Balancing Body Chemistry

How Reducing Acid Can Unleash Abundant Energy and Healing

Go from ACID to ALKALINE and watch joint pain, digestive problems, mood swings, memory lapses and fatigue miraculously disappear.

By Michael Cutler, M.D.

A MEDICAL TREASURY

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## Contents

**Introduction** ........................................................................................................ 7

**Chapter 1:**

pH Medicine: Preventive Medicine that
Can Save Your Life ............................................................. 11

**Chapter 2:**

Your Buffering Minerals: Ingredients for Better Health .... 21

**Chapter 3:**

Acidosis Leads to Disease ......................................................... 33

**Chapter 4:**

Acid and Alkaline Foods ....................................................... 51

**Chapter 5:**

The pH of Thoughts and Emotions ...................................... 63

**Chapter 6:**

Monitor Your Own pH ............................................................ 67

**Chapter 7:**

The Power of Alkalinity ........................................................... 71

**Alkalizing Recipes** ...................................................................................... 76

**Appendix: The Meaning of Acidity** ......................................................... 105

**Index** .............................................................................................................. 119
Introduction

We’re all familiar with the destructive effects of a strong acid. Just think about how a tiny drop of a powerful chemical like hydrochloric acid could eat away your skin! That’s something you’d want to avoid at all costs. But did you ever realize that acidic build-up inside your body may be causing long-term damage that’s just as serious? This hidden acidity may not cause the same sharp pain as the acid you can see and feel, but right now it may be making you more vulnerable to chronic problems like heart disease, cancer and arthritis.

The great news is that these problems can be stopped. With simple changes in lifestyle and diet, you can shift your internal environment away from acidity to a healthier alkalinity. The results can be the kind of wonderful well-being you’ve always dreamed of.

Profound Effects

As a medical doctor specializing in natural therapies, I wasn’t always aware of the profound effect that the acid-base balance of the body has on health. When I was told that an acidic pH (a measure of acidity or alkalinity) in the body’s tissues paves the way for degenerative diseases including cancer, cardiovascular disease and hypertension, osteoporosis, obesity, premature aging, diabetes and many others, I was stunned. This was not taught to me in medical school or in residency training at all.

In fact, I learned that what you eat and drink determines how acid or alkaline your internal environment becomes. Plus, exposure to the toxins and pollutants you encounter every day at home, at work and in the outdoors can also induce acidity and make you age faster.
When I first encountered these perspectives on physiology, I immediately decided to dig deeper into the science of acidity and health. I already knew that the body constantly works to maintain a delicate acid/alkaline balancing act, keeping the blood at a critical homeostatic pH of 7.35 to 7.45. (The term pH refers to the acidity or alkalinity of a substance, 7.0 being the neutral level of most water. Above 7.0 represents increasing levels of alkalinity. Below 7.0, substances become exponentially acidic.)

Before I learned of this aspect of health, like most doctors, I had no idea how it operated. During my medical career, I’ve tried to keep an open mind about these types of complementary medical ideas. But, unfortunately, most physicians believe that if a health concept isn’t part of standard medical training, it can’t be relevant.

In any case, I was initially a little skeptical of the health claims by Dr. Theodore Baroody, author of *Alkalize or Die*. I didn’t think of him as credible, even though he had earned a wealth of degrees including a Doctor of Chiropractic (DC), Naturopathic Doctor (ND), Doctor of Philosophy (Ph.D.), Certified Nutritional Consultant (CNC) and Acupuncturist (Dipl. Acu.).

But now, after first-hand experience, I’ve confirmed the importance of keeping the body alkaline and avoiding acidity. As Dr. Baroody says, “The countless names attached to illnesses do not really matter. What does matter is that they all come from the same root cause... too much tissue acid waste in the body!”

**Research Into Alkalinity**

The importance of keeping your body alkaline is supported by scientific investigation. For example, researchers reporting in the *American Journal of Clinical Nutrition* have noted that “Increasing evidence... suggests that such persisting, albeit low-grade, acidosis, and the relentless operation of responding homeostatic mechanisms, result in numerous injurious effects on the body including dissolution to bone, muscle wasting, kidney stone formation, and damage to the kidneys.”¹
There’s no doubt about it. If you can learn about and apply all the established methods to keep your body in alkaline balance, you may be able to prevent or even reverse many chronic diseases.

**Sorry State of the American Diet**

After I learned about the dangers of chronic acidosis it became clear to me that the standard American diet (SAD) is disastrously acidic and disease-producing. Not only that, but in addition to the harmful effects of our snacks and meals, all of our negative thoughts and emotions also promote acid production in the body.

As a country, the United States will never reach a state of national health until we embrace a healthy eating lifestyle and make it the foundation of our healthcare. We have to become a society that is fully aware of the disease dangers created by processed, nutrient-poor foods that are modified, poisoned and chemicalized to appeal to our taste buds. They may delight our tongues but they destroy our health. Convincing people that they should make better food choices and seek a disease-preventive, alkaline-style diet represents an important step toward better health for everyone.

**Very Little Information**

When I first began investigating the role of pH in the body, I was bothered that there only seemed to be the occasional study of this aspect of health. I didn’t find very much in the peer-reviewed scientific research on the pH of the body and on how foods influence the acid-base balance of body tissues.

But I soon discovered there were some serious researchers investigating this topic. Plus, their work had made it clear that the body’s pH balance can be disrupted by acid-producing food as well as by environmental pollutants, prescription medications and other factors.

In this report on acid/alkaline balance, I begin with a simple and straightforward discussion of pH and how your body chemistry
shifts when you metabolize food. In the process, I clarify how various body tissues and other individual body parts respond to changes in pH. Also important is an understanding of the ways in which your body uses buffering minerals in its attempt to stay alkaline.

The book also includes the experiences of people who have incorporated these alkaline health principles into their daily lives and offers some of the recipes that helped them embark on their new pathway to healthy eating.

With all this exciting information about the wonders your diet can accomplish for your health, you’ll be delighted to follow Hippocrates’ advice to, “Let your food be your medicine.”
The founder of “pH Medicine” was the German physician, Günther Enderlein (1872-1968) whose observations provide whole new vistas of insight into preventive medicine. Fact is, his findings could transform our entire approach to healthcare in America if they weren’t being suppressed by conventional medicine’s obsession with profiting from “sick” care. But in today’s world, a perspective like Enderlein’s, which emphasizes how to stay well with a healthy lifestyle, has been overpowered by modern industrial medicine. The tyranny of the medical-industrial complex favors quick symptom relief by applying the expensive treatments of pharmaceuticals and surgery.

Perhaps the biggest factor in confining Enderlein’s work to obscurity (so far) was the success of the germ theory of disease promoted by the French microbiologist and chemist, Louis Pasteur (1822–1895). Thanks to the fact that Pasteur developed the techniques used for inoculations and stimulating rapid immune responses, mainstream medicine focused on therapies later responsible for the first vaccine against rabies. Pasteur enjoyed dramatic success and was rewarded with intensive attention from the media of his day. His work was reported on the front pages of newspapers around the world as though he had been enshrined in the Medical Hall of Fame.

Subsequently, at the point in Western medical history when Pasteur did his investigations, healthcare came to a fork in the road. One path, the road we unfortunately took, led to the stamp-out-the-symptom mindset that conventional medicine uses to this day.
Under this system, a doctor treats you after you get sick by giving you a drug that suppresses your symptoms. If that drug produces problematic side effects, you get another drug to deal with those. And so on.

