

## **Bodily pH – How it is Involved in the Disease Process, and How to Modify it** *Robert P. McBride, D.D.S., M.A.G.D.*

As a health-centered practice, the Dental Wellness Center's mission is primarily patient education, an essential element of a health development process between a wellness health practitioner and patient. The goal is to discover the cause of a disease condition with the assignment of mutual responsibilities on the part of both practitioner and patient to gain a desired level of health. I can think of no more important area of health relative to the mouth-body connection than that of pH – a measurement of the relative acidity/alkalinity of the body. As the mouth is part of the body, the state of its health can both affect and be affected by that of the rest of the body – a reciprocal effect.

It is hurtful to see young parents enter the Center whose children have rampant tooth decay, seeking second opinions other than recommendations of fillings, root canals and crowns along with general anesthesia. These are immediate problems that may be able to be dealt with in another fashion, but more importantly, if their cause is understood and dealt with, the tide can be reversed. Most often, when we test these children's pH, it turns out to be acidic. We also see new adult patients with bleeding gums and bone loss around their teeth that have been to the dentist regularly and exhibit excellent self-care with an acidic pH, and patients who don't floss or know how to use a tooth brush with healthy gums – with a neutral or slightly alkaline pH.

### **Disease Definition**

The origin of the word 'disease' is dis - ease: to not be at ease and harmony. Most medical practitioners have forgotten this, and they merely participate in what is essentially chemical warfare against the symptoms of bodies at dis-ease.

### **Bodily pH and Disease**

At the chemical level, pH stands for potential of hydrogen. pH is a measure of hydrogen ion concentration; a measure of the acidity or alkalinity of a solution. Aqueous solutions at 25°C (77°F) with a pH less than seven are acidic, while those with a pH greater than seven are basic or alkaline. The pH scale is: zero to 6.9 being acidic and 7.1 to 14 being alkaline. The body tries to maintain a pH of 7.2, which is moderately alkaline.

### **A Look At pH Chemistry**

An acid has many hydrogen ions, while an alkali has few hydrogen but many oxygen ions. Let's do some easy chemistry to see where the oxygen in an alkali comes from:

- 1 A water molecule contains two hydrogen and one oxygen atom; remember H<sub>2</sub>O?
- 2 Some water molecules split up.
- 3 Some of these split molecules lose one of their hydrogen ions and thereby become hydroxide ions, or "OH" which are accordingly, oxygen-rich compared to water.

- 4 The hydrogen ions that they lose unite with other water molecules to form hydrogen ions, or  $H_3O$ , which are accordingly hydrogen-rich and oxygen-deprived.
- 5 An alkali has lost many hydrogen ions and therefore contains a lot of oxygen-rich hydroxide (step 3 above). Mix it with your blood, and your blood will also contain a lot of oxygen-rich hydroxide.
- 6 An acid has gained hydrogen ions that it wants to donate (step 4 above). Mix it with your blood and your blood becomes a hydrogen-rich oxygen-deprived acid.

### **We're mostly Water**

Seventy percent of the human body consists of water, which makes it especially sensitive to the balance between hydrogen and hydroxide ions in your food and drinks. You can therefore bring about large shifts in your body's acid or alkaline levels through your choices of which foods to consume.

### **Hyperemia -> Hypoxia ->Acidosis**

Hyperemia is a condition wherein the arterial blood is low in oxygen; therefore insufficient oxygen is distributed into the tissue cells, causing hypoxia (tissue oxygen deficiency), leading to bodily acidosis (low bodily pH) and inflammation. With the low amounts of oxygen that are seen with extreme acidosis, cells must use fermentation for energy in lieu of oxygen, and this transforms healthy cells into cancer cells. The transition into cells that live from energy that is derived from fermentation is actually part of a survival response. Whenever there is oxygen depletion, there may be an excess of cancer cells that may form into tumors. This cancer is no disease in itself, but merely a troubling symptom that the body's immune system can no longer regulate itself because external forces have overwhelmed it. The cause may be vitamin and mineral depletion, illnesses, extreme stress, chemical carcinogens, unhealthy (chemically altered) fats and oils, or a lack of omega-3 oils, pharmaceuticals, or lack of sleep or not enough oxygen during sleep (Sleep Disordered Breathing). Diet usually plays a huge role in making a person acidic as well, and therefore oxygen depletion; especially the synthesized food products that are ironically marketed as healthy alternatives to natural fats and oils.

