

Change Your pH, Change Your Life

Recently, in my newsletter and on my Facebook page, I've been covering several topics related to digestion, including acid reflux and gastroesophageal reflux disease (GERD). These problems have skyrocketed and become a cash cow for pharmaceutical companies and surgeons.



Dr. David Williams

Currently, about 30 percent of the US population suffers from GERD, and most cases are treated with drugs like Nexium, known

as proton pump inhibitors (PPIs). Unfortunately, PPIs don't eliminate the symptoms in as many as

40 percent of these people. (I say "eliminate the symptoms" because, in the best-case scenario, that's all they do—treat the symptoms and not the underlying cause.)

When PPIs don't work, patients are often given antidepressants in an effort to treat the symptoms. When those fail, gastroenterologists have no problem performing surgery. I have no doubt future historians will look back in shock at the way GERD was being treated in the early 2000s.

My articles and posts on GERD and acid reflux have triggered numerous questions, many of which involve the role of pH (acidity/alkalinity) both in the stomach and of the diet. Although I'll answer many of these questions concerning the stomach, it's important to understand that pH levels don't just influence digestive capabilities. I'm going to share some of the latest research that illustrates how pH levels have a profound effect on overall health. Once you have a better understanding of the role of pH, and more importantly what can be done to change it, you'll have an amazing tool that can dramatically improve your health.

Many people (including doctors) get confused about this topic. This is particularly true

when it comes to the acidity of the stomach.

When there's a lack of acid production in the stomach, several things start to happen. Proteins aren't broken down sufficiently, leading to excess gas formation and pressure, which can force the stomach contents into the esophagus. Adequate amounts of acid are needed to help open and close the sphincter muscles that keep stomach contents from emptying too soon into the small intestine or moving upward into the esophagus.

When acidic stomach contents do move into the esophagus, you experience the heartburn associated with GERD and acid reflux.

Baking soda (sodium bicarbonate), an ingredient in many over-the-counter antacids and also a baking staple in practically every kitchen, is alkaline and can help neutralize the acid and provide temporary relief. But in an attempt to continue the digestive process, the stomach will react by producing another surge of digestive acids. This is why baking soda and other antacids will often trigger a rebound reaction, requiring ever-increasing doses.

Baking soda doesn't lower stomach acid production. It only neutralizes what's been released.

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You will observe with concern how long a useful truth may be known, and exist, before it is generally received and practiced on.

— BENJAMIN FRANKLIN

However, that's not to say that baking soda is harmful or that it can't be helpful when used correctly. In fact, it's very safe. It has been widely used for centuries, primarily in cooking and baking. It reacts with other components, creating carbon dioxide gas, which is the process that makes dough rise (without the need for yeast).

The formation of this carbon dioxide is what makes you burp after ingesting baking soda. This is the basis for a not-so-accurate test to determine if your stomach is making enough stomach acid. This test is performed by mixing 1/4 teaspoon of baking soda with 4 ounces of water. You drink this mixture in the morning before eating anything, then you time how long it takes to burp. Do this for three consecutive days. Each day if you haven't burped within three minutes, it may indicate insufficient stomach acid production.

I say this test is not that accurate because when there's no digestion going on in the stomach, acid levels will naturally be lower. And whenever you drink any liquid on an empty stomach, the fluids typically pass right through the stomach and are absorbed further down the intestinal tract. In fact, this just happens to be the best way to take baking soda without

neutralizing the beneficial effects of stomach acid.

Before I go further into discussing how baking soda can be used to help some common health complaints, it's best that you know a little bit more about pH values and variances within the body.

Understanding pH

The pH scale goes from 0 (most acidic) to 14 (most alkaline), with a pH of 7 being neutral.

The survival of both our environment and our bodies is dependent on being able to maintain the appropriate range of pH levels. In fact, as the pH of our oceans has gradually become more acidic over the past century (dropping from 8.2 to 8.1), we are starting to see events like the collapsing of the coral reefs.

For optimal minerals and micronutrients in our food, the ideal soil pH should be slightly acidic, between 6 and 7. When the pH is too acidic, it results in decreased levels of available calcium and magnesium. When the pH rises higher than 7 and becomes more alkaline, there's less availability of minerals like copper, iron, manganese, and zinc.