But the other possible medical pathway Western physicians could have embraced would have followed the principles of Günther Enderlein. These emphasize preventive medicine and form the foundation for establishing wellness by acquiring healthy lifestyle habits.

**Enderlein’s Wisdom**

Enderlein’s knowledge of human health came largely from his microscopic studies of blood. Using techniques called dark field contrast microscopy and bright field microscopy, he observed the biological terrain of the human body. His observations demonstrated that every individual’s terrain was unique. Fending off disease depends on maintaining the health of the individual’s interior terrain.

When I first learned of this idea—the biological terrain theory of chronic disease—it seemed impossibly abstract. Then I worked alongside the two best microscopists in the state of Utah and it became a phenomenon I could securely grasp.

**Blood Inspection**

When you take a drop of blood from your finger and place it under a high-powered dark-field or bright field microscope, you discover an incredible jungle of microbial life taking place in the tiniest of spaces. Organisms abound, each in a different stage of development. Many are visible in their primitive phases as organisms that are too insignificant to make you sick. But others present the appearance and behavior of bacteria or fungi, which can wreak havoc as invasive pathogens.

There is a direct and obvious correlation: The more a person’s bodily fluids (measured in saliva and urine) climb in acidity, the more prevalent are the advanced stages of pathogenic organisms visible under the microscope. But it’s not an unchangeable situation. As soon as you clean up your diet (by eating fruits and vegetables)
and improve your pH measurements, your blood begins to improve in appearance under the microscope.

Therefore, it can be observed that the pH of the internal milieu (biological terrain) of patients directly correlates with the quality of their diet, emotions and immune status. When the tissues climb in acidity, harmful organisms increasingly thrive, spilling over into the blood stream. To keep these organisms under control, the body has to call the immune system into action. That stimulates the problematic immune response we generally call inflammation. When inflammation goes on too long or grows too intense it can lead to disease. Furthermore, medical researchers are recognizing that inflammation forms the underlying process of all chronic illness.

If you look at the accompanying dark-field microscope photos you can see tiny white threadlike strands called Fila. These metamorphose into more problematic pathogens under the microscope in patients who eat poorly and remain acidic. Sometimes, when you look at blood samples (under the microscope) from extremely ill patients, these form very rapidly right before your eyes.

The photo on page 14 show red blood cells in a patient who has developed an extremely toxic internal terrain. The cells display varying stages of budding off of the cell membrane which pinch off, forming new organisms. (Not new red blood cells.)
The buds then form into long hollow tubes, which develop in just minutes. Also, long beaded strings called Chondrit appear which are well on their way to developing into pathogenic viral forms. In these cases, the harmful acidity imbalance has become very severe.

Let me emphasize that if you think about this from a preventive health point of view, you don’t need to be primarily focused on the invading organisms that are forming in the body. These organisms will always be there in one form or another. The real concern is improving the state of the surrounding body fluids and tissues—the internal milieu. If these are healthy, they restrict the growth and development of unwanted microbes, keeping them from progressing into the more advanced strains that can grow and cause harm. In particular, these pathogenic changes are very worrisome when they take place in the blood since the circulating blood normally helps to stabilize the body. The body’s homeostasis is at serious risk if the blood displays these changes.

Rather than treating sickness that has manifested into disease and using drugs to suppress symptoms, Enderlein’s approach uncovers these types of early warning signs on microscopy. Then, to head off the chronic diseases that can result from these conditions, Enderlein’s philosophy advocates educating threatened individuals in how to eat an alkaline, nutrient-rich diet. For optimal healing, further improvements entails enjoying peaceful and loving emotions and getting physically fit to promote detoxification.
Causes for Acidity

Although we can now recognize that chronic degenerative diseases like heart disease and arthritis are caused by or associated with acidic blood and tissue, we still have to tease out what causes the body’s pH to get seriously out of balance.

There are a number of significant causes. The main ones include:

- Eating a great deal of meat.
- Gaining large amounts of weight and being obese.
- Poor elimination of toxins through the skin, bowel, lungs, kidneys and lymphatic fluids.
- Consuming too many refined, processed, refined-carbohydrate foods.
- Experiencing high levels of stress or other painful emotional build-ups.
- Not consuming enough plant source minerals (from fruits,
vegetables, grains, seeds, nuts).

- Suffering cancer. Cancer cells produce acid in order to sustain themselves, much like bacterial and fungal forms make their own acids. Cancer is the most acidic of all diseases.

- Taking prescription drugs. Pharmaceutical metabolites can persist and cause acidity for years after you’ve ceased taking them.

Then again, acidity may be linked to contaminants in food. For instance, food may contain residues and manufactured ingredients that push the body into an acidic condition. Problematic adulterants include pesticides, herbicides and fungicides along with many food additives such as preservatives, flavoring, bulking agents and appetite stimulators.

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**Environmental Hazards**

Outside forces, besides your own diet and lifestyle, contribute to the body’s acidity. For example, acid rain in your part of the country can render your tap water acidic. Pollution in the air you breathe can fill your lungs with acid residues like hydrocarbons and nitrogen wastes. Indoor pollution adds to the problem. The synthetic chemicals in furniture, carpets and upholstery emit acid-based gases like
formaldehyde, benzene, toluene and xylene that tax your body’s cleansing and detox channels.

In summary, I encourage you to see that the state of your health is a function of the underlying acid or alkaline balance in which all disease develops. Just as distasteful creatures thrive in fetid swamps, we should recognize that chronic disease flourishes in a mistreated body.

Think of it this way: If you want to build a clean swimming hole in a swampy area, you drain the land and do what’s necessary to create a healthy, pleasant environment. The same goes for your internal environment. You can use an alkaline-promoting diet and lifestyle to drain your physiological swamp and banish harmful microbes.

The fact that people’s tissues and fluids are acidic and show signs of degenerative species in the blood on microscopy are a sure sign that they are not eating an alkaline, nutrient-rich diet. It verifies that they are already on the road to falling victim to disease in one form or another. But you don’t have to be a victim. All you need to do is adjust your diet and lifestyle to keep the proper acid/alkaline balance.

**Your Body Makes Acid**

The human body constantly produces acids. After you breathe in oxygen, you breathe out carbon dioxide, in the form of carbonic acid. Your liver makes bile acids which are stored in the gallbladder. Your kidneys excrete uric acid. Your muscles make (and metabolize) lactic acid. Every living cell in your body produces acids as a result of its fundamental metabolism which is called the citric acid cycle or the Krebs cycle.

Your stomach is a significant source of acid. This hydrochloric acid, which aids in digestion, normally remains in the stomach and upper small intestine. However, when this acid travels up the esophagus and into your mouth as heartburn, it’s a sure sign that your physiology is slipping out of balance.
Acidity in your kidneys is similarly desirable. An acid pH in the urine is normal (6.2-6.8), and an extremely acid urine pH (5.0-6.2) is a sign that you are quite acidic and it is being eliminated by well-functioning kidneys. But when your urine pH is highly alkaline it means that you are not eliminating acids well and could be a sign of infection or disease.

