

pH of the Body, Water & the Food We Eat

Hardly a day goes by at **watermatters™** without someone asking for a device to make 'alkaline' water. Usually, when asked why they want to make their water 'alkaline', the response is something like 'because I want to drink healthy water' or 'because diseases like cancer can't survive in an alkaline environment'. These responses represent commonly held but inaccurate assumptions. This four-part article series is my attempt to clarify this misunderstood subject of 'pH balance' and 'making the body alkaline'.

Let's start with the first three of eighteen clarifications, and some background info about acids, bases, and pH. A base is an alkaline substance.

Clarification 1: There is not one ideal 'pH of the body'. There are many.

Clarification 2: Our pH balance is rhythmic, not static.

Clarification 3: Acids are essential. They are not the enemy.

Part One: pH and the Alkaline/Acid Dynamic

Acids & Bases are Equally Essential to Life.

Acids and bases are opposite sides of the same coin, as conjoined as day and night, male and female, inhalation and exhalation. They are equally essential to Life.

Acid/base chemistry is based on the interplay between H⁺ and OH⁻ in the presence of water.

Notice that H⁺ and OH⁻ combine to make water (H₂O).

This is a reversible process.

H₂O molecules can donate H⁺ and OH⁻ to other water molecules and to other substances.

This interplay is fundamental to virtually all living systems and one of the reasons why water is the medium, means and mother of life.

H⁺ is the chemical symbol for hydrogen ions. [A lone hydrogen ion is a proton.]

OH⁻ is the symbol for hydroxide ions.

An ion is defined as an electrically charged atom or group of atoms.

pH is about Hydrogen Ions.

pH is a scale which indicates the concentration of hydrogen ions (H⁺) in an aqueous solution.

Acids have a surplus of H⁺ (hydrogen ions) which they donate.

Bases (alkaline substances) lack hydrogen ions. They accept H⁺ (hydrogen ions) and donate OH⁻ (hydroxide ions) of which they have a surplus.

On a scale of 0 to 14, pH below 7 is exponentially more acidic as it approaches zero, and pH above 7 is exponentially more alkaline as it increases toward 14.

pH 7 is neutral, representing an equal concentration of H⁺ and OH⁻ ions.

'Pure' water is neutral (pH 7) at 25° centigrade. However, water is rarely 'pure' in nature because water has a remarkable ability to dissolve other substances. H⁺ and OH⁻ ions in water are constantly changing partners as the H₂O components of water interact with each other and with everything else.

When an acid substance is dissolved in water, the balance between the H⁺ and OH⁻ shifts. There is now more H⁺ than OH⁻ in the solution. The solution becomes acidic.

When a base (alkaline substance) is dissolved in water, the balance between H⁺ and OH⁻ shifts in the opposite direction. The alkaline substance attracts H⁺ from the water. The solution then becomes more alkaline because it has less H⁺ remaining in solution.

The 'p' in pH stands for the 'potential' or 'power' of hydrogen, depending on who you are talking to. Those who use 'potential' are referring to the electrical 'potential' required to register a state change. Those who use 'power' are referring to a mathematical power. Either way, it works out to about the same numbers on the pH scale. ¹

You might wonder why the pH number gets smaller as the concentration of hydrogen ions gets bigger. The reason is because the pH scale is based on a *negative* logarithmic concentration of H⁺. ²

pH and the Body

The body is largely made up of water in the form of various types of bodily fluids. The pH levels of those fluids are tightly regulated by the body to maintain essential life processes. Organs, blood, cells, proteins and enzymes require fluid environments with specific, yet dynamic, pH ranges which must remain relatively constant for those systems to function properly.

There is currently a popular assumption that mistakes the slightly alkaline pH required for the blood and extracellular fluid to be the optimal pH of the entire body. The body is a complex organism involving layers of interrelated systems requiring appropriate ranges of pH to maintain the specific functions of each system.

