

The Science of Your Breath and Well-Being

by Cheryl Valk

To begin, one must understand how breathing and oxygen affect every cell in your body. Breathing involves one of only nine muscle groups within the body with dual control. Dual control means these select muscle groups can be controlled both by the conscious mind through the somatic system and by the unconscious mind through the autonomic system. The muscle groups involved with breathing include the diaphragm and the intercostals (the muscles between the ribs). The other eight muscle groups provide the processes to blink, chew, swallow, control elimination, and move the hands and feet, either consciously or not. Breathing is a unique process as compared to the processes controlled by the other eight muscle groups with dual control since it affects the functioning of every cell and the physiology of the entire body. The other eight dual controlled muscles and the corresponding processes have a much more limited effect on the body.

Clearly, there is a need to be able to control the breath at will. Imagine not being able to hold your breath when swimming or if exposed to an unpleasant smell. Yet, we breathe without thinking about it most of the time. When we breathe without our conscious involvement, the process is governed by the autonomic nervous system. This autonomic nervous system has both a sympathetic and a parasympathetic sub-system which work best in balance. The sympathetic system is involved with active states, such as flight or fight and the parasympathetic system is involved in states of relaxation.

Most people breathe 15 breaths per minute without their conscious involvement. At this breathing rate the autonomic nervous system perceives a "fight or flight" situation, stressing physiological functions throughout the body. Breathing too frequently and without enough depth to involve the diaphragm produces sympathetic dominance. The heart rate increases, muscles tense, and various bio-chemicals are produced and released in response to the perceived flight or fight situation. When the autonomic nervous system is in this state of alert, every single cell is affected. In other words, the body is placed in an imbalanced state. This imbalance has been found to be a factor in the development of high blood pressure, anxiety, attention deficit, and many other problems.

When sympathetic dominance continues over a prolonged period, cells and systems wear out, failing to function properly. Maintaining the proper balance within the body will keep the body healthier and appearing younger. Balancing the breath through optimal frequency and depth brings the autonomic nervous system into balance. Breathing frequency affects the sympathetic system and breathing depth affects the parasympathetic system. When stressed, one can simply take a few slow deep breaths to experience a more balanced state of being.

Diaphragmatic breathing which engages the movement of the diaphragm increases the available oxygen levels throughout the body. This increased oxygen level improves the

flow of energy in every cell which in turn affects every organ and system within the body. Most people think in terms of getting their energy from the food they eat. While this is partially true, it does not factor in the role of oxygen in converting nutrients into useable energy to maintain life. Our food must go through an oxidation process and have the converted energy stored within the molecule called ATP (adenosine triphosphate) released to drive the function of the cell. So to maintain life, respiration involves and affects every cell in the body.

Obviously, there is a relationship between your breath and your well-being. Furthermore, the quality of your breathing process varies during different physical and emotional states. If you are anxious, the process becomes fast, shallow, and even irregular. Think about the last time you were scared. What happened to your breath? When a sudden threat is perceived, most will experience an interruption in normal breathing. Just as an event can affect your breath, your conscious control of breath can affect how events in life affect you. In various relaxation programs, participants are instructed to slow and deepen the breath. These techniques bring rich levels of oxygen to the cells and balance the sympathetic and parasympathetic systems.

Here is a summary of what C. Samuel West, D.N., N.D. says about the impact of deep breathing in his book, *The Golden Seven Plus One*:

Breathing deeply keeps the blood proteins circulating via the lymphatic system. Deep breathing allows the necessary oxygen to convert glucose into energy. He states that oxygen is the most important nutrient.

Dr. West explains the lungs function as a suction pump for the lymphatic system. The lymphatic system has the responsibility to remove the blood proteins, like the fibrinogens, albumins, and globulins from the spaces between the cells. These blood proteins have been shown to leak out of the tiny blood capillaries. Once the blood proteins are outside the capillaries there is not enough pressure between the cells to push them back into the blood circulation. The lymph system must pull these trapped proteins back through the lymphatic vessels with their one-way valves up into the subclavian vein at the base of the neck.

If the lymph does not move effectively, these blood proteins become trapped between the cells and interfere with oxygen metabolism. Once this occurs, these trapped blood proteins attract excess sodium, pulling water from the blood which in turn causes excessive sodium and water to build up around the cell. Then oxygen deficiency within the cells upsets the sodium and potassium balance which causes a loss of energy, disease, and death at the cellular level. He said these conditions at the cellular level produce pain, inflammation, infections, and disease conditions. In fact, these blood proteins must be removed by the lymphatic system or you can die within a day. He believed better health could be gained by five minutes of deep diaphragmatic breathing than by five minutes of walking. The lymphatic system is also responsible for removing poisons and waste from the body plus purifying the blood. A lack of sufficient oxygen is responsible for pain, cancer, inflammatory responses and ultimately, disease states in

general. Other conditions such as arthritis, obesity, and high blood pressure all share trapped blood proteins as a causative factor.