Our blood serum must be slightly alkaline, between 7.38 and 7.42, to survive. Our body has

numerous mechanisms in place to ensure that serum pH stays in this range. However, other areas of the body—such as the skin and the gastric, urinary, and vaginal tracts—are on the acidic side. The acidity in these areas helps limit the overgrowth of pathogenic microbes.

Besides the blood, other areas of the body contain fluids that are more alkaline, usually to neutralize excess acid. These include pancreatic, bile, and cerebrospinal fluids.

The pH level can change dramatically from one area of the body to another. This is normal and healthy. I mention this because some people get the idea that all the acid in the body needs to be neutralized. While there are benefits to "alkalizing" the body, you do still need adequate amounts of stomach acid to remain healthy. Actually, in this day and age, it's rare for anyone to have too much stomach acid. Low stomach acid is why our society experiences so many digestive problems. Setting aside the benefits of stomach acid and the need for digestive enzymes, there are some known benefits of alkalizing other parts of the body by consuming baking soda and certain other foods.

Our bodies are constantly trying to remove excess acid and buffer

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NEWS TO USE *from around the world***Bacteria and the Brain**

WACO, TX—Researchers at Baylor College of Medicine have found more evidence of how influential various forms of bacteria can be when it comes to brain function.

The researchers discovered that female mice fed a diet that was roughly equivalent to eating fast food on a regular basis gave birth to young mice with behavioral deficits similar to autism in humans.

After the mice were weaned, they were placed in cages with mice that exhibited normal social behavior. It was easy for the researchers to perform fecal transplants on the mice since mice eat each other's poop. Within four weeks, the researchers noticed the offspring of the mothers fed the fast food

diet showed an improvement in their social behavior.

Researchers then began sequencing the various forms of bacteria in the feces to determine what specific type of bacteria might be deficient in mice that exhibited behavioral deficits. It turns out that the mice born to mothers on a fast food diet had a nine-fold reduction in the amount of *Lactobacillus reuteri*.

When the researchers began adding this single strain of bacteria to the food of young mice with autistic behaviors, their social behavior returned to normal. ([Cell 2016 Jun;165\(7\):1762–75](#))

Lactobacillus reuteri was originally isolated from human breast milk and is known to promote the production of oxytocin. Oxytocin has been called the bonding hormone and

is known to play a role in social behavior. It seems all children with low oxytocin levels have problems when it comes to functioning socially. A nasal spray of oxytocin is one form of treatment used to help treat children with autism.

It appears from this latest study that supplementing with the probiotic *Lactobacillus reuteri* may be another way to increase oxytocin levels in children with social/behavioral problems or autism. Hopefully human studies are coming. Fortunately, for anyone with an autistic child, standalone *Lactobacillus reuteri* probiotic supplements are easy to find.

This study illustrates the importance of a healthy diet by pregnant mothers. It also highlights just one of the many benefits of breastfeeding. ■

its effects. When baking soda is processed in the body, bicarbonates are produced. Bicarbonates are alkaline buffers that help neutralize excess acid. As we age, it often gets more difficult to neutralize excess acids and the associated waste products.

A few signs/symptoms that can indicate overacidity in body tissues include skin eruptions, sinus problems, headaches, allergies, recurring colds/flu, and inflammatory autoimmune conditions.

In one of the more exciting research studies I've seen

lately, it appears that many autoimmune diseases may be quelled through the use of baking soda. ([J Immunol 2018 May;200\(10\):3568–86](#))

Researchers found that taking baking soda orally stimulates anti-inflammatory pathways in spleen cells. The spleen is part of the immune system and not only filters blood cells, it stores many of the white blood cells that fight infections.

After the consumption of water with baking soda daily for two weeks, the immune cells

(macrophages) in the spleen shifted from being on high alert and attacking cells, to more of a calm, maintenance, non-attack mode. There was also a similar shift in other immune cell types that keep the immune system from attacking the body's own tissues. The same anti-inflammatory shift in the spleen was also found in the kidney and peripheral blood. In other words, the entire body shifted its profile from inflammatory to anti-inflammatory.