### **Acidosis and our Immune System**

Acidosis is now being shown to be related to an over-taxed immune system, for it is known that in sickness, the human body is always acidic. The orthodox establishment considers acidosis to be a symptom of whatever disease happens to be present, instead of considering that acidosis could be the root cause of multiple disease states. The utter lack of success in curing cancers may be due in part to a fundamental misunderstanding of these relationships.

### **Acidosis and Inflammation**

Acidosis is related to inflammation, which is a natural protective response by the body. It can be beneficial in some instances as with a cut finger - the inflammatory process helps to block harmful microorganisms and repair the wound - but lasting inflammation can be

very harmful to the body. Chronic inflammation produces continual free radicals that can potentially damage DNA, speeding the aging process and contributing to disease.

### **pH and Bodily Healing**

Unless the body's pH level is slightly alkaline, the body cannot heal itself. You cannot improve your oral or general health until pH levels are above 7. Most all drugs and medications (over the counter & prescription) are toxic and can cause the pH to be acidic as well. Acid decreases the body's ability to repair damaged cells, decreases the ability to get rid of heavy metals and it makes the body more susceptible to fatigue and illness. Everything pivots on a balanced pH. When bodily pH drops, enzymes are deactivated, digestion is interrupted; vital nutrients are not effectively assimilated. Disease cannot survive in an alkaline state; however, in a low oxygen/low pH (acidic) state, viruses, bacteria, yeast, mold, fungus, Candida and Cancer cells all thrive.

### **Nobel Prize Winner – Dr. Otto Warburg**

Dr. Otto Warburg, winner of the Nobel Prize in 1931, discovered that cancer cells are not fueled by oxygen as normal cells are. The high levels of oxygen that are found in healthy, alkaline bodies are toxic to cancers. He found that cancers get their energy from sugars and a process of fermentation in acidic environments. He proved empirically the relationship between cancers, acidic body pH, and cellular oxygen starvation. His findings demonstrated that cancers are merely a symptom of acidosis, and therefore it is impossible to truly cure any cancer without first curing the underlying acidosis (an excessively acid condition of the body fluids or tissues).

### **Another Nobel Prize Winner – Dr. Christian Bohr (pH and Carbon Dioxide)**

Hypercapnia refers to excessive carbon dioxide (CO<sub>2</sub>) in the bloodstream, typically caused by inadequate respiration. An increase in CO<sub>2</sub> is linked with pH decrease. This is because when there is an increase of CO<sub>2</sub> in cells, there is also an increase of H<sup>+</sup> ions, which is the reason for the pH decrease (more acidic). When the question is asked as to what happens when there is a CO<sub>2</sub> increase or a pH decrease, they're both asking the same thing. It means that there is CO<sub>2</sub> buildup and hemoglobin is going to "dump" more O<sub>2</sub> to offset that acidity. The **Bohr Effect** is a physiological phenomenon first described in 1904 by the Danish physiologist **Christian Bohr**, stating that hemoglobin's oxygen binding affinity is inversely related both to acidity and to the concentration of carbon dioxide. Since carbon dioxide reacts with water to form carbonic acid, an increase in CO<sub>2</sub> results in a decrease in blood pH, resulting in hemoglobin proteins releasing their load of oxygen. Conversely, a decrease in carbon dioxide provokes an increase in pH, which results in hemoglobin picking up more oxygen.

If a body is made too acidic by factors such as diet, toxins, and inadequate respiration, then things no longer work as they are supposed to. Excessive acidity impairs the immune system which is the core of life itself. When the immune system is compromised, the body loses its ability to alkalize itself, and then the body loses its

ability to absorb oxygen effectively.

