

# The Prime Cause and Prevention of Cancer, by Dr. Otto Warburg

## The Prime Cause and Prevention of Cancer

Dr. Otto Warburg

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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.**