The following are acids produced in your body:

- Hydrochloric acid
- Nitric acid
- Phosphoric acid
- Sulfuric acid
- Boric acid
- Hydrofluoric acid
- Hydrobromic acid
- Chromic acid
- Levulinic acid
- Pyruvic acid
- Acetoacetic acid
- Glutamic acid (an amino acid)
- Aspartic acid (an amino acid)
- Methanesulfonic acid (aka mesylic acid)
- Ethanesulfonic acid (aka esylic acid)
- Benzenesulfonic acid (aka besylic acid)
- Toluenesulfonic acid (aka tosylic acid).
- Acetic acid
- Citric acid
- Formic acid
- Gluconic acid
- Lactic acid
- Oxalic acid
- Tartaric acid
- Ascorbic acid
- Proline
- Serine
- Threonine

Acids called keto acids are produced when your body metabolizes amino acids and these also contribute to your body’s organic
acid load. Since acid accumulation increases the production of caustic hydrogen ions (H+) molecules, to offset this production the body relies on buffering partners. The body employs potassium and other mineral salts—best consumed from fruits and vegetables—to produce this buffering effect.

**Compensatory Mechanisms of the Body**

Most disease develops from long-term conditions of chronic acidosis. The late Dr. George W. Crile (1864-1943), cofounder of the Cleveland Clinic, observed, “There is no natural death. All deaths from so-called natural causes are merely the endpoint of a progressive acid saturation.”

Fortunately, the human body contains built-in compensatory mechanisms that can reverse the formation of acids before it reaches a fatal state.

Your blood is the first line of defense in the wonderful system of acid-base compensatory mechanisms. Optimally, if you develop an acid overload condition, your body stores the acid in tissues (causing tissue pH to drop) and the blood compensates by becoming more alkaline—the blood pH increases. Your blood’s ability to do this is linked to the body’s physiological feedback mechanisms that allow adjustments to the amount of oxygen you breathe in and the carbon dioxide in the form of carbonic acid that you breathe out. To keep things in balance, the blood can develop a “respiratory alkalosis” very quickly to offset acidic increases.

If your body is constantly confronted with the acid-forming foods you consume, those foods challenge the body’s ability to stay alkaline. Other factors also increase the difficulty: Acidic environmental pollutants, anxious emotions and shallow breathing. All of these surpass the blood’s ability to detect the acidic changes quickly enough to call on the lungs and breathing processes to offset acidic developments. But the body has further mechanisms it can rely on to help in its quest to stay
It is also important to recognize that the body’s enzymes, which drive the major molecular reactions that sustain life, are impacted by very slight variations in acidity. To keep your enzymes functioning as efficient catalysts to chemical reactions, your body must keep its pH within a very narrow range. If the pH of body tissue and fluids deviates too far to the acid side (or even too far to the alkaline side), cell functions are disrupted. This abnormal behavior can also be observed on a microscope. If enzymatic activity malfunctions for an extended time, cells can become poisoned by their own toxic waste and mutate or die.
Your Buffering Minerals: Ingredients for Better Health

The minerals stored up in your body can act as an alkaline fail-safe mechanism, keeping your pH levels from slipping completely off the charts. For example, if your blood starts to drop too far in its pH, buffering minerals are liberated from the cells and enter the bloodstream to prevent the escalating acidity. In this process, cells essentially exchange their minerals for acidic material circulating in blood. From within the cells, potassium emerges as the initial alkalizing mineral that is released, followed by magnesium and then sodium and finally calcium. (These are the four most critical minerals in your body.) The potassium and magnesium will be excreted, but the sodium is retained and recycled.

Calcium, however, is so abundant in the body, that, over time, it represents the major physiological buffering tool. Of course, to the body this mineral only seems inexhaustible, since so much of it can be withdrawn from your bones. But eventually, if enough is taken from the skeleton, major problems of bone weakness start to appear.

This is precisely what medical researchers have observed in the United States today: Many of us now suffer from very low mineral reserves brought on by eating the modern, acid-producing, standard American diet. That’s why bone and joint weakening conditions like osteopenia, osteoporosis and chronic arthritis are so prevalent. All that fast food is quickly depleting our calcium.

When you force the body, day after day, to neutralize and buffer acids from an acidic diet, you submit yourself to extreme physiological stress. The consequences are dire: Continually
borrowing calcium, sodium, potassium and magnesium from vital organs and bones over a period of years almost inevitably leads to chronic illness.

**Critical for Life**

Your body utilizes over 60 minerals for optimum health, with 16 clearly proven to be critical for life. The more you learn about the powerful benefits of minerals, the more you’ll realize how vital they are.

Minerals are required for cellular energy production, body structure and function. Among other activities, minerals act as enzymes driving the physiological processes that form blood and bones, formulate bodily fluids, propagate the electrical charges that travel down nerves, stimulate the nerve activity leading to muscle movement and transport nutrients across cell membranes. These wide-ranging functions mean that minerals are necessary for your heart to beat, your brain to think, your digestion to process food, your organs to fulfill their duties, your immune system to defend against pathogens and your limbs to move as well as the secretion and circulation of your hormones.

Health is created or destroyed according to the availability of minerals your cells possess. That’s why Linus Pauling, Ph.D. and winner of two Nobel Prizes asserted, “You can trace every sickness, every disease and every ailment to a mineral deficiency.”

**Mineral Categories**

Minerals are generally classified as either macrominerals or trace minerals (microminerals), depending on how much your body needs. The macrominerals, which the body needs in relatively large amounts, include calcium, magnesium, sodium and manganese. However, only minute quantities of the trace minerals are needed for optimum health. The trace minerals include: Boron, chromium, iron, zinc and many others.

From another point of view, minerals can be classified as:
Metallic minerals, chelated minerals, and colloidal minerals:

- Metallic minerals are the ones in elemental forms such as metals, rocks or salts. Examples include sodium chloride and zinc sulfate. These are often available as nutritional supplements. They are usually poorly absorbed by the body.

- Chelated minerals are more easily taken in by the body, usually about 40 percent more efficiently than metallic minerals. The term *chelate* derives from the Greek word for *claw*. These minerals are chelated (linked up to) amino acids. In its molecular structure, the metallic mineral is usually enclosed by the accompanying amino acid making it more soluble in liquid. This structure also makes it more bio-available to the body. Examples include magnesium aspartate and chromium picolinate.

- Colloidal minerals are suspended in liquid form in their natural state—the colloid state. Because they exist as single molecules and not large clumps, they have greater exposure to the liquid (or solvent) in which they are dissolved. This renders them more soluble and bioavailable, absorbable and therefore useful to the body. Plant-derived colloidal minerals possess the best of these useful properties.

Frighteningly, most Americans are only getting about eight minerals in their standard American diet, so there’s plenty of room for improvement. Researchers have also found that a large proportion of U.S. adults eat no vegetables or fruits on a given day. Consequently, they are missing the minerals that can be absorbed from those foods.

Think about your diet. Are you getting living food or just the pale, imitation processed version? Chemical processing, heating, freezing and microwaving destroy the natural configuration of mineral complexes in fruits and vegetables.

The best assurance you have that you consume sufficient minerals is the fact that you eat uncooked, whole foods. Therein is found the best nutrition. Supplements can be useful too, but most are poorly absorbed if they are not chelated or colloidal.
Mineral Story

Calcium

Calcium is central to an American medical paradox. If the U.S. diet is so full of calcium, how come we have the highest rates of osteoporosis and bone weakness?