### **Advantages of an Oxygen-Rich Alkaline Body**

- All living cells need oxygen to survive. We all understand this. During a stroke when the brain's oxygen supply is cut off, brain cells die. A heart attack occurs when the heart's blood and oxygen supply is cut off and the heart muscles die. An alkaline body, therefore, facilitates the healthy life of all its cells while an acidic body starves its cells of this life-giving element. This means that cells live longer and perform their functions better when lots of oxygen is available.
- Oxygen is required for the burning of material throughout the body that would otherwise be stored, a process that is called metabolism. This burning process also supplies your body with its energy and heat. An alkaline body, therefore, is not only clear of piles of stored fats and toxins, but is more energetic and warmer too.
- While the brain constitutes about two per cent of your body's weight, it uses 20 per cent of its oxygen and 25 per cent of its energy that is generated by oxygen. An alkaline body can, therefore, drive a more powerful brain.
- Without exaggeration, a lack of oxygen is responsible for almost all diseases. Many bacteria and fungi flourish in oxygen-starved environments; just think of the moldy food which you hopefully purge from your fridge and pantry regularly. As mentioned, Dr. Otto Heinrich Warburg won a Nobel Prize for proving that cancer was caused by a lack of oxygen in cells, which force them to meet their energy needs through fermentation. Hypertension often occurs when red blood cells are damaged due to low oxygen, which depletes them of the substance that they normally release to relax blood vessels. In fact, to destroy harmful organisms and flush them from cells, the immune system needs a significant amount of oxygen too.
- Nutrients from food cannot provide your body with any benefits until they combine with oxygen in cells. There is, thus, absolutely no bodily function that does not benefit from copious amounts of oxygen. In other words, in an acidic body, calcium does a poor job of developing bone, protein struggles to grow muscle, omega 3 essential fatty acids cannot improve concentration and cognition, iron cannot build red blood cells, and so on.

Therefore, feeding your body with an abundance of oxygen through an alkaline lifestyle is one of the biggest contributions you can make to your health.

### **Causes of a Low pH:**

There are several intertwining factors that singularly and collectively lower one's pH, including:

- Extreme stress
- Environmental toxins - chemical carcinogens in food, air and water
- Pharmaceuticals - most drugs and medications (over the counter & prescription) are

toxic and can cause the pH to be acidic

- Lack of enough sleep
- Sleep Disordered Breathing, such as Obstructive Sleep Apnea
- Lack of enough exercise
- Nutritional factors:
  - Vitamin and mineral depletion – food isn't what it used to be.
  - Unhealthy (chemically altered) fats and oils – lots in today's junk foods.
  - Lack of omega-3 oils
  - Eating too many foods that leave an acid ash; Alkaline ash is the residue left in your body when it has digested alkaline foods. Your body excretes this ash residue in your urine. Acidic foods, on the other hand, create acid ash, which can adversely affect your health. The acid-ash diet hypothesis of osteoporosis suggests that acid from the modern diet causes a demineralization of the skeleton, and mobilized bone calcium is excreted. This can leave insufficient minerals in the alkaline reserve. The body will try to raise the pH by using the minerals in the alkaline reserve, mainly sodium from the stomach and calcium from the bones, as well as potassium, magnesium and iron. This is the cause of Osteoporosis and a number of other diseases. Acids buildup in the cells, causing pain, which may be diagnosed as Arthritis, Fibromyalgia, MS, Lupus, etc. An acidic diet creates an acidic oxygen-starved body, and an acidic oxygen starved body suffers from the symptoms listed above.
  - Synthesized food products that are ironically marketed as healthy alternatives to natural fats and oils.
  - Slow Intestinal Transit Time from acidic foods that cause constipation that leave toxins accumulating in the colon or any process that deprives the cells of oxygen and other nutrients, including essential minerals, as with #4 above.

### **Tooth Decay and Gum Disease**

These two diseases are still running rampant in spite of an emphasis in prevention within the past several decades. Although proper brushing and flossing is important, the state of one's pH can directly affect the oral environment along with that of our systemic health. Bacteria that are involved in both tooth decay and gum disease thrive within a low oral pH, and a low bodily pH, and as indicated results in the loss of bone calcium resulting in osteoporosis in general and specifically the bone around the teeth - a "double whammy." As the essential bodily minerals escape, the body will try to balance itself through demineralizing the bone and tooth enamel.

