinogen.

To prevent cancer it is therefore proposed first to keep the speed of the blood stream so high that the venous blood still contains **sufficient oxygen**; second, to keep high the concentration of hemoglobin in the blood; third, to add always to the food, even of healthy people, the active groups of the respiratory enzymes; and to increase the doses of these groups, if a precancerous state has already developed. **If at the same time exogenous carcinogens are excluded rigorously, then much of the endogenous cancer may be prevented today.**

These proposals are in no way utopian. On the contrary, they may be realized by everybody, everywhere, at any hour. Unlike the prevention of many other diseases, the prevention of cancer requires **no government help, and not much money.**

Many experts agree that one could prevent about 80% of all cancers in man, if one could keep away the known carcinogens from the normal body cells. But how can the remaining 20%, the so-called spontaneous cancers, be prevented? It is indisputable that all cancer could be prevented if the respiration of body cells were kept intact.

Nobody today can say that one does not know what the prime cause of cancer is. **On the contrary, there is no disease whose prime cause is better known, so that today ignorance is no longer an excuse for avoiding measures for prevention.** That the prevention of cancer will come there is no doubt. But how long prevention will be

avoided depends on how long the prophets of agnosticism will succeed in inhibiting the application of scientific knowledge in the cancer field. In the meantime, millions of men and women must die of cancer unnecessarily.

Dr. Otto Warburg was a German scientist who dedicated his life to researching cancer and in the 1920's discovered it's prime cause. Frustrated by the lack of acceptance of his ideas, Warburg often spelled out the axiom attributed to Max Plank, "Science advances one funeral at a time."

Dr. Otto Warburg was the man who discovered the cause of cancer, he was awarded the nobel prize in 1931 for his work. Initially it was my understanding that he discovered cancer but he actually discovered the cause which in my opinion is even more valuable than discovering cancer. Many people have recognized a problem, a disease, a tumorous lump growing on someone and labeling it a disease. The cause of that disease is even more important and relevant than the disease itself if you want to do something about it. His work came to be known as the **"Warburg Effect"** or the **"Warburg Hypothesis"** which basically entailed that cancer cells live off sugar (glycolysis) and that they also thrive in an anaerobic environment. These causes lead me to believe the opposite would help to reverse the cancer growth. What do you think?

"Cancerous tissues are acidic, whereas healthy tissues are alkaline. Water splits into H⁺ and OH⁻ ions, if there is an excess of H⁺, it is acidic; if there is an excess of OH⁻ ions, then it is alkaline."

"All normal cells have an absolute requirement for oxygen, but **cancer cells can live without oxygen – a rule without exception. "Deprive a cell 35% of its oxygen for 48 hours and it may become cancerous."** Dr. Warburg has made it clear that the root cause of cancer is oxygen deficiency, which creates an acidic state in the human body. Dr Warburg also discovered that cancer cells are anaerobic (do not breathe oxygen) and cannot survive in the presence of high levels of oxygen, as found in an alkaline state.

Dr. Warburg understood the importance of oxygen and an alkaline environment around the cancerous growth. He even went so far as to say that **"No Disease, including cancer can live in an alkaline environment"**

In oncology, the Warburg effect is the observation that most cancer cells produce energy predominantly not through the 'usual' citric acid cycle and oxidative phosphorylation in the mitochondria as observed in normal cells, but through a less efficient process of 'anaerobic glycolysis' consisting of high level of glucose uptake and glycolysis followed by lactic acid fermentation taking place in the cytosol, not the mitochondria, even in the presence of abundant oxygen. This observation was first published by Otto Heinrich Warburg, who was awarded the 1931 Nobel Prize in Physiology for his "discovery of the nature and mode of action of the respiratory enzyme". The precise mechanism and therapeutic implications of the Warburg effect, however, remain unclear.