



The Clinical Evidence of Cellular Respiration to target Cancer

By Professor Serge Jurasunas

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Part I

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The Clinical Evidence of Cellular Respiration to Target Cancer

Introduction

Cellular respiration and the resulting consequences of this process is, to me, not a new theory that apparently is just now emerging but is, in fact, a very old story. Because of recently published articles on the subject of oxygen being presented as the “missing link” in understanding cancer, I decided to present my own story and experience concerning mitochondria and cellular respiration. In 1969, about 44 years ago, I returned to Europe after my US and Canadian residency, including my first 2 years of naturopathic practice in Montreal. I knew that Germany was the most advanced country in the field of biological medicine and my desire was to learn more about what could cause cancer and how to approach this disease with natural therapy.

At that time I was already concerned with the disease of cancer but available literature was much limited, offering only meager knowledge, but I was fortunate to find a book written by Max Gerson that increased my desire to treat this disease. It was this book that prompted me to return to Europe, especially to Germany. While traveling and spending time in Germany, I became acquainted for the first time with the work of famous researchers such as Otto Warburg, Manfred Van Ardenne, Hans Nieper and Paul Seeger, opening a whole new world to me with new hypotheses of how to explain and treat cancer.

At first, I was fortunate enough to meet Otto Warburg’s co-workers and started to discover the theory of cellular respiration and mitochondrial activity, something totally new to me. More fortunate, was to meet Dr. S. Wolz, scientific co-worker of Nobel Laureate, Professor Dr. Feodor Lynen who worked on isolating coenzyme A from yeast. For this research he received the Nobel Prize for medicine in 1964. Dr. Wolz is an engineer for biotechnology and fermentation processes. For many years he collaborated with the great cancer pioneer Paul Seeger and later, he developed the famous yeast cell enzyme preparation (formerly known as “Zell-oxygen”), a natural complex containing billions of young, active yeast cells, activating cellular oxygenation described in a theory of Paul Seeger. This new theory of cancer about mitochondria, totally unknown to me and probably to most doctors, is indeed, an enormous step ahead in forming a better understanding of the disease, cancer. For the first time I discovered a natural preparation that could not only regenerate the whole body but also target mitochondria, activate cellular respiration and treat cancer.

The Warburg Effect

In 1924 (1) Otto Warburg hypothesized that cancer, malignant growths, and tumor cell growths are caused by the fact that tumor cells principally generate energy (as adenosine triphosphate – ATP) by non-oxidative breakdown of glucose (a process known as glycolysis). This is in contrast to “healthy cells” that generate energy principally from oxidative breakdown of pyruvate, an end-product of glycolysis, being oxidized within the

mitochondria. According to Warburg, who presented a paper in 1966 entitled, “The prime cause and prevention of cancer”, the prime cause of cancer being the replacement of respiration in normal cells by the fermentation of sugar (2). He attributed this metabolic alteration to mitochondrial “respiration injury” and considered this as the most fundamental metabolic alteration in malignant transformation or the origin of cancer cells.

Cytochrome Inactivation

Warburg was able to prove (Ref. ?) that certain enzymes (cytochromes) of the respiratory chain bind carbon monoxide analogously to hemoglobin, inactivating them for oxygen transport, but also inhibiting the respiratory system enzymes (3) containing iron. The consequence is the obstruction of the functional groups of respiratory enzymes and oxidative phosphorylation. Damage to these enzymes leads to a disturbance of cytochrome activity and consequently, to a breakdown of the entire cellular function.

There is no doubt that oxygen and oxygen delivery is critical to aerobic life, although the same oxygen can be one of the body’s most destructive agents if not controlled by specific protective agents known as antioxidants.

In the book, “The Hidden Story of Cancer”, (Peskin, Brian, Pinnacle Press, Houston), the author explains that “Warburg stated that there are countless secondary causes of cancer, but each of these causes leads to a lack of oxygen in the cells which then produces cancer”. The author also states that by increasing levels of oxygen in cells by eliminating any possible chronic deficiency of oxygen will eliminate the fundamental condition necessary for cancer to develop. According to the author, “the greater the oxygen deficiency is, the more virulent the cancer”.

Hypoxia Inhibits ATP Synthesis

It is well known that an hypoxic environment within the tumor mass limits the availability of oxygen for use in mitochondrial respiration and synthesis of ATP, forcing cancer cells to up-regulate the glycolytic pathway. In this case, this dependence that confers resistance to cancer cells can be exploited to serve as a biochemical basis to develop therapeutic strategies. One possibility is to inhibit glycolysis which, in turn, preferentially kills the cancer cells (4).