“Americans consume more calcium-rich dairy foods than almost every other nation and we have one of the highest rates of bone loss. There’s a disconnect here. Dairy may be rich in calcium, but most dairy foods also produce an acid yield,” warns Loren Cordain, Ph.D., professor and researcher at the Department of Health and Exercise Science at Colorado State University.

Calcium is the main mineral constituent of bone alongside magnesium, sodium, potassium and zinc. The Recommended Dietary Allowances (RDA) for calcium is generally around 1,000 mg for pregnant women and young adults, and 1,200 mg for the rest of us.

Aside from its importance in bone, calcium also contributes to the regulation of nerve excitability and muscular contraction. Among my patients, I have seen the effects of too much calcium in the blood: Muscle flaccidity and profound weakness. On the other hand, low levels of blood calcium cause muscles and nerves to be overly-excitable.

It’s important to recognize that you can get plenty of calcium from uncooked fruits, vegetables and soaked grains. And using those as calcium sources are sufficient for good health if you adopt a healthy eating lifestyle.

Natural sources of calcium include:

- Milk products (cheese, yogurt)
- Soybeans
- Sardines
- Salmon
- Sunflower seeds
- Dried beans
- Green vegetables (kale, broccoli, collard greens)
- Whole grains
Remember that cow’s milk may be a good source of calcium, but its benefits to bones are negated by the animal protein in dairy milk, as proven by the many studies which correlate milk drinking with osteoporosis.\textsuperscript{3,4} If you are considering taking supplements, do not use calcium carbonate (which is a form of chalk). Instead, use a much better, absorbable form such as calcium citrate, calcium gluconate or calcium lactate.

**Magnesium**

Magnesium is one of the key minerals necessary to support nerve and muscle function. It is also one of the alkaline minerals found in bone that buffers chronic metabolic acidosis. Magnesium serves as a muscle relaxant and therefore can lower blood pressure.

Taken as a supplement at 500 mg once or twice a day, magnesium acts as a laxative often in the form of magnesium hydroxide (milk of magnesia). The negatively charged hydroxide ion portion (OH-) of magnesium hydroxide, which is technically expressed as Mg(OH)\textsubscript{2}, combines with hydrogen ions (H+) in the stomach to form water. The RDA for adults over the age of 31 varies from 420 mg for men to 320 mg for women and 360 for pregnant women. The best sources are foods like green vegetables, beans (kidney, lima, navy, pinto), peas, nuts, seeds and whole, unrefined grains which are high in this mineral.

Also note that refined, processed grains like white flour or white rice are low in most all micronutrients, including magnesium. For instance, when wheat is processed to white flour, the magnesium-rich germ and bran are removed. That’s one reason to eat whole grain bread as much as possible (if you are going to eat bread at all). Also, hard tap water can provide magnesium.

**Phosphorus**

Phosphorus, like calcium, is required for bone formation. It is the second most abundant mineral after calcium: 75 percent of phosphorus is found in your skeleton. It is a key component of DNA genetic material and RNA. In addition, it is necessary for
many metabolic processes required for life, such as the generation of energy from ATP.

Phosphorus is found in meats, eggs, nuts, dairy products, whole grains and soft drinks. Most Americans ingest far more phosphorus than necessary, which can be harmful. Our sources of this mineral include bread, burgers, fries, soft drinks, chicken, peanut butter and tuna. Excess phosphorus in your bloodstream promotes calcium loss, which weakens your bones. The RDA is generally 800 mg to 1,200 mg. Chances are you are getting a lot more than that.

**Potassium**

Potassium is critical for pH balance, muscle and nerve function. It is the third most abundant mineral after calcium and phosphorous in the body. It can be rapidly depleted if you are ill and vomiting or suffering diarrhea. Minor changes in your potassium status can lead to serious consequences, so potassium balance must be maintained by the body within a narrow range. Potassium supplements orally or through an intravenous administration are often provided in clinical settings for rapid reversal of muscle weakness that occurs in various conditions. The RDA is 2,000 mg.

**Sodium**

Sodium is in all bodily fluids including blood, tears, sweat, etc. Sodium interacts with potassium and chloride to maintain pH balance, fluid distribution, muscle contraction and nerve function.

The best source of sodium is, of course, in your living food, not from table salt. Sodium can be eliminated easily through your kidneys and only contributes to worsening blood pressure in approximately 15 percent of persons with hypertension.

Even though we consume way too much sodium in products such as processed foods, soft drinks, meats, shellfish, condiments, snack foods, food additives, and over-the-counter laxatives, overdosing on this mineral, for most people, is not really a serious concern. Instead, we should be focusing on the nutrient content of the food and its value for our health. Clearly, for example, when you analyze fast food
meals, you find that beverages like soft drinks are a much more serious problem than the meals’ other elements. Soft drinks contain worrisome amounts of acid, phosphorus, sugars and carbonation. They also lack nutrients and replace other foods that would be more nutritious. Focusing on sodium is more of a health distraction (and nuisance) than a help. There are far worse “food” substances to worry about than sodium. The RDA is 500 mg. Safe to say, hardly any American consumes less than about six times that amount daily.

**Sulfur**

Sulfur makes up 10 percent of the total body’s mineral content, concentrated in the protein-rich tissues of hair, nails, muscle and skin. It is clearly acid-forming. It is found in animal meats and leads to calcium loss through the urine when animal proteins make up a significant dietary load (over 60 grams daily). It is part of the chemical structure of the amino acids methionine, cysteine and taurine. It plays a role in many metabolic functions. No RDA has been set but approximately 850 mg daily is plenty. Sources include meat, fish, poultry, eggs and legumes.

**Trace Minerals**

**Boron**

Boron is a trace mineral that is primarily needed for healthy bones plus the metabolism of calcium, magnesium, and phosphorus. It enhances brain function and builds muscles. Boron is required to activate the hormone estrogen and vitamin D. Postmenopausal women can benefit by supplementing with 2 mg to 3 mg daily doses of boron. A study conducted by the United States Department of Agriculture (USDA) found that in just eight days of supplementing their diet daily with boron, a test group of postmenopausal women retained 40 percent more calcium and one-third more magnesium.

Fruits and vegetables such as apples, carrots, grapes, spinach, cabbage, nuts, pears and many grains are the main sources of boron. There is no RDA for boron.


**Chloride**

Chloride combines with sodium (sodium chloride) and potassium (potassium chloride) in maintaining the acid/base balance of bodily fluids. It is a very weak alkaline molecule when ionized in solution (Cl\(^{-}\)), but will combine with hydrogen ions (H\(^{+}\)) to form hydrochloric acid (HCL), a key component of stomach acid. A diet of unprocessed natural food provides all the chloride you need. A pinch of table salt contains about 250 mg chloride, which is one-third the RDA of 750 mg.

**Chromium**

Chromium works with insulin to regulate the body’s use of blood sugar and metabolize fatty-acids. Chromium in the form of chromium picolinate contributes to metabolism as a helpful supplement in weight loss. You’ll find chromium in brewer’s yeast, eggs, lean meats, molasses, whole grains and cheese. Supplementation with chromium at 200 mcg to 800 mcg daily is a standard recommendation in diabetes treatment because it reduces insulin requirements and can relieve symptoms of hypoglycemia. The RDA for men aged 19-50 years is 35 mcg. Women of that age require 25 mcg. After age 50 the RDA for men is 30 mcg and 20 mcg for women.

