How Does Alkaline Water Work To Extend Life?

by Sang Whang MD

Alkaline water and stomach acid

We all know that we get old and sick because of excess acid accumulation in our body, and that alkaline neutralizes acid; therefore, drinking alkaline water makes sense. But do we know how alkaline water works in our body? Some doctors say that our stomach acid will kill the alkalinity and, therefore, drinking alkaline water is useless. How do we answer that? Have you thought about that?

This is what happens in the stomach.

The stomach maintains its pH around 4.0. When we drink high pH alkaline water, the water pH comes down; but stomach pH goes up as a result. How high it goes up is a function of the amount and the pH of the alkaline water we drink. When the stomach pH rises above 4.5, the stomach will produce more hydrochloric acid and put it in the stomach to bring the stomach pH down to below 4.0.

How the stomach produces hydrochloric acid is not well known to medical doctors, except pathologists. The chemical formula of hydrochloric acid production is:

$H2O + CO2 + NaCl = HCl + NaHCO3$

Water, carbon dioxide and sodium chloride (table salt) produce hydrochloric acid and sodium bicarbonate. The hydrochloric acid goes into the stomach, and the sodium bicarbonate goes into the bloodstream.

[Note: An interesting fact is that the formula above looks simple, but no scientist in a laboratory can produce hydrochloric acid and sodium bicarbonate from water and carbon dioxide and salt. Only living cells can do that. In the lab, the reverse is easy: adding hydrochloric acid to sodium bicarbonate will instantly produce water, carbon dioxide and salt.

Sodium bicarbonate is an alkaline buffer in our blood. In our blood, there are alkaline buffer and acid buffer constantly monitoring the blood pH to maintain a constant blood pH of 7.365. When the blood becomes too alkaline, the acid buffer works to bring the pH down; and when the blood becomes too acid, the alkaline buffer works to raise the pH.

Alkaline buffers are bicarbonate ($HCO3^-$) mated with alkaline minerals. Examples of them are sodium bicarbonate ($NaHCO3$), potassium bicarbonate ($KHCO3$), calcium bicarbonate ($Ca(HCO3)2$) and magnesium bicarbonate ($Mg(HCO3)2$). Acid buffer is mainly carbonic acid ($H2CO3$), a water and carbon dioxide combination. Carbohydrate completely burnt becomes carbon dioxide ($CO2$) and water ($H2O$); therefore there is no shortage of acid buffer.

Discovery by Dr. Linda Frassetto

In 1996 Dr. Lynda Frassetto at the University of California, San Francisco, discovered that as we age, starting around age 45, we lose the alkaline buffer – bicarbonates - in our blood. By the age of 90, we lose 18% of bicarbonates in our blood.

Journal of Gerontology: BIOLOGICAL SCIENCES, 1996, Vol. 51A. No. 1, B91-B99
By Dr. Lynda Frassetto of University of California, San Francisco
Dotted line added by Sang Whang

Insufficient amount of bicarbonates in our blood reduces our capabilities to manage (neutralize and dump) the acid our body produces. This is the cause of aging. The age of 45 is the average age when human beings start to show symptoms of diabetes, hypertension, osteoporosis and many other adult degenerative diseases. And since we cannot manage the acid, we accumulate acidic wastes in our body. These wastes show up as cholesterol, fatty acid, uric acid, urate, sulfate, phosphate, kidney stones, etc.

Which is the most important property of alkaline water?
There are many properties in alkaline water, such as surface tension, structure of water, molecular size, oxygen reduction potential, pH value, which alkaline minerals are used to sustain the pH value, etc. However, with the exception of the water's pH value, nothing else helps the blood receive bicarbonates. Also, all the other properties change as the water reaches the stomach and interacts with the stomach acid. Even the pH value changes in the stomach. However, the change of pH value causes the stomach to produce hydrochloric acid that goes into the stomach, and the bicarbonates go into the bloodstream. The most important function of alkaline water is to increase bicarbonates in the blood because we lose bicarbonates as we age.

When we say that we alkalize our body, we don't necessarily mean increasing our saliva pH or urine pH; it means increasing the bicarbonates in our blood. The blood pH does not change, but the ability of our blood to neutralize acid in the body increases.

In the January/February 2003 issue of American Industrial Hygiene Association Journal, Dr. Gospodinka R. Pradova published the result of a 10-year study of industrial pollution in Bulgaria. The study compares two groups of people in a plastic manufacturing plant: one group working in the plant with chemical pollution, the other in the non-polluted office environment of the same company. The conclusion shows that people living/working in a polluted environment have less amount of bicarbonates in their blood than people working in a clean environment.

We live in a world that was changed from an agricultural environment to an industrial environment, which produces more pollution. Our stressful life-styles create more acid, which causes us to use up more bicarbonates. Some foods are more acidic than others, especially, high protein meat products and highly acidic soft drinks. These are the reasons why we lose bicarbonates in the blood as we age.

The medical society considers the reduction of bicarbonates in the blood as an inevitable fact of aging. I argue that the reduction of bicarbonates in the blood is the cause of aging and diseases, not the result of aging. As long as we can replenish bicarbonates in the blood, we don't have to age!

This is the good news about alkaline water!

When to drink alkaline water
Since bicarbonates enter the bloodstream only when the stomach produces hydrochloric acid, it is important that we drink as high a pH value alkaline water as possible. I recommend we drink alkaline water on an empty stomach. On an empty stomach, the stomach pH value may be high but the amount (volume) of hydrochloric acid in the stomach is small; therefore, drinking high pH (9.5 to 10) alkaline water will raise the stomach pH relatively high. That may cause the stomach to produce more hydrochloric acid, allowing more bicarbonates to enter the bloodstream.

Another possibility is that alkaline water may pass into the intestine immediately, since there is no solid food in the stomach to be digested. When that happens, the blood will absorb alkaline water into the bloodstream from the intestine. If alkaline water is introduced directly into the bloodstream from the intestine, the acid buffer (carbonic acid, H2CO3) will interact with the alkaline water to bring down the blood pH and the acid buffer will become the alkaline buffer.

$Ca(OH)\ 2 + 2(H2CO3) = Ca{+}{+}(HCO3{-})2 + 2(H2O)$

An increase of bicarbonates in the bloodstream will prevent aging and the onset of adult degenerative diseases. Now you know the scientific mechanics of how alkaline water extends life.

The above example is based on calcium hydroxide-rich alkaline water. This kind of water is produced with a water ionizer because the alkaline mineral in tap water is predominantly calcium.

Only alkaline water can extend your life!