As soon as any substance enters your mouth, bicarbonates adjust the pH of the saliva preparing the substance for delivery to the stomach (pH 1.5 – 4.0) where very strong acids kill foreign bacteria and enable the digestion process. Alkaline secretions from the pancreas neutralize this acidity before the contents of the stomach move on into the duodenum (pH 7.0 – 8.5) where nutrient absorption occurs. Waste passes to the colon (pH 4.0 – 7.0) for excretion.

Here are the approximate pH levels required by various body parts:	
Blood	7.4
Extracellular fluids	7.4
Intracellular fluids	6.8

Skin	5.5
Saliva	6.5 – 7.5
Sinuses	6.5
Stomach	1.5 – 4.0
Chyme	2.0
Bile	7.0 – 8.0
Duodenum	7.0 – 8.5
Small intestine	4.0 – 7.0
Large intestine	4.0 – 7.0
Urine is a waste product. Consequently, its pH will vary according to what the body needs to eliminate.	

pH is Dynamic and Rhythmic

Although tightly controlled, the pH levels within the body are not static. There is a natural acid/alkaline tide which swings in sync with your circadian rhythm (response to hours of light and darkness). Your life force, immunity and reparative cycles are dependent upon this natural momentum. More about this important daily rhythm in Part Two of this article series.

Acids are Not the Enemy. They Supply the Fuel of Life.

‘Acidity’ has been mistakenly given a bad reputation, as though it must be avoided. However, life does not happen without acids. Acids donate hydrogen ions. Our energy comes from the hydrogen supplied by acids digested from the food we eat. Hydrogen fuels life.

A surplus of acid in some part of the body may be the natural response to, not the cause of, a problem as the body attempts to supply more hydrogen ions to correct an imbalance.

Acids Defend the Body

The parts of your body that come in contact with the outside world have an acid pH. Acids help keep the pathogens that enter your body under control.

Skin: pH 5.5

Mouth: pH 6.3 (average fluctuating pH for oral cavity)

Stomach: pH 1.5 – 4.0

Large intestine: pH 4.0 – 7.0

Sinuses: pH 6.5

Vagina: pH 3.8 – 4.5

End of Part One

About Part Two of This Article:

There are strongly held and highly charged opinions about the importance of making oneself more 'alkaline'. Part Two of this article will address some highly contentious issues which may be met with strong disagreement from some parties. However, I believe science backs up the points that will be made in Part Two which are outlined in the following clarifications:

Clarification 4: Your Lungs, Kidneys and Buffering Agents Maintain Your pH Levels, Not Your Diet

Clarification 5: Abnormal pH is a Symptom, Not the Cause, of Disease.

Clarification 6: Acid-Forming Foods Do Not Cause Acidosis.

Clarification 7: The pH of Urine is Not the pH of the Body.

Clarification 8: Candida Thrives in an Alkaline Environment.

Clarification 9: Cancer Cells Have a Neutral to Alkaline Internal pH.

Clarification 10: Cancer Cells Produce Acidity, Not the Reverse.

References for Part One:

1. <http://cultureofchemistry.fieldofscience.com/2010/03/chemical-urban-legends-ph.html>
2. <https://www.yesi.com/ysi-blog/water-blogged-blog/2015/02/why-is-the-ph-scale-logarithmic>

Disclaimer:

The information in this article is for information purposes only. It is not intended to diagnose, treat, cure or prevent any disease. It should not be construed as personal medical advice or instruction. No action should be taken based solely on the contents of this article. Readers should consult appropriate health professionals on any matter relating to their health and well-being. The information and opinions provided here are believed to be accurate and sound, based on the best judgment available to the authors, but readers who fail to consult appropriate health authorities assume the risk of any injuries. The publisher is not responsible for errors or omissions.

pH of the Body, Water & the Food We Eat

Part Two: The Body's Amazing Mechanisms for pH Balance.

There are strongly held and highly charged opinions about the importance of making oneself more 'alkaline'. The following clarifications will be addressed in Part Two of this four-part article:

Clarification 4: Your Lungs, Kidneys and Buffering System Maintain Your pH Levels, Not Your Diet

Clarification 5: Abnormal pH is a Symptom, Not the Cause, of Disease.

Clarification 6: Acid-Forming Foods Do Not Cause Acidosis.