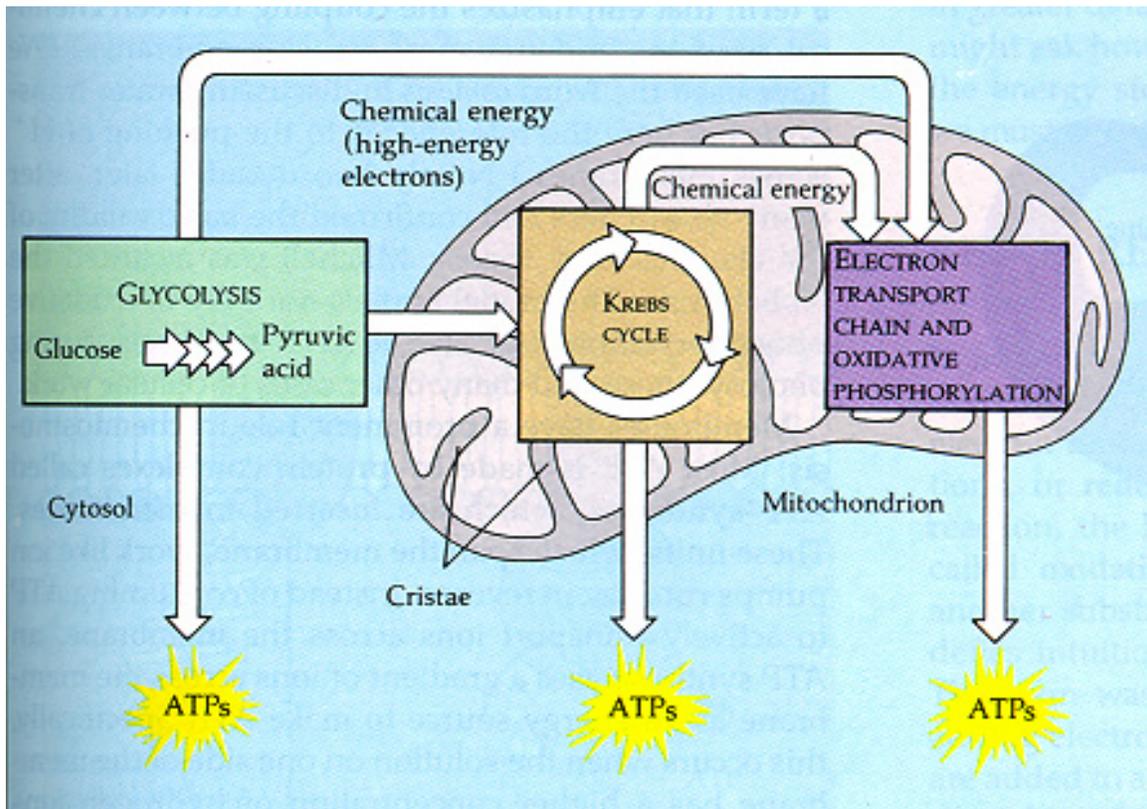
Oxygen Utilization, the Missing Link

Therefore, the fact that oxygen is conveyed by red cells in blood and delivered to every corner and to every cell of our bodies is crucial, however, it is not the only missing link in understanding cancer, since Warburg showed that a cell can switch to glycolysis even in

the presence of oxygen (5). To other researchers such as the well-known Paul Seeger, the missing link to cancer is oxygen utilization by mitochondria and how cellular respiration is functioning. One theory that enjoys a resurrection after decades of darkness and insignificant scientific research is about mitochondrial dysfunction as one of the most consistent phenotypes of cancer cells. According to Warburg, cancer itself should be interpreted as a mitochondrial dysfunction while Paul Seeger interpreted cancer as an inhibition of cellular respiration.

Mitochondria: The Source of Cellular Respiration

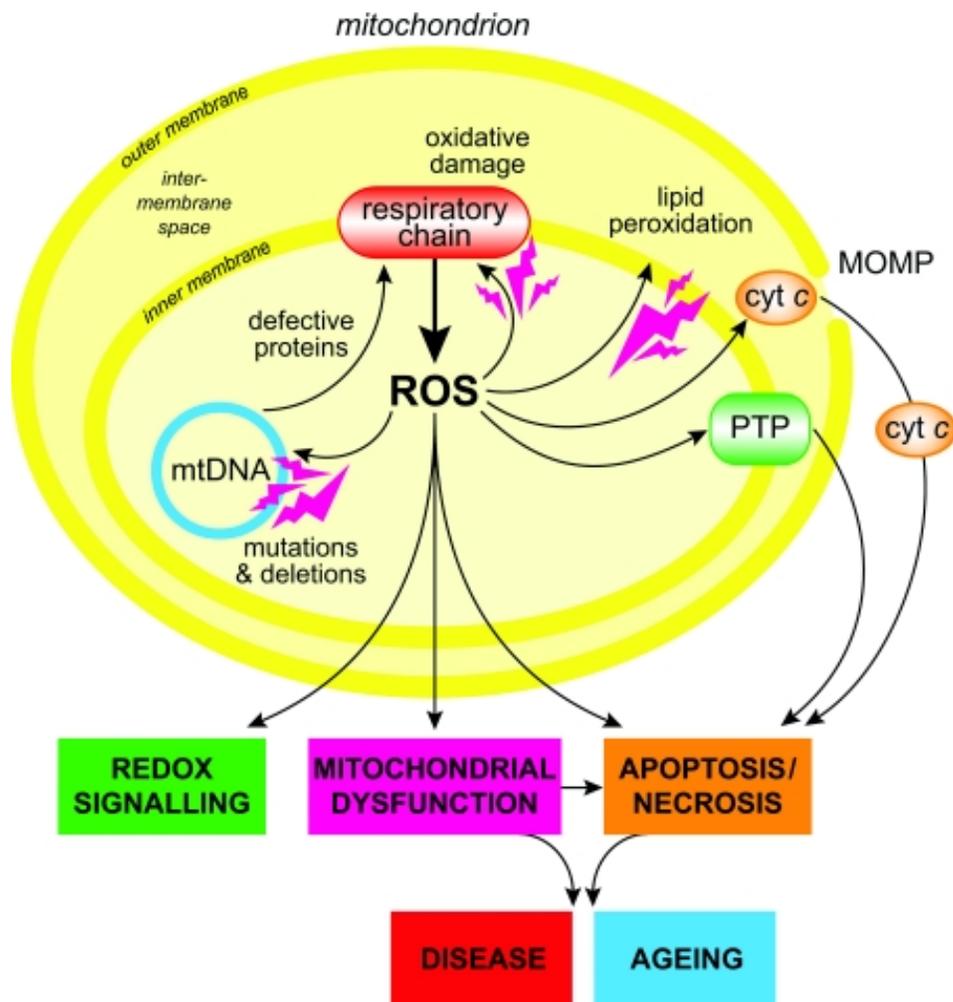
Mitochondria are the source of cellular respiration, the utilization of oxygen, and contain genes for the making of all of the oxidative enzymes (proteins), represented by the respiratory (citric acid) cycle. Mitochondria have a well-ordered, multi-enzyme system and only they contain the enzymes of the citric acid cycle, in total, the enzymes of biological respiration.