**Cobalt**

Cobalt is the mineral constituent of vitamin B12 (cobalamin) and aids in forming red blood cells and maintaining nerve tissue. To be used properly in the body, cobalt must be ingested from foods such as oysters, clams or sea vegetables or from vitamin B12 supplements. Dietary deficiency is uncommon, unless you are an alcoholic or a poorly nourished vegan. If you run short of cobalt (and vitamin B12) you may suffer deficiency symptoms including sore tongue, tingling arms and legs or back pain. Vegans should always take B12 supplements. There is no RDA for cobalt.

**Copper**

Copper helps to form hemoglobin in the blood and enhances absorption of iron for red blood cell oxygen transport while
strengthening blood vessels, bones, tendons and nerves. Copper also promotes fertility, normal skin and hair pigmentation. Sources of copper from food include molasses, nuts, seeds, green vegetables, black pepper and cacao (raw natural chocolate).

Crohn’s Disease and celiac disease can inhibit copper absorption from food and contribute to deficiency. Signs of deficiency include brittle, discolored hair; skeletal defects; anemia; hypertension; arrhythmias of the heart; and infertility. Never take more than 10 mg daily if you are going to supplement. The RDA for copper for men and women over the age of 30 is 900 mcg.

**Fluoride**

Fluoride (fluorine) is required for healthy teeth and bones. Beginning in the 1950s many U.S. cities added fluoride to municipal drinking water with the belief that this could reduce tooth decay (especially in children) by 40 percent to 70 percent. Fluoride has antimicrobial properties, yet for bones it can both make them harder and often more brittle. Since the introduction of fluoride in city water, the incidence of osteoporosis has not changed and has not been reduced. Dietary sources are most appropriate and an alkaline diet is the best source. Also, dried seaweed, seafood (sardines, salmon) and cheese are good food sources. RDAs are 3 mg for women over the age of 31 and 4 mg for men of that age group.

**Germanium**

This trace mineral in organic form improves cellular oxygenation and therefore can be classified as an antioxidant. It has become controversial because of the political posturing, profiteering and pseudo-science it has attracted. The real organic form (bis-carboxyethyl germanium sesquioxide) has been shown to have some healing properties to reduce pain, boost the immune system and improve stamina. The Japanese researcher, Dr. Kazuhiko Asai, reportedly found that organic germanium protects against cancer by stimulating the body to produce interferon (increase natural killer cells). The recommended dosing of 100 mg to 300 mg of germanium daily is reputed to reduce rheumatoid arthritis, viral infections
and even some cancers. Germanium is obtained through the diet from garlic, shiitake mushrooms, onions, aloe vera, comfrey, ginseng and suma root.

**Iodine**

Iodine is necessary for proper functioning of the thyroid gland and is a critical ingredient of the thyroid hormones. It also is an effective antiseptic (used in surgical scrubs) and water sterilizer. It is found in kelp and in smaller amounts in seafood like clams, lobsters, oysters, sardines and other saltwater fish. Vegetables grown in iodine rich soils are also rich sources of the mineral. Iodized salt, the standard table salt, contains approximately 70 micrograms of iodine per gram of salt. The RDA of 150 mcg per day is easy to attain even on the standard American diet.

**Iron**

Iron is the chief mineral component of the hemoglobin molecule that carries oxygen in red blood cells. Iron-deficiency anemia is a common type of anemia, remedied by increasing iron in your diet or boosting your iron absorption (taking vitamin C with each meal increases uptake). Dietary iron comes from red meat, chicken, seafood, dark-green vegetables, whole grains, nuts and fruit. Foods fortified with iron are not as beneficial as the iron in living foods. Many common foods inhibit iron absorption, including coffee and soy-based foods. Its absorption is also restricted by antacids, tetracycline and high doses of calcium, zinc and manganese. The RDA of iron is 18 mg for women aged 31-50, 8 mg for women over age 50 and 8 mg for men over the age of 31.

**Manganese**

In addition to being essential for bone and connective tissue, manganese also acts as an antioxidant. It is a cofactor for clotting blood and in driving the enzymes of glucose metabolism. Subjects with diabetes and rheumatoid arthritis have been shown to have half the manganese of the rest of the population. Food sources of manganese include brown rice, wheat germ, beans, whole grains, nuts, seeds, peas, bananas, oranges and strawberries. The RDA for
manganese is 1.8 for women over the age of 31 and 2.3 for men of that age group.

**Molybdenum**

This essential trace mineral is a component of the enzyme xanthine oxidase that helps form the uric acid in urine. It is a key to normal growth and development of the nervous system and tooth enamel. It is also necessary for iron utilization, acts as an antioxidant and is important in normal male sexual function. Additionally, there are many other minor reactions involving molybdenum. Molybdenum is found in legumes, whole grains, dark-green leafy vegetables, yeast, milk and organ meats. The RDA is 45 mcg for men and women over the age of 31. It is best taken in colloidal form.

**Selenium**

Selenium’s antioxidant effects complement vitamin E and it should be taken together with that vitamin. Selenium can neutralize the toxic effects of the elements cadmium, mercury and arsenic. Low levels of selenium are associated with a higher risk of cancer, cardiovascular disease and premature aging. Selenium sulfide is used to treat dandruff, acne and eczema. Unfortunately, inorganic selenium compounds (like those found in insecticides) are toxic and contribute to hair loss, nail problems, accelerated tooth decay and swelling of the fingers, while being linked to cancer and birth defects. Foods containing selenium include whole grains, asparagus, garlic, eggs, mushrooms, lean meat and seafood. You can expect to get plenty from your diet alone. The RDA for adults over age 31 is 55 mcg.

**Zinc**

Zinc is a star trace mineral for health, contributing to many proteins, enzymes, hormones and prostaglandins. It also takes part in processes such as bone growth, cell metabolism, wound healing, detoxification, immune function, electrical function of the heart and many more.
Vegetarians and the elderly are most susceptible to zinc deficiency, which causes loss of taste, loss of hair or discoloration, white streaking on the nails, eczema, diminished appetite, fatigue and slow wound healing.

Supplementation has been shown to improve various conditions, but with mixed results. In particular, studies on zinc’s ability to help the body fight the common cold have come up with conflicting results. Zinc deficiency has been suggested to play a role in the development of diabetes, and zinc deficiency is a well-known complication of Crohn’s disease. Treatment with topical and oral zinc has been shown to reduce the duration and severity of herpes outbreaks.

I recommend increasing zinc-rich foods in your diet. If you take a multi-nutrient supplement, look for zinc as a chelate such as zinc picolinate or zinc aspartate in combination with vitamin A, calcium and copper. As a topical cream, use zinc oxide as a barrier for diaper rash or on burns. Zinc is found in lean meat, seafood, eggs, soybeans, wheat bran, cheese, oysters, seeds and Brewer’s yeast. The RDA for zinc for men over the age of 19 is 8 mg. For women over the age of 19, the RDA is 8 mg.
Acidosis Leads to Disease

Aging and pH

An acidic internal environment in your body can make you age faster. In 2001, a report in the *European Journal of Nutrition* made it clear that aging corresponds with a low-grade chronic metabolic acidosis. The report goes on to point out that, in addition to aging, chronic metabolic acidosis decreases muscle mass and bone mass while compromising endogenous human growth hormone (HGH) levels and insulin-like growth factor-1 (IGF-1) levels. Swiss researchers also observe that they found increases in kidney stones in those with chronic metabolic acidosis. Microscopically, acidosis enhances the destructive process known as free radical damage, which is the hallmark of aging. In addition, the risk of cancer continually rises as tissues age and cancer is known to be able to thrive only in an acidic environment.