Clarification 7: The pH of Urine is Not the pH of the Body.

Clarification 8: Candida Thrives in an Alkaline Environment.

Clarification 9: Cancer Cells Have a Neutral to Alkaline Internal pH.

Clarification 10: Cancer Cells Produce Acidity, Not the Reverse.

The Rhythm and Precision of pH Balance

As the day dawns and we wake up to a new day, our body requires acids to fuel our activities and alertness, and to activate immunity from contact with foreign substances and the world beyond our own body.

As the day ends, our body becomes more alkaline to support its nighttime work of healing, rest and repair.

This daily alkaline/acid swing is managed by the body while maintaining tightly regulated pH levels for the various body fluids and functions. For instance, the pH of the blood and extracellular fluid must be maintained within a very narrow range (pH 7.35 – 7.45) to prevent acidosis (too much acid) or alkalosis (too alkaline). Either of these conditions can result in the failure of vital functions.

Your Lungs & Kidneys Maintain pH Balance in the Body

The body has several powerful mechanisms by which it regulates its requirements for acid-alkaline balance. These mechanisms are:

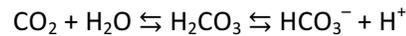
- A. The lungs⁴
- B. The kidneys⁵
- C. Buffering agents— especially the bicarbonate buffering system⁶

A buffering system is a chemical process that resists changes in pH when acids or bases (alkaline substances) enter or are produced in the body. Buffers work by binding or releasing H⁺ (hydrogen ions).³

Here is how the remarkable coordination between these systems works to maintain critical pH levels within your body.

CO₂ (carbon dioxide) is a by-product of your metabolic processes, including all the food that you digest.

CO₂ dissolves in the blood to form carbonic acid (H₂CO₃) which then becomes bicarbonate (HCO₃⁻) and the hydrogen ion (H⁺).



If your blood becomes too acidic (excess of H⁺ ions), the body raises the blood pH by increasing respiration so that more CO₂ is exhaled through the lungs. If your blood becomes too alkaline (excess of bicarbonate), respiration will slow down to build up CO₂.

The kidneys participate in this process by excreting and reabsorbing bicarbonate (HCO₃⁻). Kidney excretion produces new bicarbonate ions which are supplied to the blood to replace bicarbonate used to buffer acid. Excess acidity or alkalinity accumulated in the kidneys is urinated out of the body.

This self-sustaining cycle is how the body maintains its pH levels. The body depends upon you keeping it well hydrated in order to carry out these complex processes well.

Abnormalities in pH are a Symptom, not the Cause, of Disease.

Abnormalities in the pH of various body fluids are indicative of a disorder with which the body is trying to cope. For instance, research suggests that dangerous changes in blood pH are a symptom of a severe condition, not the cause of the disorder.⁷ Causation and correlation are not the same.

Acid Foods Do Not Cause Acidosis

Acidosis is a condition where there is too much acid in the blood and/or extracellular fluid. It is a potentially life-threatening condition that occurs when your kidneys and lungs can't keep your body's pH (a measure of acidity) in balance. It is usually the result of serious illness or poisoning. Acidosis is not caused by an acidic diet.⁸ (More about pH and Diet in Part Three of this series of articles.)

Measuring the Swings in Urine pH: What it Tells You

Measuring the pH of your urine does not show you the 'pH of your body'. However, according to biochemistry and nutrition expert, Steven Fowkes, it can provide useful feedback about your metabolism if tracked *every time you pee over a period of 2-5 days* so that you can see the pattern of your metabolic rhythm. The body generates acids in response to the daily stresses of life, whether environmentally or otherwise induced. A healthy body with a good circadian rhythm will produce urine that swings from pH 5 during the day to pH 7 at night.⁹ This is because the pH of urine indicates any acid or alkaline excess the kidneys have recently accumulated for removal from the body in order to maintain balance. Keep in mind that the averaged pH of urine is slightly acidic (pH 6).¹⁰

Candida Thrives in an Alkaline Environment

All organisms, including pathogens, are dependent on specific pH levels for survival. Some microorganisms thrive in neutral pH environments (neutrophiles), some require alkaline environments (alkaliphiles), and others need highly acidic conditions (acidophiles).¹¹

Candida is an example of a pathogen that thrives by producing an alkaline environment.¹²

Cancer Cells Have a Neutral to Alkaline Internal pH.