ROS Generation by Mitochondria

One aspect of mitochondria is the generation of “reactive oxygen species” or ROS, the main source in the body from oxygen utilization by respiratory chain reactions (6). 98%

of the oxygen we breathe is utilized by mitochondria, during the transfer of electrons by cytochromes. Superoxide is generated by electron transfer to oxygen by cytochromes (7) and is converted to hydrogen peroxide by superoxide dismutase (SOD), the only antioxidant enzyme induced in mitochondria. Hydrogen peroxide is decomposed into water and oxygen by the enzyme catalase or by glutathione peroxidase, imported from the cytosol. However, accumulation of superoxide or hydrogen peroxide can become a problem to cells by coupling with other ROS, such as nitric oxide, generating additional toxic free radicals, including hydroxyl radical and peroxynitrite, having profound, damaging effects on mitochondrial function. The result of the activities of these free radicals, generated by oxygen utilization in mitochondria, may lead to mutation. of mitochondrial DNA (mtDNA) (8-9).



By M.P.Murphy

Overview of mitochondrial ROS production

Today, we know that mitochondria are involved, either directly or indirectly, in many aspects of altered metabolism in cancer cells. The constant generation of ROS within the mitochondria and the increased free radical stress in cancer cells may cause more damage to both mtDNA and the electron transport chain, thereby amplifying respiratory malfunctions and dependency on glycolysis (10). The respiratory abnormalities may be responsible for the promotion and progression of cancer as explained in my article, "Mitochondria and Cancer" (11). Cellular respiration is critical in synthesizing the energy molecule, adenosine triphosphate (ATP), which is not accumulated or stored in cells but remains for only 2 minutes. Because of this instability, ATP must be constantly generated, since it activates most of the biological functions of our bodies, including immune cell activation and apoptosis (programmed cell death). Cells lost by apoptosis are eventually replaced by new cells originating from stem cells.

Paul Seeger's Most Significant Discovery

Paul Seeger, Warburg's close assistant, spent nearly 60 years of his life working in cancer research and had been a great innovative scientific thinker, making discoveries as important as those of Warburg.. In 1938 Paul Seeger discovered that cancer results from the inactivation or destruction of the most important enzyme of the respiratory chain, cytochrome oxidase, or more specifically, cytochrome a/a_3 . Even in the presence of oxygen, as mentioned previously, the destruction of cytochrome a/a_3 may revert cancer cells to a primitive way of generating energy (ATP) by fermenting sugar and, for what reason?

Cytochrome C Significance

Cytochrome a/a_3 is a critical mitochondrial respiratory enzyme responsible for processing over 90% of the oxygen consumed. Basically, cytochrome C molecules bind electrons and transfer them to one oxygen molecule, converting molecular oxygen to superoxide. Again, this is only one aspect of cellular respiration".

Formation of Water

Two hydrogen ions are also bound to oxygen, the last, terminal acceptor in the mitochondrial respiratory chain. Therefore, electrons are accepted by oxygen and hydrogen combines with oxygen only if cytochrome a/a_3 is functioning. If not, electrons accumulate, blocking the respiratory chain and its associated oxidative phosphorylation. Disorganized electrons act as free radicals to induce more damage to mitochondrial components, specifically mtDNA. In addition, hydrogen ions not accepted by oxygen accumulate, becoming a poison to cells.

Therefore, cancer cannot be seen as necessarily caused by oxygen deficiency but rather by a blockage of cellular respiration that inhibits the whole electron transport system (including cytochromes). Again, I will say that in the presence of sufficiently high

oxygen partial pressure, Warburg was able to show that cellular respiration can be blocked by a mixture of various gases.

We realize that the mere existence of oxygen is not sufficient, since it can be used by mitochondria only if “biological catalysts” are present, because a lack of these active substances interrupts the respiratory chain, even in the presence of oxygen.

Paul Seeger’s Research

Paul Seeger proved in his 310 scientific works of basic research that the results of thousands of carefully conducted electrochemical experiments and hundreds of histochemical experiments (conducted in the Department of Cellular and Virus Research, Berlin, 1936-1940 and from 1956-1964, Charity Hospital) confirmed his early research in this Hospital concerning the inactivation and destruction of cytochrome a/a_3 as a factor that initiates cancer. He was able to prove that oxygen transported by erythrocytes can only be utilized in the mitochondria if certain respiratory enzymes (cytochrome oxidases) are present (12). Seeger also demonstrated that chemicals from the environment or poisons such as cyanide can bind to an iron atom in cytochrome a/a_3 , inducing inhibition of the electron transport chain. This situation also leads to a lower number of mitochondria, related to lower respiratory function as well as lower ATP levels.

Cardiolipin Damage

In addition, cytochrome a/a_3 is firmly anchored to the Inner membrane of mitochondria (IMM) by cardiolipin, a phospholipid found only in the IMM, optimizing the activity of the electron transport complexes, especially complex IV. Phospholipids are major targets of ROS and cardiolipin can be severely damaged, resulting in the inhibition or destruction of cytochrome a/a_3 .

Various Levels of Cellular Respiration

Researchers describing the relationship between the proliferation of tumor cells and their respiratory activity demonstrated that the QO_2 levels (QO_2 : O_2 consumption in mg of tissue per hour), resulting from destruction of the respiratory chain, has an effect on the proliferation of tumor cells. The work of P. Seeger, E. Euber and W. Schatch, 1956-1964, demonstrated that oxygen utilization is reduced to $1/2$, $1/3$, $1/4$ and even $1/20$, depending on the inhibition or destruction of mitochondrial structure (13). On the other hand, if the cell’s respiration is increased, oxygen then accepts electrons in mitochondria.