There is also research on shock, containing facts about how blood proteins can kill someone in just a few hours. When someone is in shock, the capillaries dilate all over the body. This causes the blood proteins to be released and the circulatory system to collapse. A film documented by Dr. Shields demonstrates how deep breathing improves the lymphatic system's ability to move. Other researchers at top medical schools have discovered that cells can be kept alive indefinitely as long as proper chemical balance is maintained and waste products of metabolism are removed. This is what the lymphatic system does when it operates efficiently.

Dr. Otto Warburg, a Noble Laureate in Physiology and Medicine, discovered the primary cause of cancer occurs when the respiration of oxygen is replaced in normal cells by the fermentation of sugar. He also found that removing oxygen from healthy cells causes the cells to become cancerous. The respiration of oxygen is how cells normally meet their energy needs, whereas in contrast cancer cells meet their energy needs primarily by fermentation. In every case of developing cancer, the respiration of oxygen fell, fermentation began, and the cells became anaerobic. These cells then lost their normal function, retaining only the properties of growth and replication.

He proposed the following to prevent cancer:

- Maintain the blood flow at a high enough rate to insure the venous blood still contains sufficient oxygen.
- Keep hemoglobin, which carries the oxygen molecule, at high levels within the blood.
- Add active respiratory enzymes to food and increase the amount if a pre-cancerous state has already developed.

He believed if the above was done and carcinogens were removed, most cases of cancer could be prevented. Today, many experts agree that approximately 80% of all cancers could be prevented, if we eliminate exposure to carcinogens. It appears that the remaining 20% of cancer cases could also be prevented if the respiration of oxygen within cells was sustained at proper levels.

Dr. Warburg questioned why cancer develops if oxygen-respiration is replaced by fermentation. He knew life existed on earth before the earth's atmosphere contained free oxygen gas. These life forms existing before the presence of free oxygen must have derived their energy from fermentation. The fossil records show life-forms during this period were, in fact, limited to single and undifferentiated cells. Once free oxygen became available a billion years ago, the higher forms of life developed producing the plant and animal kingdoms. Cancer is actually the reverse process in which highly complex cells dedifferentiate. Today, cancer develops in the presence of free oxygen gas in the atmosphere, due to a lack of sufficient quantity available at the cellular level.

So why did oxygen allow differentiation to take place and why does a lack of oxygen cause the reverse process? The development of plants and animals and man from unicellular anaerobes is one of the most improbable processes we have discovered. What caused this to occur? We now understand from the thermodynamics of Boltzmann, improbable processes require work to produce temperature differences in a gas with uniform temperature. The respiration of oxygen provides this work. Dedifferentiation begins when respiration or work is inhibited. In the terms of thermodynamics, differentiation represents a forced steady state due to work, whereas dedifferentiation and the development of cancer is a state of equilibrium not requiring work.

In summary, respiration of oxygen (aerobic) is more frequently impaired than fermentation because it is a more complicated process. When aerobic respiration is impaired it can be easily replaced by fermentation, because both processes have a common catalyst called, *nicotinamide*. *Glycolysis* occurs when aerobic respiration is replaced by fermentation causing the cells to die due to a lack of energy. Glycolysis loosely means "death by fermentation" and anaerobiosis means "life by fermentation". If the energy of fermentation equals the lost energy of aerobic respiration, then anaerobiosis can occur. Cancer with its dedifferentiated growth and duplication of cells arises, because only aerobic respiration, not fermentation, can create and maintain the high level differentiation of cells.

There is much additional information about the value of deep breathing on health. In *The New Science of Breath*, Stephen Elliott and Dee Edmunson discuss the frequency of optimal heart rate variability and breathing that produce optimal homeostasis, ideal sympathetic and parasympathetic balance and wholeness. The HRV (*Heart Rate Variability*) is an indicator of the level of health within an individual. HRV takes into account the amplitude, frequency, heart rate, and coherence of the heart. They explain that breathing has a function extending far beyond gas exchange. Their theory of health is based on autonomic nervous system balance. This balance is created by a form of breathing referred to as *coherent breathing*. Once coherence becomes established, all systems throughout the body can communicate more effectively and consistently. This form of breathing creates the optimal HRV.

They also discuss that many health issues are based in sympathetic dominance. As discussed earlier in this article, sympathetic dominance creates wear and tear on the body's systems. Fortunately, humans have the ability to use their conscious minds and bring balance to the body. One of the principle ways to do so is by consciously employing techniques of deep breathing.