Highly charged beliefs about the 'need to become more alkaline' centre around concerns about cancer.

The 'alkalize or die' theory revolves around the presumption that cancer cells cannot get established or persist in an alkaline environment. Studies indicate that this is not true.¹³

It appears that tumour cells maintain a slightly alkaline internal environment.¹⁴ They expel acids (hydrogen ions/protons) which result in an acidic environment around them. Contrary to popular belief, cancer cells produce the acidity, not the reverse.

End of Part Two.

Part Three of this series is entitled '**Acidity Fuels Us. Alkalinity Restores Us.**'

It will be about pH and the food we eat and will include the following clarifications.

Clarification 11: Alkaline pH Does Not Determine the Best Food to Eat.

Clarification 12: Acid/Alkaline Requirements Are Responsive and Changing, Not Fixed.

Clarification 13: Your Metabolism Determines Your Need for Acidity or Alkalinity.

Clarification 14: Acid-Forming Foods Do Not Cause Osteoporosis or Loss of Calcium.

Clarification 15: Some Acidic Foods Are Alkaline-Forming.

References for Part Two:

3. Rachel Casiday and Regina Frey. Blood, Sweat, and Buffers: pH Regulation During Exercise Acid-Base Equilibria Experiment. <http://www.chemistry.wustl.edu/~edudev/LabTutorials/Buffer/Buffer.html>
4. <https://www.boundless.com/physiology/textbooks/boundless-anatomy-and-physiology-textbook/body-fluids-and-acid-base-balance-26/acid-base-balance-248/regulation-of-h-by-the-lungs-1218-37/>
5. <https://www.boundless.com/physiology/textbooks/boundless-anatomy-and-physiology-textbook/body-fluids-and-acid-base-balance-26/acid-base-balance-248/the-role-of-the-kidneys-in-acid-base-balance-1219-9206/>
6. <https://www.boundless.com/physiology/textbooks/boundless-anatomy-and-physiology-textbook/body-fluids-and-acid-base-balance-26/acid-base-balance-248/chemical-buffer-systems-1217-4810/>
7. John A Kellum. Determinants of blood pH in health and disease, Crit Care. 2000; <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC137247/>
8. <https://medlineplus.gov/ency/article/001181.htm>
9. <http://projectwellbeing.com/ph-the-real-deal/>
10. <https://www.rnceus.com/ua/uaph.html>
11. Microbial Growth at Low or High pH. *Boundless Microbiology*. Boundless, 26 May. 2016. <https://www.boundless.com/microbiology/textbooks/boundless-microbiology-textbook/culturing-microorganisms-6/other-environmental-growth-factors-65/microbial-growth-at-low-or-high-ph-392-5693/>

12. Slavena Vylkova, Aaron J. Carman, Heather A. Danhof, John R. Collette, Huaijin Zhou, Michael C. Lorenz. The Fungal Pathogen *Candida albicans* Autoinduces Hyphal Morphogenesis by Raising Extracellular pH. <http://pubmedcentralcanada.ca/pmcc/articles/PMC3101780/>
13. J.R.Griffiths. Are cancer cells acidic? Biomedical Magnetic Resonance Research Group, St George's Hospital Medical School, Cranmer Terrace, London SW17 ORE, UK. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1977628/pdf/bricancer00073-0015.pdf>
14. 'it is the extracellular pH (pHe) in tumors which is acidic while the intracellular pH (pHi) is neutral-to-alkaline.' http://www.u.arizona.edu/~raghunan/Reprints/Raghunand_A12.pdf

Disclaimer:

The information in this article is for information purposes only. It is not intended to diagnose, treat, cure or prevent any disease. It should not be construed as personal medical advice or instruction. No action should be taken based solely on the contents of this article. Readers should consult appropriate health professionals on any matter relating to their health and well-being. The information and opinions provided here are believed to be accurate and sound, based on the best judgment available to the authors, but readers who fail to consult appropriate health authorities assume the risk of any injuries. The publisher is not responsible for errors or omissions.

pH of the Body, Water & the Food We Eat

Part Three: Acidity Fuels Us. Alkalinity Restores Us.