Gradually, the mitochondrial function is restored and we notice a significant decrease in tumor growth. The main purpose of this is to restore the broken mtDNA chain through repair by intensifying cellular respiration (14) and renewed consumption of oxygen. Restoration of mitochondrial function increases ATP production to normalize or activate

the lost signal transduction pathway. Dr. E. Michelakis, professor at the University of Alberta (Canada), Department of Medicine, found that when the mitochondrial function is restored, there was notice a significant decrease of tumor growth. New lines of evidence show that mitochondrial oxidative phosphorylation is required for efficient execution of apoptosis, and mitochondria devoid of mtDNA, unable to conduct oxidative phosphorylation, have a resistant apoptotic phenotype (15). ATP is required to activate apoptosis, for instance, the activity of oxidative phosphorylation has been shown to be required for BAX-induced toxicity in yeast cells (16). The respiration of mitochondria, by increasing oxidative processes, DNA repair and increasing ATP levels, may be the missing links in understanding and treating cancer (17)

In his book, “Revolution in Technology, Medicine and Society”, Hans Nieper, past president of the German Oncological Society, wrote the following statement: “Today, the work of Otto Warburg is of limited significance for the practical treatment of cancer but that of Seeger is of far-reaching importance” (18).

In part II we explain how to activate cellular oxidation and how to reduce tumor growth with a revolutionary, natural product, Yeast Cell Enzyme Preparation.

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Part II

How to Reactivate Cellular Respiration

The Treatment

Yeast Cell Enzyme Preparation

Yeast Cell Enzymes and Detoxification

Yeast Cell Enzymes increase Cellular Respiration

Yeast Cell Enzymes Activate P53 Function

How Yeast Cell Enzymes may Activate P53 Function

Yeast Cell Enzymes – A very Powerful Preparation

Daily Intake of Yeast Cell Enzyme Preparation

Vegetable Base Activator

Other Hydrogen Acceptors

Anticancer Cocktail

Complementary Therapy by Enzyme Yeast Cells

How to Reactivate Cellular Respiration

Since Paul Seeger's discovery, a number of experiments and practice with cancer patients by many doctors, have accumulated enough experience (endorsed by hundreds of scientific papers) to demonstrate that cancer can be approached by targeting mitochondria (1) and by intensifying cellular respiration. Research on the relationship between the proliferation of tumor cells and their respiratory intensity (QO₂ levels) (2) have revealed a reduction of respiration in cancer cells arising from the destruction of cytochrome a/a 3 with an effect on the proliferation of tumor cells. On the other hand, if the respiration of the cancer cell is intensified, oxygen is accepted again by mitochondria and tumors become less aggressive. This means that the mitochondrial consumption of oxygen during respiration improved, increasing ATP synthesis and in turn, regulating signaling pathways, cellular differentiation and apoptosis (3). Some new lines of evidence suggest that mitochondria, under these conditions, efficiently execute apoptosis (4). In fact, cells devoid of mtDNA, unable to carry on oxidative phosphorylation, have a resistant apoptotic phenotype that should be targeted by using biological substances that repair disrupted DNA, reverse DNA mutation and activate oxidative phosphorylation.

The Treatment

A treatment to target cellular respiration and intensify respiratory enzymes of mitochondria and, as a whole, restore the function of mitochondria, requires the following substances:

A – Required micronutrients and enzymes:

Enzymes of the respiratory chain, krebs substrates, small molecules, minerals, vitamins, glutathione, coenzyme A, coenzyme Q10, cytochrome, cysteine, methionine, NADH, etc.

B – Hydrogen acceptors

Respiratory nutrients that have been suggested by Paul Seeger and Otto Warburg.

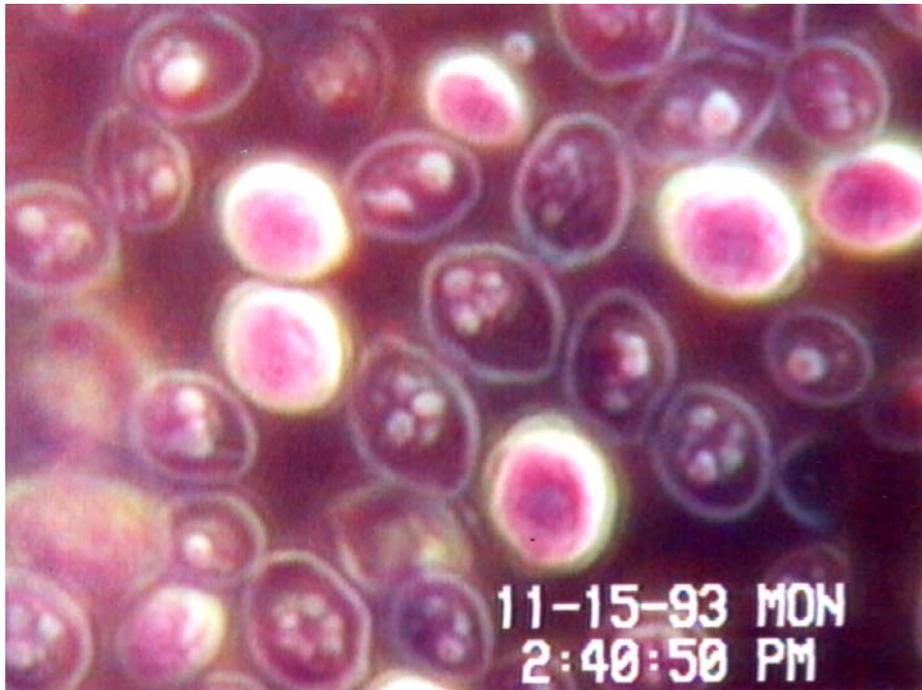
Yeast Cell Enzyme Preparation

Yeast Cell Enzyme Preparation (Zell-oxygen) has a long history (since I used this product for nearly 40 years), but today it is more widely used in Europe, particularly in Germany, Austria and Switzerland by naturopaths and physicians, including private-bed hospitals and clinics that treat cancer with non-toxic therapy. In 1999 I wrote my first article in the Townsend Letter for Doctors and Patients titled, "Orthomolecular medicine and cancer treatment", that introduced Yeast Cell Enzyme Preparation as the bedrock of my method to treat cancer. In 2001 I published the booklet, "The yeast cell enzyme

therapy in cancer, C.F.S. and the aging process”, that was quite successful, having been mentioned in many Internet sites, the subject of a short article in the Townsend Letter, June 2004 written by Kother Jule.