In short, baking soda can reduce the excessive inflammatory response that commonly occurs

(continued on page 7)



Restoring Gut Flora After Antibiotics

Question: *Over the years, I've needed numerous rounds of antibiotics. I take probiotics, but I still don't think my system has ever fully recovered. I understand that antibiotics destroy both the good and bad bacteria in the gut. You say that sometimes antibiotics are necessary, but they continue to be overused. Agreed. However, everyone I know has taken antibiotics many times during their life and will probably need them in the future. Since antibiotic use seems to be inevitable these days, can you please explain what steps we can take to restore the beneficial bacteria following a round of antibiotics? — J. K., Chicago, IL*

Answer: I have no doubt there are tens of millions of individuals whose intestinal flora remains disrupted after the use of antibiotics and other drugs.

Here are some guidelines and tools you can use to help reverse this problem. I'd suggest keeping these on hand because, as you say, antibiotic use seems inevitable. As I'll explain, though, antibiotics are only part of the problem.

Research has shown that antibiotics can permanently transform the natural balance of bacterial strains and have long-lasting detrimental health effects. The use of antibiotics early in life has been shown to eradicate essential bacteria that help immune cells mature. Since antibiotics have become the most common prescription given to children, we've seen an increase in diseases of the immune system and those related to metabolism (like obesity).

A weeklong course of antibiotics can dramatically change the gut's microbiome for a year or longer, and antibiotic-resistant genes can remain practically forever. Antibiotic-resistant strains can persist due to a lack of "selective pressure" that would normally come from higher numbers of beneficial strains.

Most people aren't aware that this imbalance (dysbiosis) in the gut can be directly responsible for

many health problems, including *Clostridium difficile*; Crohn's disease; ulcerative colitis; colon cancer; acid reflux; vitamin deficiencies; allergies/asthma; vaginal, bladder, urinary tract, and yeast infections; high cholesterol; high blood pressure; cardiovascular disease; neurological disorders; cognitive, behavioral and mood disorders; and type 1 and 2 diabetes.

Here are some signs that your healthy gut flora has been damaged:

- **Upset stomach/indigestion**
- **Abdominal cramping/bloating**
- **Excess gas**
- **Diarrhea**
- **Constipation**
- **Yeast infection**
- **Chronic bad breath**

How to Restore Gut Flora

The good news is there are ways to help speed up the process of restoring gut flora after the use of antibiotics. These are the steps you should take:

Increase your intake of probiotics. These beneficial bacteria are the underlying key to restoring the gut microbiome following antibiotics. They need to be ingested daily to reestablish the beneficial bacterial growth in the gastrointestinal tract that has been destroyed by antibiotics. This can be accomplished by eating live fermented foods and taking probiotic supplements.

After antibiotic use, it's vital to gradually introduce fermented foods into your diet. Don't stick to one particular food; try to alternate and experiment. Variety is the key to having a healthy gut and immune system. Each type of fermented food contains its own unique strains of bacteria that will help "seed" and start to balance your own gut garden. Some examples include yogurt, buttermilk, whey, kefir, sauerkraut, kimchi, miso, natto, and kombucha.

Probiotic supplements also need to be taken regularly following antibiotic use. They provide constant replenishment of beneficial bacteria. It has been suggested that for every week of antibiotic usage, a probiotic needs to be taken for at least a month.

Personally, I feel daily probiotics need to be taken for a lifetime. Antibiotics aren't the only drugs that disrupt and destroy the microbiome; common

medications like antacids and over-the-counter and prescription pain medicine disrupt gut bacteria.

Probiotic supplements don't replace fermented foods. But they do provide the daily "insurance" for the days you can't or don't want to eat those foods, as well as a consistent, steady supply of beneficial bacteria, which is necessary to restore and maintain the microbiome.

Here are some of strains of bacteria to look for in a quality probiotic supplement:

- *Acidophilus*
- *Fermentum*
- *Plantarum*
- *Rhamnosus*
- *Salivarius*
- *Bifidum*
- *Longum*

For the bacteria to become reestablished in the gut after a course of antibiotics, they must be "fed" with fiber-rich foods. Beneficial bacteria in the gut feed on indigestible fiber. These are the compounds and fibers that your body can't digest. Bacteria break these fibers down through the process of fermentation. Byproducts of this fermentation process include various vitamins and compounds that support our immune system and essential fatty acids that provide fuel for the cells that make up the intestinal wall.