Alkaline pH Does Not Determine Healthy Food or Water.

Diets of people and cultures around the world vary greatly. Many of these diets have evolved from ancient wisdom based on local climate, crops, game and animal husbandry. The body is designed to adapt to and accommodate the pH of the wide range of foods and beverages humans eat and drink.

At an individual level, each person has unique peculiarities, energy requirements and rhythmic patterns that determine the metabolic needs of their body at any given time. Alkalizing and acidifying influences are required at different times of the day and in response to a wide range of metabolic needs. For instance, the reason why you may feel sleepy after eating a meal is because eating tends to alkalize the blood because the stomach is demanding acid to make hydrochloric acid for digestion.

The Body's Acid/Alkaline Requirements Are Responsive and Changing, Not Fixed.

The body has complex layers of systems, each with its own acid/alkaline balance. Our tissues consist of cells which contain subcellular systems such as mitochondria. Each level of this metabolic hierarchy requires its own pH balance to function properly.

Similarly, intracellular fluid (67% of body fluid) maintains a slightly acidic pH, while our blood and extracellular fluid (26% of body fluid) require a slightly alkaline pH. We are not designed to be simply 'alkaline'.

Eating alkaline foods can be beneficial or counterproductive depending on the condition and immediate needs of your metabolism and your lifestyle. Acid-forming foods are activating, alkaline-forming foods are reparative.

A healthy body swings naturally between acid (active) and alkaline (reparative) cycles. We require acids to initiate energy-consuming daytime activities. The alkaline momentum dominates at night to facilitate rest, recovery and healing.

Acids Are Our Fuel

Our mind and body are fueled by acids. They are essential for digestion and genetic coding, plus the production of proteins, hormones and energy. No acids, no vigor.

Some acids that are essential to the body:

Amino acids = protein

Fatty acids = cell membrane, protein, hormone and energy production

Hydrochloric acid = digestion

Deoxyribonucleic acid = DNA, your genetic code

Ribonucleic acid = RNA, protein production and genetic information

There are two types of acids generated in the body. A healthy, efficient metabolism is aerobic and produces acid in the form of CO₂. Anaerobic energy production produces lactic acid, resulting in an inefficient metabolism.

Your Metabolism Determines Your Need for Acidity or Alkalinity.

According to biochemist and nutrition expert, Steve Fowles¹⁵, how your body responds to an alkalizing diet depends on how your body is utilizing energy. An efficient metabolism typically responds well to an alkalizing diet. A challenged metabolism may be overwhelmed by alkalizing foods.

If you are a night owl, alkalizing food may help you wind down in the evening but it won't get your day kick started in the morning when you are having trouble getting out of bed. In fact, quite the opposite. That is when you may need that cup of coffee or food containing healthy fats (acids). On the other hand, early birds may thrive on an alkalizing breakfast because their activating acid 'momentum' has already kicked in.

It is obviously wise to ingest healthy food and water. Eating lots of fresh fruits and vegetables helps prevent disease. However, the needs of the body do not necessarily require or benefit from a fixation on alkaline-forming foods and 'alkaline' water. Studies show that it is not acid-forming foods that cause acidosis, cancer or osteoporosis.^{16, 17}

For instance, the Paleo and Bullet Proof diets are popular health regimens based on acid-forming foods such as meat and select dairy products. Studies show that these diets are beneficial to many people and do not contribute to calcium loss and osteoporosis, as was once thought. In fact, research shows that they can augment the utilization of calcium and bone density in the body.^{18,19, 20, 21, 22, 23, 24}

Healthy Acids That Become Alkaline-Forming Foods

Many healthy foods, such as most fruits and vegetables, are acidic before being digested, yet they contribute alkaline minerals upon digestion.