Acidosis is thus believed to be a seriously threatening initiation of the deterioration that results in premature aging. Conversely, the fact that switching to an alkalizing diet can reverse the symptoms of aging shows how strongly the pH of the body affects health. Researchers have demonstrated that study subjects who eat plant-based, potassium-rich foods or who supplement with potassium bicarbonate can reverse signs of aging and preserve more bone, muscle and HGH (human growth hormone).
Bones and pH: The pH Connection and Osteoporosis

Staying on the right side of the acid-base balance can help you lower your risk of osteoporosis. To understand this process, keep in mind that your body is constantly rebuilding your skeletal structure, replacing about half of it every five years. Because of poor diets and lifestyle, 50 percent of all American Caucasian women aged 65 and over will suffer at least one osteoporotic fracture in their lifetimes. Plus, one of every five American men can expect to break at least one bone due to osteoporosis, according to the National Osteoporosis Foundation 2000 report. And with more than 10 million Americans currently suffering this bone-thinning condition, we spend more than $15 billion annually for direct medical costs. The tragedy of this situation is that the disease is largely preventable with exercise and a decent diet. And even though, according to the National Institutes of Health (NIH), we are spending more than $130 million of Federal research dollars examining ways to deal with this condition, we still neglect to educate folks on how they can take simple measures to lower their risk. Consequently, fracture rates continue to increase in even younger people.

Excess Acid

Researchers believe that when the body has an excess of acid that cannot be immediately eliminated, it stores the acid for later removal in a place where it is least likely to do harm. For example, acid cannot be stored in the blood or in functioning cells, otherwise the acid would make cells swell while impairing mitochondrial electron transport, slowing ATP production, disrupting protein synthesis, multiplying free radical production and leading to a whole host of other serious problems.

Instead, this excess acidity is stored in the interstitial spaces (between cells), where extracellular fluid can safely be acidic, at least for a short time. Unfortunately, it cannot be allowed to stay
that way indefinitely. This interstitial space, also called the extracellular matrix, surrounds the cells and communicates with lymphatic fluid. For every molecule of acid that gets stored in these tissues, an equal molecule of bicarbonate or base substance is required to neutralize it. Your bones represent the foremost reservoir of minerals available to buffer this acidity and they are broken down to neutralize the acid. Distressingly, the long-term result of pulling out bone minerals to offset acidity thins bones and causes osteoporosis. Sadly, this entire process is not well-recognized or acknowledged among medical doctors even today.

**Bone Problems**

Many studies have established that chronic metabolic acidosis robs you of mineral reserves and impairs your body’s efforts to adequately rebuild the bone matrix. Your bones respond to an acid load by dissolving its basic buffering mineral salts. As you might expect, bone is where you’ll find 99 percent of your body’s calcium. Bone contains magnesium too, and bone loss is also accelerated in the face of a magnesium deficit. In fact, a variety of alkaline buffering salts (including those of sodium, potassium, zinc, and other minerals) are stored in your skeleton. They are also lost from your bone in the obligatory buffering of excessive metabolic acids.

Early on, as the body defends against acidity, protons are exchanged with sodium and potassium, providing your first line of buffering defense. But in time, if this process continues long enough, metabolic acidosis depletes the supply of the sodium and potassium buffers. If and when this occurs, calcium and magnesium cations (positively charged particles), along with bicarbonate and phosphorus (negative charged particles), become the major source of buffers.

Researchers report that eventually, when buffering mineral salts are significantly depleted, your ability to compensate for a chronic acid load becomes significantly impaired. At the same time, your
internal pH, as well as your first-morning urine pH, becomes measurably more acidic. (That’s why measuring your first morning urine pH is a useful clinical tool for demonstrating your systemic acid/alkaline state.)

Notably, your bone is quite sensitive to even small changes in pH. A mere one-tenth of a point drop in pH greatly stimulates osteoclastic activity (bone break-down), inhibits osteoblastic action (new bone formation) and induces bone mineral loss many fold.\textsuperscript{19,20}

For example, a 500 percent to 900 percent increase in osteoclast bone resorption was noted in laboratory animals with just a 0.2 pH unit change.\textsuperscript{21} In another study, acute fasting showed a venous pH decrease from 7.37 to 7.33 (4/100th of a pH unit). This caused significant calcium release from bone, which was independent of osteoclastic activity.\textsuperscript{22}

It is clearly established, therefore, that urinary calcium excretion is associated with bone loss\textsuperscript{23} and several studies show that calcium is excreted in larger amounts as acid loads are added to the body. One of those acid loads is created when you consume too much meat in your diet. This is an area where modern medicine turns a blind eye, ignoring the fact that our diet and other acidifying substances are causing the body to excrete acids along with calcium, leading to an osteoporosis epidemic in this country. If doctors recognized and acknowledged this, then they would teach how to prevent and reverse this condition through diet and alkaline pH of the body. But they don’t!

**Animal Protein Impairs Calcium**

Researcher T. Colin Campbell, Ph.D., and associates of the China Study reported in their cross-sectional survey of 764 middle-aged and elderly women that urinary excretions of calcium and acids increased when folks ate more animal and nondairy animal protein (meat) but that they lost less calcium and acids when their diets were higher in plant-protein. Further analyses
showed that urinary calcium and acid excretion were associated with, and likely even caused by, acid-forming foods but reduced by plant foods.24

Other studies similarly bear this out and show that eating a lot of meat increases the risk of osteoporosis. For example, researchers in New York City reported in the Journal of Nutrition in 199825 that the standard American diet, which is high in protein and low in fruits and vegetables, generates a large amount of acid in the form of sulfates and phosphates. As such, this causes bones to give up calcium in order to buffer the constant acid load through the process of bone resorption. These same researchers also explain that your kidneys respond to this dietary acid challenge by excreting acids along with ammonium.

A seven-year study reported in 2003 in the American Journal of Clinical Nutrition at the University of California, San Francisco looked at 9,704 postmenopausal women and found that a high ratio of dietary animal to vegetable protein increases the rate of bone loss and the risk of fracture.26

This is a big problem among the elderly. Research on senior citizens found that calcium balance was negative (-64mg/day) on a high-protein diet of 84 grams/day on average for a 150 pound person.27 And this certainly means that along with calcium, magnesium and other minerals are being lost.

What does this mean for your health? A 65 mg daily loss of calcium might not seem like much, when a typical calcium supplement contains 500 mg to 1,000 mg of calcium. However, over 20 years, a daily calcium drain of this size translates into the depletion of 365 grams of calcium: One-half of the average female skeletal calcium and one-third of that of a man.28 This easily explains the induction of osteoporosis in America from just our meat eating habits alone! Yet there are still more causes of acid load to your body to consider, mostly dietary, that cause problems.
Cut Back On Animal Protein

What can be done to prevent or reverse this effect of animal protein intake? Researchers point out that calcium supplementation and consuming more fruits and vegetables can at least partially offset the effects of a high protein diet and reduce the amount of acidic urine you pass. This in turn means that with a reduction in animal protein and a serious increase in fruits and vegetables, bone resorption and osteoporosis may be halted. The scientists who studied osteoporosis in California conclude by saying, “...excessive dietary protein from foods with high potential renal acid load adversely affects bone, unless buffered by the consumption of alkali-rich foods or supplements.”