Some of the fiber-rich foods that feed beneficial bacteria in the gut include:

- Asparagus
- Artichokes
- Squash/zucchini
- Mushrooms
- Kale
- Onions
- Garlic
- Leeks
- Beans and legumes
- Nuts and seeds
- Sweet potatoes
- Green bananas
- Whole fruits

There are some other things to keep in mind when changing your diet to a more fiber-rich selection:

When picking fruits and vegetables, try to find those that are grown locally. Locally grown fruits and vegetables have soil bacteria and organisms that are native to your specific climate and environment. They are part of your personal ecosystem and can make your system more compatible with local pollens or allergens.

Add walnuts. Walnuts have been shown to specifically increase the microbes that produce butyrate, the primary energy source for intestinal wall cells. They also increase levels of the bacteria *Faecalibacterium*, which reduce inflammation and improve insulin sensitivity. Walnuts also lower LDL cholesterol and microbial-derived secondary bile acids, which have been associated with a higher risk of colorectal cancer.

In one study where participants ate 42 grams (roughly 1/3 cup) of walnuts daily, all of these benefits were observed within three weeks. (*J Nutr* 2018 May; doi:10.1093/jn/nxy004)

If you find eating a handful of walnuts difficult, then you can easily make homemade walnut milk. (This recipe produces enough milk for three days. I wouldn't make much more than that because homemade walnut milk doesn't last long—three days, tops, from personal experience.)

- Place a cup of raw walnuts in a glass bowl and cover with an inch or two of water. Let them soak overnight. The next morning, drain and rinse.
- Dump the walnuts in a blender, add 4 cups of water, and blend on high for two minutes.
- Using a cheesecloth, strain the milk and squeeze any remaining milk from the cloth.
- Drink one-third of the milk, and store the remainder in an airtight container in the refrigerator. Drink the remaining milk over the next two days.

I don't sweeten or add anything to my nut milks, but some people like to include a little vanilla extract, cinnamon, or xylitol during the blending process.

If your intestinal tract is especially sensitive, you may have to go easy on the high-fiber foods until some healing takes place. Bone broth is a natural probiotic and loaded with healing collagen. Baked fruits and vegetables are easier to handle than raw ones. Baking apples helps release pectin, which soothes the intestinal tract. Baked sweet potatoes

are another great option, particularly when you add a little virgin coconut oil. Coconut oil is a good source of medium chain fatty acids.

Of all the apples, Granny Smiths have the highest levels of phenolics, proanthocyanidins, and dietary fiber. And as a bonus, unlike other apples, Granny Smith apples encourage the growth of specific strains of bacteria that are predominant in the guts of lean individuals.

The extra intestinal gas formed when beneficial bacteria break down dietary fiber through fermentation is one of the most common complaints when first starting probiotics. The excess gas can be especially pronounced after a round of antibiotics, when the entire pH of the gut has changed. Understand that gas is normal and a sign that the beneficial bacteria are working. Typically, after two to four weeks, the pH will normalize and things will calm down. It's perfectly okay to skip taking the probiotic for a day or two and let the bacterial activity proceed more slowly if you need to.

You may have to rebuild the protective mucus lining of the gut after long-term antibiotic use.

Extended antibiotic use damages the protective mucus lining of the gut. When this happens, it becomes difficult for beneficial bacteria to establish a foothold in the intestines. Therefore, many people who consume probiotic supplements and foods after using antibiotics come to the conclusion that they don't work.

The destruction of the protective layer exposes the intestinal wall to the effects of harmful bacteria, yeasts like *Candida albicans*, fungi, and other pathogens. This results in reduced amounts of Immunoglobulin A (IgA) in the mucus intestinal barrier. IgA is the primary protective antibody in the gut. Symptoms of low IgA levels include inflammation of the gastrointestinal tract, resulting in problems like ulcerative colitis and Crohn's disease, food allergies, depression, diabetes, rheumatoid arthritis, thyroid issues, dermatitis, etc.