Soft drinks, sodas and colas are notoriously bad acids with an extremely low pH (as low as 2.5). Yet, lemon juice has an even lower pH (2.0) and is highly beneficial to ingest. It has an alkalizing influence inside the body.

On the other hand, meat is very alkaline but has an acidifying effect inside the body. pH alone does not determine the health benefits of a given food or liquid.

End of Part Three.

Part Four, the final segment of this series, is entitled **The 'Myth' of Alkaline Water**. It will address the following points:

Clarification 16: The pH of Water Does Not Determine How Beneficial It Is to Drink.

Clarification 17: 'Alkaline' Does Not Mean 'Alkalizing'.

Clarification 18: Your Need for pH Balance, Not Oxygen, Stimulates Your Urge to Breathe.

References for Part Three:

15. <https://www.youtube.com/watch?v=NdScVgeIVIs>
16. [John J. B. Anderson](#) and [Philip J. Klemmer](#). Risk of High Dietary Calcium for Arterial Calcification in Older Adults. *Nutrients*. 2013 Oct; 5(10): 3964–3974. Published online 2013 Sep 30. doi: [10.3390/nu5103964](https://doi.org/10.3390/nu5103964). PMID: PMC3820054. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3820054/>
17. [Jean-Philippe Bonjour](#). Nutritional disturbance in acid–base balance and osteoporosis: a hypothesis that disregards the essential homeostatic role of the kidney. *British Journal of Nutrition*, Volume 110, Issue 7. October 2013, pp. 1168-1177
<https://www.cambridge.org/core/journals/british-journal-of-nutrition/article/nutritional-disturbance-in-acidbase-balance-and-osteoporosis-a-hypothesis-that-disregards-the-essential-homeostatic-role-of-the-kidney/3EAD569004A55B4AEAA0DAFC30AB5BE6/core-reader>
18. <https://chriskresser.com/how-to-keep-your-bones-healthy-on-a-paleo-diet/>
19. [Fenton TR¹](#), [Lyon AW](#), [Eliasz M](#), [Tough SC](#), [Hanley DA](#). Meta-analysis of the effect of the acid-ash hypothesis of osteoporosis on calcium balance. *J Bone Miner Res*. 2009 Nov;24(11):1835-40. doi: 10.1359/jbmr.090515. <https://www.ncbi.nlm.nih.gov/pubmed/19419322>
20. <http://ajcn.nutrition.org/content/75/4/609.full>
21. <http://press.endocrine.org/doi/full/10.1210/jc.2004-0179>
22. <http://www.westonaprice.org/our-blogs/cmasterjohn/does-meat-really-leach-calcium-from-the-bones/>
23. <http://nutritionj.biomedcentral.com/articles/10.1186/1475-2891-10-41>
24. <http://onlinelibrary.wiley.com/doi/10.1359/jbmr.090515/abstract;jsessionid=BF6DFFA3FA57EA3B3A8745465E825813.d02t02>

Special thanks to Steve Fowkes (ProjectWellBeing.org) for his bio-hacking insights and to Dave Asprey (<https://www.youtube.com/watch?v=NdScVgeIVIs>) for broadcasting cutting edge info about upping our physical and mental game.

Disclaimer:

The information in this article is for information purposes only. It is not intended to diagnose, treat, cure or prevent any disease. It should not be construed as personal medical advice or instruction. No action should be taken based solely on the contents of this article. Readers should consult appropriate health professionals on any matter relating to their health and well-being. The information and opinions provided here are believed to be accurate and sound, based on the best judgment available to the authors, but readers who fail to consult appropriate health authorities assume the risk of any injuries. The publisher is not responsible for errors or omissions.

pH of the Body, Water & the Food We Eat

Part Four: The 'Myth' of Alkaline Water

The pH of Water Varies Naturally

Water is the basis of all life processes. It is always moving, influencing and being influenced as it penetrates the tiniest organelle or spans the hydrological cycles of inner and outer earth, and even the galaxy.