The book, *Science of Breath*, by Swami Rama, Dr. Rudolph Ballentine and Dr. Alan Hymes, discusses how one can improve physical, mental and spiritual well-being through the breath. Specifically, the authors share how diaphragmatic breathing in an upright position (a favored position during a Transformational Breath session) has been found to be the most physiological efficient way to expose blood in the capillaries to air for optimal oxygen absorption and metabolism. Diaphragmatic breathing also increases

the suction pressure within the chest cavity and improves the venous return of blood to the heart.

Their book does a great job at explaining how inner emotional states are evident within the breathing pattern of a given individual. Various breathing patterns and associated emotional states are reviewed. They also discuss how one breathes through the nose affects the total well-being of the individual. Various techniques are shared to equalize the flow of air between the right and left nostril. Once the flow is equalized higher states of consciousness can be experienced. This book offers many reasons one would benefit from a conscious breath practice.

Oxygen is an amazing element able to sustain life and facilitate innate healing within the body. The increase in available oxygen through a conscious breathing practice is very beneficial to bring the body into balance and maintain its proper functioning. Over time diaphragmatic breathing as a habit will develop. This improves the efficiency of oxygen exchange and the overall functioning of every physiological process.

The relationship between healing and oxygen has been studied by many other experts. On a most basic level, oxygen is required for the body to function and obviously for life to continue. Whenever breathing is hindered and oxygen is limited, the health is negatively impacted. Here are some basic facts to consider:

- The body needs between 1 cup to 2 gallons of oxygen per minute depending on whether engaged in a restful state or strenuous exercise.
- Oxygen is one of the major elements within the body.
- The brain needs 20% of the total amount of oxygen needed by the body.
- Oxygen is required to have the energy for every physiological process.
- Oxygen affects the body through oxidation and oxygenation.
 - Oxidation occurs as food is converted into energy.
 - Oxygenation occurs when the blood absorbs oxygen.

Bio-Oxidative Therapies

Oxygen has been used within various therapies for many years. Bio-oxidative therapies employ various substances comprised of oxygen to accelerate oxygen metabolism. The information within this section on healing and oxygen can be referenced within the book, *Oxygen Healing Therapies*, by Nathaniel Altman.

It has been demonstrated that increased oxygen levels correlate with decreased pathogens and diseased cells. The use of these therapies is limited in the United States and yet has been found to be beneficial in several countries. Since it is difficult to produce sustainable profits through bio-oxidative therapies, this may be a critical limiting factor of seeing more bio-oxidative therapies in the U.S. Here are a few oxygen based therapies along with a summary of the benefits seen.

Hyperbaric Oxygen Therapy

This treatment is used for carbon monoxide poisoning and the bends. This is the most common use of oxygen in healing within the U.S. It has also been useful in treating wounds, bone infections, burns and other conditions in which oxygen does not reach the tissues. The benefits are achieved by the following actions:

- Reduces free gases trapped in tissues.
- Contracts blood vessels and reduces healing time in burn and crush injuries.
- Increases oxygen in the tissues of the body.
- Has an antimicrobial effect.
- Promotes blood cell formation.

Ozone and Hydrogen Peroxide

Both of these substances kill viruses and inhibit the growth of tumors. They also increase the production of interferon and tumor necrosis factor which are used by the body to combat cancer and infections. The use of these agents has been shown to increase tissue oxygenation. There are many studies showing the benefits of these substances in a wide range of ailments. Some of the highlights are listed below. The book provides more specifics on the multitude of studies and clinical results.

Heart Disease

Bio-oxidative therapies have been used for over 30 years to treat cardiovascular disease and circulatory problems. In Cuba, hospitals routinely administer ozone to heart attack and stroke victims. Both ozone and hydrogen peroxide positively affect the flow of blood within arteries and veins. Studies have shown hydrogen peroxide to affect how platelets stick together which affects blood clot formation. It can also oxidize fatty deposits or plaque adhering to blood vessels. Bio-oxidative therapies can activate enzyme activity able to minimize free-radicals which often contribute to heart disease and circulatory problems.

There is much evidence of the effectiveness of bio-oxidative therapies in treating dysfunction of the heart and its related systems. Here is some information from studies around the world on bio-oxidative therapies:

- Angina attacks have decreased from 6 per day to less than 3 per day.
- Substantially more patients have responded positively to bio-oxidative therapy as compared to traditional therapies for the treatment of atherosclerosis in the extremities.
- A mixture of oxygen and ozone reduced the death rate during surgery in patients with infectious inflammation of the heart's membrane.
- Vast improvements in outcomes for stroke patients have been seen.