This is the beginning process of tooth decay, as well as the loss of bone around the teeth in gum (periodontal) disease and is the first sign of osteoporosis. Before I understood this bit of body chemistry, I was confused as to why some patients who exhibited excellent daily oral hygiene had bleeding gums and bone loss, while others who showed poor oral

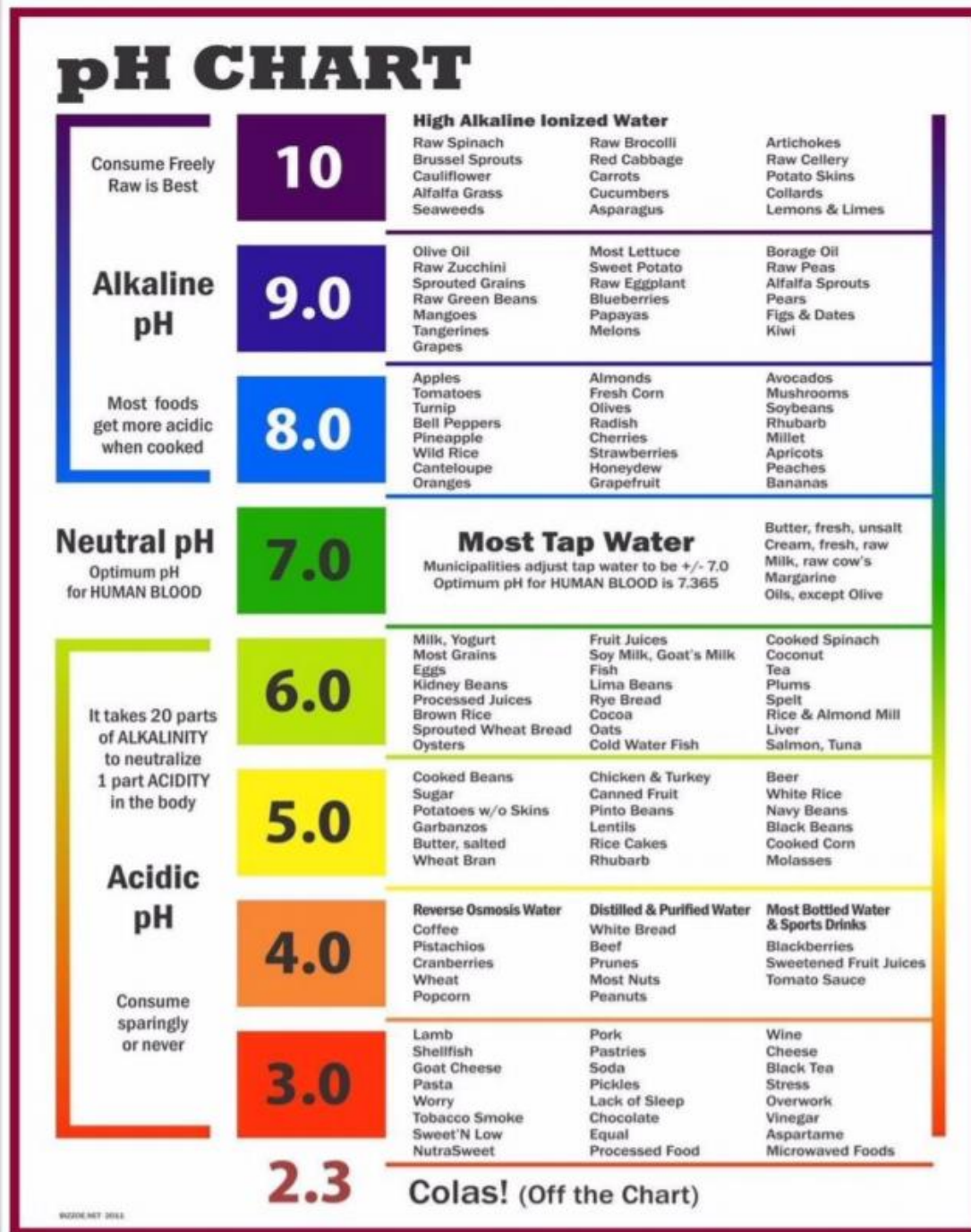
hygiene had no gum bleeding or periodontal pockets. So, as important it is to have good oral hygiene, the actual underlying cause of periodontal disease is systemic and related to conditions seen in all degenerative diseases. The disease cycle: *Acidemia* -> *excess free calcium* -> *inflammation* -> *gum and bone breakdown*-> *release of free radicals causing* -> *more inflammation, perpetuating the cycle.*