There are several ways to help rebuild the protective mucus barrier and increase IgA levels, giving beneficial bacteria a more stable platform to colonize:

- **Numerous probiotics have been shown to increase IgA levels.** Some of these include *L. reuteri*, *L. casei*, *B. bifidum*, *B. lactis*, and *L. helveticus*. I'm sure future research will reveal others. This is just one reason why taking a quality probiotic supple-

ment is so important after using antibiotics.

- **A special yeast probiotic called *Saccharomyces boulardii* has been shown to displace harmful yeasts like *Candida*, and it sets the stage for repair by increasing IgA levels.** If your probiotic supplement doesn't already contain this beneficial yeast, it can be purchased as a standalone supplement. I suggest starting with one capsule a day of this yeast taken between meals. After a few days, increase to two capsules and gradually work up to three or four capsules a day between meals. Normally, it only needs to be taken for a month to six weeks.
- **If you have a juicer, cabbage juice can help repair a damaged gut wall.** It contains protective mucin-like compounds and loads of lactic-acid-producing beneficial bacteria. Anywhere from a cup to a quart a day can work wonders.
- **The amino acid L-glutamine acts as strong anti-inflammatory compound and promotes the growth and restoration of the intestinal lining.** I suggest 5 grams of powder daily when trying to restore normalcy after antibiotic use. Glutamine is one of the primary nutrients needed to maintain an intact intestinal barrier. It's at the top of the list when it comes to nutrients used to heal leaky gut syndrome.

There's one final thing to consider, which many people do not realize. Drinking chlorinated water also destroys beneficial bacteria in the gut. After all, chlorine and other chemicals are added to drinking water to eliminate bacteria.

If your drinking water is chlorinated, you're fighting an uphill battle in trying to maintain the good bacteria in your gut. If you're not fortunate enough to have your own uncontaminated deep-water well or pristine spring in your back yard, you have a few options. You can filter or distill your water. You can also let a pitcher sit uncovered overnight to help break down the chlorine or, even better, add two teaspoons of powdered vitamin C to neutralize the chlorine.

Antibiotics are wonderful tools and they save lives by fighting off serious infections. Unfortunately, they have been overused without any regard for the negative effects they have on our microbiome. Obviously there may be times when you absolutely need antibiotics or other medications, but hopefully, by following these suggestions, you can minimize their long-term side effects. ■

with certain allergies, asthma, diabetes, hypertension, and autoimmune conditions like rheumatoid arthritis, multiple sclerosis, irritable bowel, kidney disease, and neurodegenerative conditions.

Considering the prevalence of autoimmune disease is increasing across the world (one study reported annual increases as high as 7 percent per year), the usefulness of something as inexpensive and universally available as baking soda should not be overlooked. (*Inter J Celiac Dis* 2015;3(4):151–55)

There are at least 100 different diseases that have been classified as autoimmune in nature. This means that baking soda has the potential of helping tens of millions of people—yet conventional medicine has shown little, if any, interest. To see a complete list of autoimmune diseases, I recommend visiting aarda.org/diseaselist. If you (or a loved one) suffer from any of these diseases, consider adding baking soda to your treatment protocol.

That study involved rodents, but a follow-up study was conducted in humans and showed the same results. In that experiment, a daily dosage of 2 grams of baking soda mixed with 250 milliliters water was given to participants. (For us metric-challenged individuals, that works out to a little less than 1/2 teaspoon of baking soda mixed in about 1 cup of water. And, as I mentioned earlier, to avoid interfering with any stomach acid deficiencies or acid reflux issues, it is recommended that this baking soda mixture be consumed once a day between meals.) The anti-inflammatory shift was sustained

in humans for at least four hours (and three days in the rodents).

At this point, the researchers aren't suggesting that anyone take baking soda for any disease. It's a line we've seen over and over: "More studies need to be conducted..."

I can't tell you with certainty exactly what conditions might benefit from this safe, simple, inexpensive therapy. There haven't been specific studies focusing on each and every autoimmune disease. The only area where it has been extensively studied and proven to be helpful is in chronic kidney disease.

One English study conducted almost 10 years ago looked at 134 patients with chronic kidney disease and low blood bicarbonate levels. The patients were randomly divided to either standard care, or given a total of 600 mg of baking soda supplements orally (divided into three 200 mg doses spread out throughout the day).