What is important to mention about the yeast cell enzyme preparation (cannot be compared to other products) is the fact that the preparation contains the same biological substances as found in the human body, with high biological value.

The yeast cell enzyme preparation is, in fact, a biological, nutritional complex but, above all, has a great potential to intensify cellular oxidation by providing natural respiratory enzymes, vitamins, minerals and other substances required to boost the Krebs cycle. Among other nutrients, including vitamins B2, B5, B6, B12, iodine, magnesium, citric acid, coenzyme A and fumaric acid. As we shall see, iodine is important to stimulate the Krebs cycle.



Enzyme Yeast Cells 600x by Serge Jurasunas

We may observe the light reflection on the walls of each young-live-active yeast cells from the natural preparation

For instance, iodine is very important and, with the other substances, is contained in the yeast cell enzyme preparation. Paul Seeger demonstrated that iodine activates the thyroid function. All of these substances work in cooperation with iodine, enabling the synthesis of thyroglobulin (a hormone transporter, not a hormone) and the hormone thyroxin. This hormone is active in all cells as a catalyst of the oxidation process, in particular, cell respiration. A lack of this hormone (thyroxin) results in an incomplete utilization of oxygen needed by cells and tissues, including mitochondria. Therefore, as mentioned in

the first part of this article, oxygen, by itself, is not the only missing link in cancer therapy, even though oxygen is required by all aerobic life on this planet.

Yeast cell enzyme preparation contains basically all of the nutrient requirements needed by our bodies, including amino acids, nucleus-building substances needed to build up and regenerate the respiratory enzymes, including porphirin, the cytochromes, cysteine, methionine, choline etc. Important to mention is the fact that the DNA repair enzyme of yeast cells has the same activity as that in humans (5) and is 70% identical to that generated by human genes.

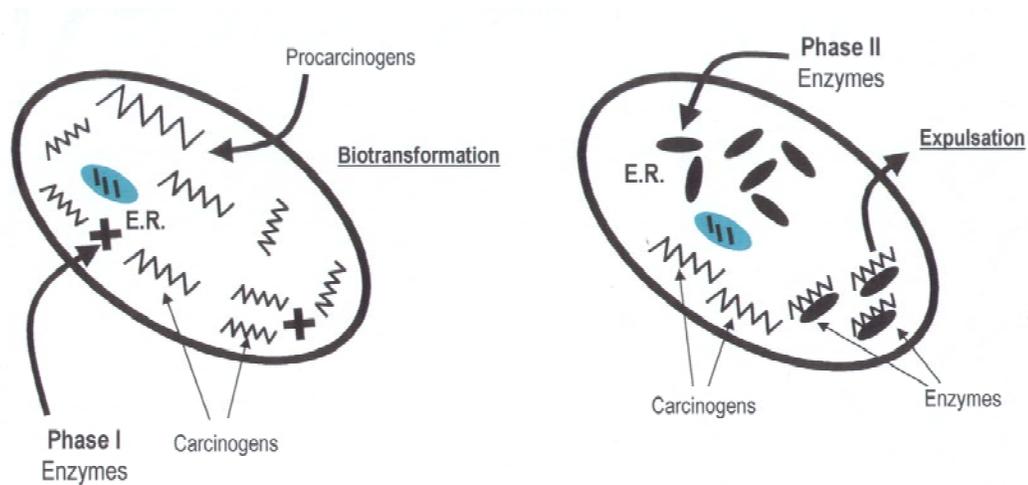
Yeast cell enzyme preparation contains all of the vitamins, minerals, trace elements, biocatalysts and most of the precious, powerful antioxidants, including SOD, catalase, glutathione peroxidase (Gpx), selenium (a component of Gpx), coenzyme Q10, zinc, all of these in a natural composition with high bioavailability.

Yeast cell enzyme preparation is high in coenzyme Q10, a vitamin-like substance found in the inner mitochondrial membrane and plays a central role in oxidative phosphorylation. Its functions are greatly linked with the transfer of electrons and therefore, play an essential role in the synthesis of ATP (the energy molecule). In addition, coenzyme Q10 also functions as a powerful antioxidant that scavenges free radicals and inhibits lipid and protein peroxidation. Several reports attribute to coenzyme Q10 a support during chemotherapy by protecting the heart and liver from the toxic effects of antineoplastic agents, thereby increasing the efficiency of these agents. (6). Lookwood et al. reports the partial or complete remission and regression of metastases in patients with breast cancer (7) but there is no proof that coenzyme Q10, by itself is able to cure cancer. Nevertheless, cancer patients are benefited by taking high doses of coenzyme Q10 during chemotherapy, since it also improves the effectiveness of the cytotoxic treatment.

Yeast Cell Enzymes and Detoxification

Yeast cell enzymes have considerable effect on the regulation of the detoxification system, including toxic substances from the environment with carcinogenic effects (xenobiotics). Among the enzymes and amino acids contained in yeast cell enzymes, we can mention protective substances such as L-cysteine, methionine, glutathione and coenzyme A, some containing sulphhydryl groups that cause a biotransformation of toxins, preventing them from causing mutational damage. Glutathione is very prominent in yeast cell enzyme preparation, approximately 100 mg/100 ml, important for liver detoxification but also plays an important role in the redox system. Glutathione can raise the membrane potential which may fall by 1/10 as a result of the effects of environmental pollutants.

Since the beginning of my practice in Europe, yeast cell enzymes are the pillar of my method to detoxify my patients, including colon detoxification that is vital in all cancer cases, specifically breast cancer, as I mentioned in one of my articles in the Townsend Letter (8).