It is interesting to note that a British study, reported in the British Journal of Nutrition, attempted to concoct a study that showed animal protein has no significant influence on urinary calcium excretion. But the study was majorly flawed, rendering it invalid. For example, the subjects of this distorted study only consumed either 12 percent or 21 percent animal protein in their diets and the researchers only tracked these people for three weeks! And when you consider the very small size of their study (56 subjects), you see that they did not produce a reliable scientific argument that eating large quantities of meat doesn’t make you more vulnerable to osteoporosis. However, this kind of flawed research is designed to fool the public and supply the lobbyists for the meat industry pseudo-data to perpetuate the lie that eating animal meat is harmless.

This study demonstrates how “scientists” can prove or disprove anything by designing a study to come out the way they want. In reality, it takes years of significant meat eating to pull calcium from bones, as is the typical case in the U.S. So a three-week study establishes exactly nothing.

Protein Conundrum

It is also interesting to note that much of the scientific literature discusses “protein” but never makes reference to its source. Clearly,
fruits and vegetables contain protein. For example, blue-green algae have nearly twice the protein density as beef. Nuts and seeds are also high in protein. In general, researchers equate protein with animal meat almost as if fruits and vegetables had none. But think about it. If these vegetarian protein sources were insignificant, how could strict vegan animals such as the gorilla and the hippo grow so big and strong?

One study that distinguished animal protein from soy protein found that animal protein caused calcium to be lost in the urine while soy protein did not have that effect. As reported in *The Journal of Nutritional Science and Vitaminology*, these researchers compared the effects of meat protein and soy protein as well as potassium consumption on urinary calcium excretion. Meat protein caused an increase in urinary excretion of calcium with increased excretion of urinary sulfur, phosphate and ammonia. The soy protein diet did not. But the mere addition of apples to the high-meat diet decreased the urinary excretion of calcium, suggesting that the alkalinity of this fruit made a crucial, healthy difference. The results suggest that high calcium loss through the kidneys is induced by a high-meat diet; soy protein does not induce urinary calcium loss; and the effect of meat protein may be reversed by the ingestion of potassium-rich foods (fresh fruits and vegetables).

Other research confirms the highly differing effects of consuming protein from animal and vegetarian diet sources on calcium loss. One study showed that consuming animal protein resulted in urinary pH that was more acidic and higher in daily urinary calcium than in those consuming a plant-based diet with the same quantity of total protein, phosphorus, sodium, potassium and calcium. So there can be no mistake about it—animal protein accelerates osteoporosis. We should be asking: Why aren’t we preaching this fact to all aging citizens? How could all these studies be ignored by mainstream medicine? It is truly baffling and frustrating.

Studies of other cultures confirm the clear link between osteoporosis and acidity in the body that is created by an
abundance of animal protein intake. Analyses of cross-cultural fracture rates in women document the fact that the consumption of animal protein is a causal link to the incidence of hip fracture worldwide. Furthermore, those consuming more fruits and vegetables have a resulting higher bone mineral density than those consuming fewer fruits and vegetables.

The mere fact that osteoporosis is uncommon in many other cultures offers more proof. The Maya Indians, who eat an alkaline-rich diet have no evidence of osteoporosis; Africans have nearly none. Chinese who eat predominately plant source protein have been found to have only one-fifth the U.S. fracture rate. There is a 30-fold variation in fracture rates around the world, which is almost entirely explainable by diet and lifestyle choices. Consuming animal meats and milks are inextricably tied to weak bones.

Soft drinks add to this acidity problem and research shows a three- to five-fold increase in fractures among teenage girls who regularly consume acidic soft drink beverages. The pH of cola drinks are measured at 2.8 to 3.2 and the kidneys cannot even excrete acids with pH below 5.0.

Cancer and Acid pH

If you are truly concerned about cancer, you must measure your body tissue pH values. Every cancer patient should realize that it is vital to take baseline measurements of urine pH and saliva pH and recheck these levels every few weeks. This indicates how internal pH is affected by consuming alkaline foods and beverages. Maintaining peaceful emotions also promotes alkalinity while turbulent mood swings make the body more acidic.

The reduction of acidity was one reason why the late Max Gerson, M.D., from Germany, had such success with his cancer treatment protocol which was instituted in more than 500 hospitals in Germany in the mid 1900s. The dietary portion of his protocol called for fresh vegetable juicing every hour along with
nutrient rich, mostly raw, whole foods. This dietary plan was in perfect alkaline balance and included, instead of the acid load of animal meat, proteins from plant sources.

Patients with cancer soon realize that they get little assistance with their diet from their oncologists. The dietary recommendations for cancer patients were founded on science, yet there is relatively little in the scientific literature in the way of clinical trials that don’t entail the use of some form of chemotherapy or radiation. Thus, the studies are skewed to include caustic and costly interventions rather than relying on the power of healing from the Divine source. On the other hand, there is still plenty of proof of the necessity of an alkaline, nutrient-rich, whole and mostly raw food diet for every cancer patient. Patients (all patients, not just a few) who take on the alkaline dietary recommendation enjoy improved energy, decreased pain, elimination of most or all medications and often overcome cancer to defy the prognosis given them by their doctors.

Researchers reported in the November, 1999, *Clinical Cancer Research* that acidosis contributes significantly to the aggressive biology of human pancreatic cancer. Acidosis activates interleukin 8, a chemical in the body that pancreatic cancer cells use to supply themselves with more blood vessels so they can grow faster. Lack of oxygen (hypoxia) also contributed to the cancer growth in their study. The following year, other researchers confirmed these findings in ovarian cancer cells. The cancers grew in direct relationship to the acidic nature of the extracellular tissue pH in these solid tumors, partly due to the elevated acid production of the tumors themselves, plus the impaired removal of acidic metabolic wastes.

Acidosis of extracellular tumor tissue is an independent indicator, even a hallmark of cancer growth status and response to treatment. The higher the acidity, the faster a tumor grows and the more it resists medical efforts to contain it. In a 2009 report, researchers at the Cleveland Clinic measured leukemia in mice by placing a beveled tip electrode right into the cancer tissue itself to serially measure pH changes. They confirmed that acidity of a tumor correlated with long-term responses to treatment.
There is no question in the mind of any knowledgeable scientist that cancer thrives in an acid pH environment. Moreover, there is not a cancer patient (who is educated on the subject) that will deny the extreme importance of alkalizing their diet, their environment and their state of emotions. Not only do cancers often regress for good, but the alkaline lifestyle has many other benefits of improved health and vitality.

**Diabetes and pH**

Everyone knows someone with diabetes. Unfortunately, it is the up and coming illness of the 21st Century because it is so related to our poor habits of diet and lack of exercise, far more than health authorities often acknowledge.

Yet there is an enlightened movement that has proven diabetes can be reversed—60 percent of type 1 diabetes (where the pancreas stops making insulin) and 100 percent of type 2 (linked to insulin insensitivity)—by diet. The movie called *Simply Raw* examines six individuals that came to the Tree of Life sanatorium in Patagonia, Arizona where Gabriel Cousins, M.D., and staff (consisting also of gourmet raw foods chefs) guided them off their medications and helped them normalize their blood sugar levels in 30 days. Watching this is impressive as you witness how people with diabetes shake their food addictions and go to a 90+ percent raw foods vegan diet.