### **Nutritional Suggestions**

- At least 80 per cent of your food should be alkaline or neutral. Alkaline and neutral food include all green and leafy vegetables, all yellow/orange vegetables including asparagus, cabbage, peas, spinach, turnips, carrots, garlic, kale, celery, and potatoes, as well as almost all fruit, most nuts, and almost all seeds. Some alkaline fruits are lemons, limes, avocados, tomatoes and grapefruit. Almonds, pumpkin seeds, sesame seeds, flax, spelt and lentils are examples of alkaline grains, nuts and seeds. Alkaline oils include flax, avocado and olive. Consuming pure water and herbal teas contributes to an alkaline environment.
- Pulses (edible seeds of plants in the legume family) are acceptable because they are only slightly acidic. Most whole grains are a bit more acidic than pulses, so should be eaten in moderation. Limit your intake of red meat, fish, chicken, eggs, dairy, and avoid all breads and cakes that contain refined carbohydrates and sugar.
- Eat nuts or lightly pan fried kale leaves to replace crisps. Use pure cacao instead of chocolate. Bake your own bread with baking soda, baking powder and whole grains, rather than the yeast and refined flour-based breads you used to buy. Replace rolls with vegetable leaf wraps. Replace white pasta and rice with whole grain pasta and brown rice or quinoa. Use stevia or dried fruit instead of sugar. Use herbs or lemon juice instead of acidic condiments like tomato sauce and vinegar. Nut butters and pressed olive oil are healthier than margarine, with all its hydrogenated oil.
- Most of your beverages should be alkaline or neutral. Buy an alkalizer/ionizer to filter the acids from your tap water. Pure unsweetened orange, watermelon, apple, mango, peach, pear, and grape juices are good alkalis. So are green vegetable juices or smoothies. Avoid acids like milk, coffee, tea, hot chocolate, sodas, and alcoholic drinks.
- Replace cow milk with almond milk. Replace tea with green tea or other herbal teas. Use water or juice in your smoothies instead of milk.
- Consider a mineral supplement that contains the alkaline minerals calcium, potassium, and magnesium. Alternatively, opt for a green powder, which is also strongly alkaline. The least effective but cheapest option is to add a pinch of baking soda to each glass of water you drink.
- Drink around eight glasses of water per day so you can remain hydrated, sweat out waste material, and give your kidneys enough water to filter waste material out of your body.
- Buy an alkaline test kit and test your pH level once or twice a week to ensure you remain on track. If the pH in your urine is below 6.5 and in your saliva below 7.0,

- it means your body is struggling too much to keep up its required 7.2 pH.
- Quality nutritional supplementation, such as Seven Point 2.
- Start slowly and set realistic goals that are achievable. If you change your diet too suddenly, you may decide to abandon it before you develop a liking for the new food.

This chart can help you get a quick start at the grocery store.



### **Sleep Disordered Breathing**

Dr. Warburg's discovery of how disease cannot exist in alkaline bodies makes it all important to make sure that there are no impediments to having a good night's sleep. Sleep is our body's chance to rejuvenate itself, and if impaired will cause a lowered pH. Sleep Disordered Breathing (SDB) is becoming more and more common – it is now estimated that 26 percent of adults between the ages of 30 and 70 years have Obstructive Sleep Apnea. One reason for this upsurge in Obstructive Sleep Apnea is weight gain that is part of the trap that many people fall into from convenience foods and lack of exercise. This increases the size of fat reservoirs that surround the airway, causing it to become obstructed. If you are feeling fatigued, snore, or have periods of gasping for air during sleep, you can go to <http://www.stopbang.ca/osa/screening.php> and take their questionnaire. If this tests gives indication of the possibility of having a sleep disorder, either a laboratory or Home Sleep Study can tell for sure.

### **Becoming Your Own Doctor**

With today's automation and hectic pace of life leading to inadequate exercise, fast food and depleted food nutrient value, along with a health system more devoted to treating symptoms rather than their causes, it's no wonder that gaining and maintaining health must involve individual responsibility. The purpose of this article is to offer an understanding of pH and how we can help ourselves, our families and loved ones by controlling it. It would take a book to deal with all the above causes of low pH, and a detailed plan to optimize it; but hopefully it will give its readers an understanding of how pH is related to all bodily systems, along with some suggestions as to how to influence it positively that are within our immediate reach.