Most cancer-causing chemicals enter the body as procarcinogens. Phase I enzymes produced in the liver are broken them. Phase II enzymes expel the dangerous residue of Phase I transformation wich can be harmful if Phase II is too slow. Glutathione and other enzymes and amino acids combined in yeast cells enzymes boost the production of Phase II and cause the transformation of toxins.

© Professor Serge Jurasunas

What is important to mention about yeast cell enzymes is its power to restore damaged mitochondria and mtDNA mutation. These mutations are likely to cause alterations in the resulting proteins, thereby compromising the respiratory chain function in cancer patients.

Yeast cell enzyme preparation contains very special respiratory enzymes and other vital substances such as mitochondrial DNA sequences, porphyrin, all of the nucleic acids and is especially rich in cytochrome a/a 3. The yeast cell preparation also reactivates oxygen utilization by mitochondria, unblocks the respiratory chain that, in turn, increases ATP production, vital for most cellular events.

Various investigations in the past 39 years have been conducted by institutes, physicians, research scientists, clinics, that also include studies employing electron microscopy. Investigations at the Institute of Cell Biology, University of Utrecht, Holland, show that yeast cell enzyme preparation (the work of Dr. Wolz) contains a large number of activated mitochondria, representing up to 25% of the cellular plasma mass, a considerable part. With a length of only 3 u, they are only 0.5 u wide, at the most.

Examination shows that mitochondria are thin-walled, subcellular components with fragile enzymes that have an immediate restorative effect on human cells. Mitochondria release not only the necessary nutrients required by our bodies, including, vitamins,

minerals, amino acids, nucleic acids, oxidizing and reducing enzymes but the yeast cell preparation also includes billions of enzymes for immediate healing and activation of cellular respiration.

One of the major roles of the yeast cell enzyme preparation is the potential for facilitating maximum oxygen utilization by body tissues. Some interesting tests conducted in 1979 by professor E. Dörling of Hamburg, Germany, suggest that yeast cell enzymes improve the oxygen-carrying capacity of the blood and utilization by the body (9). The oxygen-carrying potential of a group of 10 individuals (as indicated by changes in the arterial oxygen partial pressure), was tested by a bicycle ergometer. They were given 30 ml of yeast cell enzymes every day for 60 days. Eight out of ten cases showed improvement in oxygen utilization, up to 21.8%, revealed by oxygen partial pressure determination.

Individuals improved in vitality and performance because oxygen is delivered more quickly to mitochondria and micronutrients contained in yeast cell enzyme preparation are used by mitochondria. These nutrients include citric acid, iron, magnesium, fumaric acid, cytochromes, coenzyme Q10, etc. Additionally, yeast cell enzymes detoxify the blood, removing excess mucous that slows down the circulation and retards oxygen delivery to cells. Remember that yeast cell enzyme preparation is not a fabrication made of different ingredients but the nutrients contained in young yeast cells, almost identical replicas of the various biological substances that naturally occur in cells of the healthy human body and thus, are able to improve and restore the whole biological system.

Yeast cell enzyme preparation boosts the immune system, not only from the natural nutrients it contains, such as selenium, zinc, vitamin A, C, etc., but because the cell wall components contain D-glucans and mannan, consisting of long-chain polysaccharides with immunomodulating effects (10). The beta 1,3 / 1,6 glucan found in the cell wall of yeast is a potent macrophage activator, binding to the macrophage beta-glucan receptor (11) and, in turn, activates T-cell communication, tumor necrosis factor alpha (TNFa) (12) and interleukin 1 to potentiate antineoplastic agents. Mannan has some macrophage-activating potential but very slightly compared to that of glucan; 1,3 D-glucan has also been known to activate re-granulation of NK cells, thereby restoring their function (13) of destroying cancer cells. Beta glucan, contained in the cell wall of yeast cells, may be described as a “biological response modifier” with enormous benefits as a nutritional supplement (14). Yeast cell enzyme supplement contains approximately 200 mg of beta-glucan for each 30 ml dose.

Yeast Cell Enzymes increase Cellular Respiration

Paul Seeger experimented with yeast cell enzyme preparation combined with vegetable base activator of cell respiration and hydrogen acceptor that, in turn, activated 1200X cellular oxidation, thereby increasing the oxidation metabolism in mitochondria. The bioelectric potentials of human cells range from 175 mv to 282 mv while glutathione has 220 mv., coenzyme A 282 mv, malic and fumaric acids 170 mv, all being found in yeast

cell enzyme preparation (12),thereby improving cell function and the health status of individuals.