Cancer

The effectiveness of bio-oxidative therapy on cancer is based on three important discoveries. First, the key condition for cancer is a lack of oxygen. Second, viruses are often involved in the development of cancer. And third, tumor cells are intolerant of hydrogen peroxide. Over forty years ago, hydrogen peroxide began to be used in conjunction with radiation treatments. This improved the effect of the radiation treatment. Here are some other notes from research:

- Hydrogen peroxide in low doses can kill cancer cells.
- Ozone has the ability to kill tumor cells.
- Ozone-oxygen has improved appetite, strength, physical activity, and reduced pain.
- Significant numbers of patients have gone into remission with no evidence of cancer after bio-oxidative therapies.
- Literally tens of thousands of Europeans have become cancer free thanks to ozone therapy.

HIV and AIDS

Within the U.S., billions of dollars are spent each year to research HIV and AIDS plus treat the patients who have acquired HIV and develop AIDS. It has become big business with a high profit margin. Unfortunately, the high profitability of the mainstream approach to treating AIDS diminishes the energy put into finding cheaper therapies.

There is substantial laboratory evidence that ozone and hydrogen peroxide can inhibit and even kill the HIV. These bio-oxidative therapies change the structure of the cell's receptor site thus limiting the virus' ability to replicate and oxidize the protective coating of the virus. HIV itself inhibits the production of an enzyme involved in producing oxygen. Ozone can stimulate the production of this enzyme that converts molecules of superoxide into oxygen and hydrogen peroxide molecules.

However, bio-oxidative therapies are not the cure for AIDS. AIDS has a multitude of causes and bio-oxidative therapies can be helpful while not curative alone. Ozone used in combination with various drugs has produced some promising results including the improvement of quality of life for the AIDS patient. Many anonymous cases are known, however the specifics are limited due to the fact that the FDA prohibits these therapies and has threatened medical professionals who have been reported using bio-oxidative therapies.

Other Uses of Bio-Oxidative Therapies

Allergies

In a German clinic, 33% of the patients had their allergy symptoms disappear completely as a result of ozone and auto-homologous immunotherapy. Twenty-two percent saw significant improvement and another one-third found some relief.

Burns

Researchers using ozone for burns concluded that it normalized levels of immune response indicators. They believed this was due to ozone's anti-inflammatory, immunoregulatory and bactericidal qualities.

Candida

Hundreds of patients have responded positively to intravenous hydrogen peroxide.

Diabetes

In one study, ozone therapy was the most effective method for treating a neuroinfected foot. Another study showed ozone effective in dropping blood glucose by 50% and allowing a reduction in the amount of insulin required to control diabetes.

Duodenal Ulcers

In a clinical study, 40% of patients receiving ozonated water were completely healed within a month. The majority showed progress in healing the ulcer.

Gastrointestinal Inflammation

In a study of over 2700 patients, all of the patients receiving ozone were cured within 3 days.

Glaucoma

Ozone therapy alone was found to highly effective in improving vision in patients with glaucoma with approximately 75% of the group having highly significant improvement in their vision.

Hepatitis

Positive results have occurred in patients with hepatitis A, B, and C treated with bio-oxidative therapies.

Influenza

Patients treated with intravenous hydrogen peroxide had their recovery time cut in half.

Osteoarthritis

Ozone was effective in eliminating pain in over 93% of patients in a study of 63 people suffering with osteoarthritis in the knee.

Parkinson's Disease

Approximately 90% of patients had symptoms improve after 15 sessions of receiving ozone.

Skin Diseases

Patients with various types of herpes, rosacea, eczema, psoriasis, athlete's foot and several other conditions have found relief from the use of bio-oxidative therapies.

Wounds

Wounds have been found to heal faster with bio-oxidative therapies.

In summary, these bio-oxidative therapies have been successfully used to facilitate healing for many conditions. Yet, access to bio-oxidative therapies is often limited for most people, especially in the U.S. Fortunately, Transformational Breathing is a technique that provides similar benefits by increasing the oxygen level in the blood and increasing the circulation of lymph which results in providing more oxygen to the individual cells. Most importantly, Transformational Breathing is a modality readily available to anyone willing to learn this life enhancing technique of deep rhythmic diaphragmatic breathing.

SOURCES

Additional information about the physiology of breathing, the role of oxygen in health and in illness can be found in greater detail in the following books. These books were the primary source of the information summarized above.

Oxygen Healing Therapies

By Nathaniel Altman

Science of Breath, A Practical Guide

By Swami Rama, Rudolph Ballentine, M.D., Alan Hymes, M.D.

The New Science of Breath

By Stephen Elliott and Dee Edmondson, R.N.

The Golden Seven Plus One

By C. Samuel West, D.N., N.D.

Biochemistry

By Pamela C. Champe and Richard A. Harvey