During the following two-year period, the kidney disease progressed rapidly in only 9 percent of those patients taking baking soda, compared to 45 percent in the standard care group. In the baking soda group, just 6.5 percent developed end-stage renal failure (which requires dialysis), versus 33 percent in the standard care group.

Despite the additional sodium intake (because baking soda is *sodium* bicarbonate), there was no increase in blood pressure or fluid retention in those taking the baking soda. While baking soda may not provide an outright cure, it may at least slow down

the progression of kidney disease without any harmful side effects. (*J Am Soc Nephrol* 2009 Sep;20(9):2075–84)

In addition to toning down an overactive immune system and reducing inflammation, baking soda has been shown to correct acidosis in kidney disorders, make the urine alkaline during bladder infections, minimize uric acid crystallization during gout treatment, and improve athletic performance.

Alkalizing Foods

Alkalizing foods may also play a role in reducing pH and even autoimmune diseases.

When we talk about alkalizing and acid-forming foods, it's important to understand that just because a food is acidic (has a low pH) or alkaline (has a high pH) doesn't mean that's the effect it will have on the body. How it is classified depends on how the food changes the acidity or alkalinity of the body fluids in the kidney and urine *after it is digested*.

Scientifically, this is measured using what is called potential renal acid load (PRAL). A higher PRAL score (indicated by a positive number) means that a particular food is very acid forming. A lower PRAL score (indicated by a negative number) classifies that food as alkaline and one that produces more bicarbonates.

Lemons are a great example of acidic foods that have alkalizing effects in the body. While they have a very acidic pH of around 2.0, after they are digested, they have a PRAL score of -2.5 to -2.9, which is alkaline. So despite being

acidic in nature, lemons help alkalize body fluids.

Generally speaking, fruits and vegetables have lower PRAL scores, and processed foods, meats, white sugar, flour, caffeine, and dairy have higher PRAL scores. However, this is just a general rule. Many foods fall in between these scores and vegetables can range anywhere from very alkaline to acidic.

Also keep in mind that a PRAL score doesn't determine whether a food is "good" or "bad." Foods like fresh fish, meats, butter, beans, etc. may be acid forming, but they provide protein and other essential nutrients and can be part of a healthy diet. Like most things in life, optimal health requires a balance. I suspect many inflammatory and autoimmune diseases are caused at least in part because most people don't have this balance in their diets. A chronically acidic diet (such as the standard American diet) without the benefit of enough alkalizing foods increases inflammation throughout the body.

Studies show that switching to a low-PRAL, alkaline diet can have almost immediate benefits.

One study recently found that after just four to nine days on a low-PRAL diet, individuals experienced a significant boost in urinary pH, increased their exercise time to exhaustion by 21 percent, and had a 10 percent increase in lipid oxidation (fat burning).

Participants were told to minimize their consumption of acid-promoting foods like meats, cheeses, and most common grains and to eat between six and eight

cups of vegetables and over four servings of fruit every day. Since vegetables and fruits often don't provide satiety, they were advised to eat frequently and to include more energy-dense foods such as starchy vegetables (sweet potatoes), dried fruits (dates and raisins), and high-fat plants like nuts, seeds, coconut, and avocados. Higher-protein, moderate-PRAL foods like legumes, yogurt, egg whites, and quinoa were also allowed.

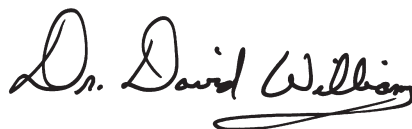
The goal of the low-PRAL diet was to achieve a urine pH equal to or greater than 7. Fasted morning urine pH was self-tested by the participants using pH strips. To achieve that pH range, they were asked to make adjustments in their diet. (*J Sports Sci Med 2015 Jun;14(2):364-71*)

If you're interested in monitoring your own pH, you can get 100 Jellas Universal pH test strips for around \$10 on Amazon.

Keep in mind, no baking soda was used in this study. Instead, the increase in bicarbonates and the buffering effects in the body were a direct result of the change in food choices only.

For anyone with an active autoimmune disease and/or chronic inflammation, following a low-PRAL diet could be a game changer. And the combination of an alkaline diet *plus* baking soda could be a lifesaver.

Until next month,



This Month Online



Visit my website at **drwilliams.com**, where you'll find information and recommendations for many of your top health conditions, including:

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