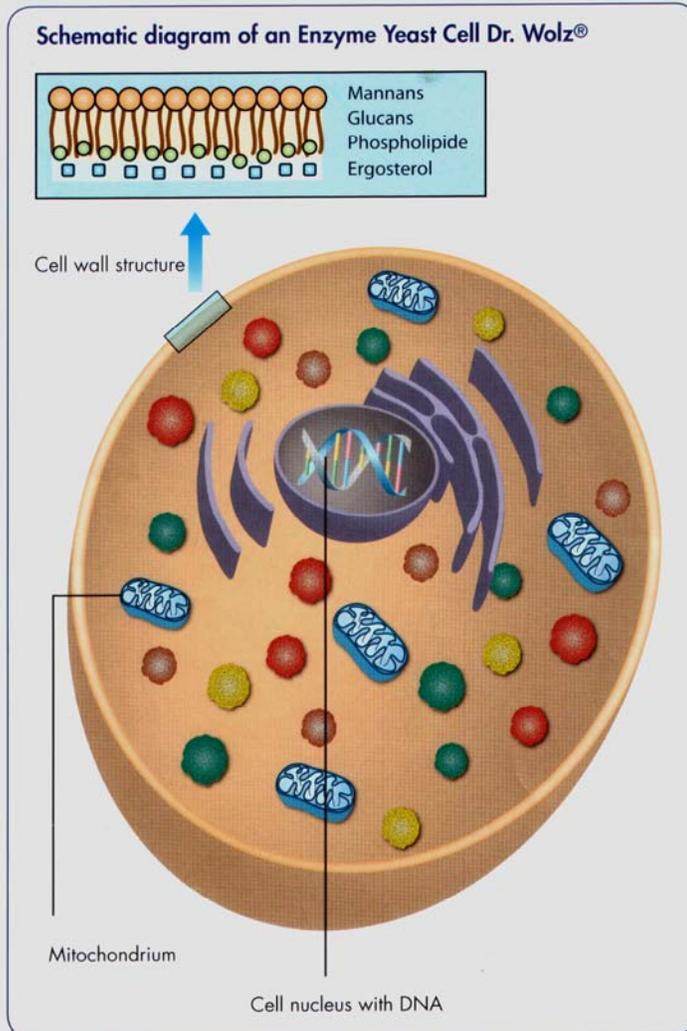
By unblocking cellular respiration, broken DNA chains can be repaired and the ATP energy regenerated through the redox system and the transfer of electrons to oxygen (16) In turn. The physical state of cancer patients improves step by step by intensifying cell respiration through activation of the regulation system and the endogenous synthesis mechanism (similar to hormone, enzyme and protein synthesis).. Step by step, unblocking cellular oxidation and repair to damaged mitochondria as explained above, increases ATP energy, much lower in cancer patients. We know that lower ATP energy levels accounts for reduced differentiation and individual phase, meaning that a cell is no longer able to switch back to the differentiated cellular state. A normally differentiated cell requires high levels of ATP to activate several key functions, such as, apoptosis, necessary for self-destruction of any transformed cancerous cells. Patient's refractory to conventional therapeutic agents tended to have higher mutation rates in mitochondria of cancer cells compared to those of patients who responded to treatment, explained by over-expression of mutated P53, thereby impairing the self-destruction of cancer cells.

Yeast Cell Enzymes Activate P53 Function

One important hypothesis that should be explored, among other modes of action of yeast cell enzymes, is probably through modulation of the P53 tumor suppressor gene, inducing apoptosis. P53 induces apoptosis mainly via two pathways, extrinsic and intrinsic. These pathways are mainly executed by activating caspase 8, thereby inducing apoptosis. Whereas the P53-associated intrinsic pathway is almost executed by influencing mitochondrial protein with the release of cytochrome C, this in turn, activates caspase 9, inducing apoptosis. Therefore, by all means, mitochondria play a crucial role in apoptosis and thus, important in the self-destruction of cancer cells.

- Immunomodulation
- Oxygen utilisation
- Detoxification
- Cell metabolism

- Radio- and chemotherapy
- Oxidative stress
- Chronic fatigue syndrome (CFS)



- Cell wall constituents, such as
- Polymeric carbohydrate structures
 - Glucans (zymosan)
 - Mannans
 - Mitochondria
 - Active SH groups
 - Active glutathione
 - Superoxide dismutase (SOD)
 - Catalase
 - Cytochrome oxidase
 - Vitamin C
 - Vitamin E
 - Natural selenium, chromium, zinc
 - Coenzyme A
 - NADH
 - Coenzyme Q 10
 - Vitamin B complex (incl. folic acid, biotin)
 - Trace elements (mainly biologically bound in enzymes)

Enzyme (Greek) – means “in the yeast”. This term was chosen because of the high enzyme content. Oxygen enzyme fermentation assures this abundance of enzymes and co-enzymes

P53 is the most frequently inactivated gene in human cancer and approximately half of all human tumors have a mutation or loss of P53, leading to inactivation of its function (17-18) (consult also the TP53 website – P53 mutations: all cancer)

For example, P53 mutation frequency is as high as 60-75% in lung cancer and 60% in colon cancer, underlining a poor prognosis from conventional treatment. P53 overexpression is associated with a poor prognosis (19-20) and mutant protein confers to all cancers an increased neoplastic potential, thereby increasing the aggressiveness of cancer cells during chemotherapy.

Most P53 mutation occurs in the central portion of the P53 gene that codes the DNA binding domain where amino acids are assembled in the correct order as encoded by the DNA. Any change in the correct order, associated with aggressiveness in the cancer. Many cancer patients coming to our clinic are seeking help because of a poor response to chemotherapy with additional metastases or rapidly growing tumors. When we included in our facility the P53 assay and other genetic tests, we began to understand the reason why cancers become aggressive and resistant to antineoplastic agents.

Today, an examination of P53 expression is of great value in understanding the degree of malignancy and determines the survival rates of patients (21-22). Any therapy that can be targeted as pro-apoptotic proteins, may be an important way of treating cancer (23).

Cancer patients may show a wild type characteristic but inactivate the P53 gene expression and have low protein levels. Therefore, many cancer cells are not self-destructive and need to be activated. Other patients show mutant P53 protein that is unable to trigger self-destruction of cancer cells, resistant to the majority of agents triggering apoptosis, thereby requiring an alternative channel such as necrosis. Usually, patients with a mutant P53 gene respond poorly to chemotherapy, having additional metastases and require a treatment program that restores P53 from an oncogenic function to a P53 gene that displays tumor suppression.

How Yeast Cell Enzymes May Activate P53 Function

Yeast cell enzymes, as explained above, can unblock cellular respiration and restore oxidative phosphorylation, thereby promoting ATP energy levels to increased cellular apoptotic potentials, completely explained in the first part of this publication.

However, the yeast cell enzyme preparation contains small molecules such as all of the nucleic acid building blocks, for example, adenine nucleotides, ribonucleic acids and amino acids. This composition is suitable to activate the wild type P53 gene expression and consequently, increase P53 protein levels

In the event of mutation, yeast cell enzymes may possibly re-establish the base pair changes and the corresponding amino acid sequence in mutation, known as “hot spots”.

This is an hypothesis but many new lines of research demonstrate that small molecules and nucleotides can “in vitro” reverse a mutant P53 (24-25).

In our clinic we have done a number of experiments with cancer patients that clearly demonstrate that yeast cell enzymes increase the wild type P53 gene expression and protein levels. While in other cases, yeast cell enzymes demonstrate efficiency in reversing mutant P53 genes with oncogenic function to normal P53 tumor suppressor gene activity in an initial time period of 3 months.