As hydrogen ions in water interact with substances unique to each locale, water partners with and relinquishes these substances causing changes in the concentration of H⁺. Consequently, the naturally occurring pH of water at different points of supply varies from acidic to alkaline.

pH is a parameter of water quality but pH, on its own, does not determine whether a particular water is beneficial to drink. Waters that are coveted for their health benefits may have an acidic pH. Other beneficial waters may have an alkaline pH.

The 'Myth' of Alkaline Water

The acid-alkaline balance of the body does not benefit in any lasting way from drinking 'alkaline' water. In fact, the chemicals used to artificially make water more alkaline may have questionable health consequences.

Very alkaline water can burden the body. Excess alkaline minerals, which are typically not bio-available, fall out of solution leaving deposits inside the body similar to the troublesome lime scale that forms in geographical locations with hard (alkaline) water.

'Alkaline' Does Not Mean 'Alkalizing'.

'Alkaline' refers to a pH above 7.

'Alkalizing' refers to the ability to neutralize acids.

An alkaline substance may have no ability to neutralize acids.

A substance does not have to be alkaline to neutralize acids. Some acids are alkalizing.

Bicarbonates in Water

Some naturally sourced waters are alkalizing due to the presence of bicarbonates. Drinking bicarbonate water can be beneficial, especially before a meal. Despite being slightly alkaline, bicarbonates assist the production of hydrochloric acid for digestion which the stomach must produce, on demand, whenever we eat something. [More about bicarbonates in water in a future article.]

The pH of Water from Various Natural Sources

- **Surface water** (from rivers, streams and lakes) is typically somewhat acidic.
- **Ground water** (from aquifers) is typically alkaline.

- **Well water** is typically alkaline due to the ground water source. However, the presence of carbonic acid may cause some well water to become acidic.
- **Rainwater** is naturally acidic.
- **Natural springs** may yield alkaline or acidic water.
- **Seawater** is naturally alkaline.

pH of Bottled Waters

- **Still bottled waters** may be naturally acidic or alkaline. Some are made alkaline artificially to meet public expectations.
- **Sparkling waters** are acidic due to the presence of CO₂ in the water.

Proper Hydration Assists pH Balance

The body, in its wisdom, deftly maintains its intricate and multi-layered requirements for acid/alkaline balance despite the acidity or alkalinity of the substances we ingest. This interplay between acids and bases takes place in the presence of water. Keeping yourself well hydrated with vibrant and contaminant free water is one of the best things you can do to help this pH balancing process.

The Urge to Breathe is Directly Related to pH Balance

Interestingly, the urge to breathe is primarily stimulated by the body's need to control CO₂ and pH levels of the blood, not by the need for oxygen.^{25, 26} Rapid breathing after running is the body's way of rebalancing itself by expelling excess acid (CO₂) created during vigorous exercise. On the other hand, deep and slow breathing conserves CO₂ by keeping it longer in your lungs. When you are relaxed your system becomes more alkaline which requires the balancing presence of CO₂.

Drink Good Water and Breathe to Assist pH Balance

The body is a complex organism orchestrated by an unfathomable Wisdom that manages your various internal pH levels. You can assist simply by drinking contaminant-free water and by cultivating good breathing habits.

Next time you feel stressed, drink some good water and remember to breathe more deeply. Get out more in nature, exercise your lungs and inhale that good air.

References for Part Four:

25. <https://www.boundless.com/physiology/textbooks/boundless-anatomy-and-physiology-textbook/respiratory-system-22/respiration-control-212/chemoreceptor-regulation-of-breathing-1039-6384/>
26. <http://www.scq.ubc.ca/waiting-to-inhale-why-it-hurts-to-hold-your-breath/>

Disclaimer:

The information in this article is for information purposes only. It is not intended to diagnose, treat, cure or prevent any disease. It should not be construed as personal medical advice or instruction. No action should be taken based solely on the contents of this article. Readers should consult appropriate health professionals on any matter relating to their health and well-being. The information and opinions provided here are believed to be accurate and sound, based on the best judgment available to the authors, but readers who fail to consult appropriate health authorities assume the risk of any injuries. The publisher is not responsible for errors or omissions.