As an example, 2.5 ug of normal P53 protein/ml of plasma or as small as 1.5 ug of normal P53 protein /ml of plasma is not sufficiently active to self-destroy cancer cells by apoptosis, those that accumulate and may form a tumor. 0.1 ug of normal P53 protein/ml of plasma is a very low amount and indicates large colonies of cancer cells resisting apoptosis. The P53 gene expression should also be activated to be able to increase the P53 protein level. Of course, this is a simple example, as it will require a whole report to describe adequately P53 function. and describe how P53 function can be improved.

Allow me to describe one example of a case of advanced prostate cancer, initially diagnosed in 1996 and submitted for prostatectomy, chemotherapy, radiation, etc. Recurrence in 2007 led to new chemotherapy, followed by bone lesions. The patient refused to undergo additional chemotherapy and came to our clinic.

First P53 assay

P53 protein level

1.1 ug of normal protein/ml of plasma

P53 gene expression

1.2 x 10⁶ copies/ml of plasma

The P53 gene expression is activated but not enough to increase the level of P53 protein 1.1 ug of normal protein/ml of plasma is low and does not activate self-destruction of cancer cells (apoptosis).

Second P53 assay

P53 protein level

9.3 ug of normal protein/ml of plasma

P53 gene expression

444.727 copies/ml of plasma

This is a significant increase of P53 protein but needs to be increased more in order to destroy more cancer cells.

Third P53 assay

P53 protein level

127.0 ug of normal protein P53/ml of plasma

P53 gene expression

3.0 x 10⁶ copies/ml of plasma

These results indicate a very active P53 gene expression and also a high protein level, increasing about 100 times from the first test with active destruction of cancer cells and tumors (subsequently proven with the genetic test of intracellular telomerase as well as extracellular telomerase).

At the beginning of these experiments, we selected several compounds that could fulfill our requirement to modulate P53 overexpression or reverse a mutant P53 to a normal wild type P53 tumor suppressor gene. We developed a potential treatment designated as “PSJ53 therapy”, containing three compounds that demonstrated strong potential to reverse mutant P53 (26) and obtain, in certain cases of poor prognosis, regression of the tumor, which is substantial. Of course, we also perform other types of complementary genetic tests (and additionally, conventional check-ups) to confirm the destruction of cancer cells and tumors to confirm that anti-tumor activity is dominant over pro-tumor activity.

Our experience with P53, apoptosis and yeast cell enzyme preparation has been quite positive because we clearly demonstrate that this natural composition can modulate P53 function, probably better than toxic molecules and specially, without any fear of adverse effects (27). These results may explain one of the reasons why, over nearly 40 years, we obtained such excellent results when this preparation is included in the patient’s protocol. Without exaggerating, over 50,000 cancer patients were treated in our clinic with different therapies, receiving considerable support from yeast cell enzyme preparation. We have had patients taking this preparation over the past 30-35 years and some, even today, are in a perfectly healthy condition.

Over the years, I developed my own clinical experience and research, believing that yeast cell enzyme preparation has a great potential and should be included in any comprehensive treatment that also requires nutritional support. Most cancer patients suffer from malnutrition and even worse during chemotherapy/radiation. We know that nutrients such as vitamins A, C, E, methionine, glutathione, SOD, selenium, zinc, and vitamin B complex, offer not only substantial nutrients but also protect against adverse toxic effects. I realize, however, that many doctors working with cancer, including naturopaths, are either unaware of the potential of yeast cell enzymes or do not take seriously this product to be included in a comprehensive cancer treatment program.

Yeast Cell Enzymes – A very Powerful Preparation

Each 10 ml dose of the preparation contains 100 billion biochemically active, young yeast cells and each cell contains 50 – 100 mitochondrial DNA strands. Therefore, each 10 ml dose contains a minimum of 50 trillion mitochondria that release into the blood billions of active enzymes to repair damaged mitochondria, unblock and intensify cellular

respiration and, as a whole, to regenerate the total body. Remember that every yeast cell enzyme preparation dose contains a rich spectrum of active enzyme groups, amino acids, minerals, trace elements, antioxidants, biocatalysors, vitamins and nucleic acids that may be considered as a unique biochemical, natural laboratory for healing.

Daily Intake of Yeast Cell Enzyme Preparation

Daily dose – from 30 ml to 60 ml per day, divided into 3 doses

Mix the yeast cell enzyme preparation in a large glass of vegetable juice, including 3 ml of beet juice

Per day – 250 ml of beet juice, a strong hydrogen acceptor.

Vegetable base activator

Liquid chlorophyll
Green barley juice
Sun chlorella (algae)

To take (mixed) with other vegetable juices. You can take 20 tablets of sun chlorella per day.

Carrot and grape juice is highly recommended, a strong hydrogen acceptor

Other hydrogen acceptors

Pollen	Garlic
Blueberry	Sweet potato
Propolis	Yellow and red peppers

Anticancer cocktail

16 oz carrot and beet juice
8 oz pineapple juice
20 ml yeast cell enzyme preparation
1 tablespoon biobifidus
6 tablets (ground sun chlorella) or
Green barley juice
2 tablespoons of pure liquid mango juice
1 tablespoon of pollen granules

I usually suggest to my cancer patients this cocktail with other options, for example, 250 ml of kefir, 20-30 ml of yeast cell enzyme preparation, 200 g of fresh blueberries, mixed in a blender.

Mixing the ingredients in a blender increases the electrical potential and releases the antioxidants trapped in the cells of blueberries

Complementary Therapy by Enzyme Yeast Cells

- Oxygen Utilization
- Detoxification
- Mitochondria Restoration (DNA, respiratory chain)
- Cell Metabolism
- Oxidative Stress
- Prevention of Cancer
- In the disease of Cancer as Support to Radiation and Chemotherapy

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