You can view the five-minute trailer by going online to [www.simplyrawmovie.com](http://www.simplyrawmovie.com). It’s a powerful example of a real medical practice that should be the norm throughout America!

When you consider that diabetes accounts for approximately 20 percent of all healthcare expenditures in this country, you will begin to question, “Why don’t all doctors do this for their diabetic patients?” It is so simple and inexpensive, yet eating patterns are difficult to change. We are largely addicted to the cooked, processed, sugarized, chemicalized, fat-laden fake foods of our modern world.

It’s also important to remember that persons with diabetes
experience elevated risks of developing diabetic complications including heart disease and stroke; blindness; peripheral nerve disease and nerve pain; kidney damage and failure; depression, dementia and skin disorders. According to the Centers for Disease Control and Prevention (CDC) about 26 million people in the United States suffer from diabetes. It is the seventh leading cause of death in the U.S., causing or contributing to more than 320,000 deaths a year, and more than 65,000 amputations a year are linked to diabetic damage. The cost of diabetes goes right along with the latent effects of a nation of gluttons who gorge on refined and processed foods. Direct and indirect diabetes medical costs total $174 billion a year.

There is a direct correlation of body tissue acidity with diabetes. Remember that insulin is the hormone that allows blood sugar to enter through the cell membrane into the cell to where it can be utilized. Researchers have discovered that when acid wastes accumulate in the pancreas, it prevents your body from creating proper levels of insulin, a condition that leads to serious blood sugar imbalances. The damage is cumulative. After years of fighting acid, your pancreas eventually starts to wear out.

Also, high amounts of circulating sugar in the blood can damage other organs, accounting for the complications of diabetes. When high amounts of insulin circulate in your blood it becomes less and less effective at influencing the sugar uptake of the muscles, liver, brain and other organs. In effect, they lose their sensitivity to insulin.

**Is Your Water Acidic?**

A study reported in *Diabetes Care* reports that water acidity is directly linked to the development of blood sugar problems. And the truth is: Most tap water has too much acid in it. The study, led by Dr. Lars C. Stene, tested tap water from the homes of 64 patients with blood glucose problems and from 250 patients with normal blood sugar levels. The results? People drinking water with high acid levels were four times more likely to develop
glucose and insulin problems compared to those drinking alkaline water (pH above 7.7).

**Acidic Foods that Worsen Diabetes**

The most problematic acidic foods that exacerbate diabetes include: French fries, potato chips, white breads, pastas, crackers and starches. These foods quickly turn into sugars in the body and produce an acidic pH in the body.

Sweet foods like honey, syrup, candy, fruit juice, carbonated drinks, alcohol, cakes and cookies are also acidic; their sugars are quickly absorbed and taken to the blood stream to be utilized by the cells. Remember, few of these products have any of the micronutrients (vitamins, minerals, enzymes, antioxidants, fiber, healthy oils) that optimize cell function. So they overload your blood stream with glucose, the fuel itself. It’s like pouring gasoline on the top of your car: It cannot be utilized there and it creates a mess. Similarly, the constant sugar overload eventually takes a toll on your body, contributing to illnesses ranging from allergies and attention deficit hyperactive disorder (ADHD) to depression and fatigue as well as sinus infections and irritable bowel syndrome.

All these problems derive from consumption of refined sugar and the acidic internal physiological environment it creates.

**Not All Sweets are Acidifying to the Body**

As a diabetic, if you love to eat and live to eat, especially if sweets are your daily reward, you have to plan to change your cravings by learning what Mother Earth has prepared for your body instead of refined sugars. Become educated on the variety of fruits and other natural sweeteners (such as stevia, pure maple syrup, raw honey, sugar cane, fruit extract flavorings, etc.) that can be used in limited amounts instead of relying on processed, refined sugar foods. Even though fruits are sweet, they have enough minerals, water and fiber to promote alkalinity in the body.
Frighteningly, over half of America’s diet consists of refined sugars and high fructose corn syrup according to the U.S. Department of Agriculture. It’s no wonder 66 percent of American adults are overweight and more than half of these are fat enough to be classified as obese. Refined sugar abnormally uses up the crucial nutrients necessary to prevent (and which can help reverse) diabetes. These nutrients include chromium, magnesium and some of the B vitamins.

Fruits are best in the morning for cleansing and vegetables best in the evening for building. There really is nothing equivalent to the real thing, though a green drink is the next best thing. There are a number of various green drink types available in health food stores that are the powdered form of various fruits and vegetables. You’ll know them by their very healthy and possibly pungent smell. If you decide to try these drinks on a steady basis, give yourself about three weeks to adapt to the organic taste. Soon you will crave vegetables and will shift to produce as your predominate food source.

Also, you might be amazed at the tasty natural flavors you can create by adding healthy foods to make a saucy salad! I love to put purple onions, boiled eggs, chopped almonds, carrot slices, raisins, chopped apples, goat cheese, pepper or another non-salt seasoning, sunflower seeds, cucumber, peppers and garlic on top of lots of fresh spinach and romaine lettuce. Only colorful veggies go into my salads. And the greener the better!

Here is a short list of useful herbs, all alkalizing, that improve blood sugar for diabetes:

- **Garcinia cambogia**: Helps reduce appetite and inhibit fat production without mental hyperactivity.
- **Gymnema sylvestre (leaf)**: Curtails the allure of sugary foods when made into a tincture.
- **Fenugreek**: Improves glucose levels by decreasing absorption of glucose in the small intestine.
- **Citrus aurantium (orange bitters)**: Produces an alkaloid
effect that stimulates the sympathetic nervous system thereby increasing metabolism.

- Green tea: Increases metabolism while significantly reducing food intake, body weight, blood cholesterol and triglyceride levels.

**Energy and pH**

Metabolic acidosis ranges from mild to severe. At its most lethal it leads to chronic kidney failure and end-stage kidney disease. Subsequently, persons who have been eating the standard American diet, but switch to more fruits and vegetables find that their energy increases as they move to alkaline, nutrient-rich foods. This results as the dampening effects of chronic metabolic acidosis, which can depress organ function, ease off.

Patients with kidney disease often develop chronic metabolic acidosis, which is associated with negative nitrogen balance, protein breakdown, anorexia and fatigue. Even more profound adverse effects can occur from chronic metabolic acidosis including depressed myocardial contractility (heart muscle weakness) and increased arrhythmias (irregular heartbeats). In the arteries, chronic metabolic acidosis causes vasoconstriction (arterial constriction) and it causes increased vascular resistance in the lungs.

Even the digestive system suffers from chronic metabolic acidosis with slowed stomach peristalsis, nausea and vomiting. Constipation can also result. A study on patients who had suffered from chronic constipation for over a year showed that drinking alkaline water for one to two weeks could result in better bowel movements. And the patients also reported significantly sharper mental alertness, too.

**Heart Health and pH**

The cardiovascular system delivers blood to the body via arteries, which are really a large network of muscular tubes that keeps blood circulating throughout the body. It also encompasses veins and
capillaries where the connections to the lymph system are made.

Lymphatic fluid acts as a cleaning or elimination medium conveying impurities to be removed by the immune system’s lymph nodes. Eventually this fluid wends its way back to your largest vein, the superior vena cava, en route to the heart and lungs. Because of these interactions, your blood plasma pH and your lymphatic fluid pH are in constant communication. But the acidity or alkalinity of your lymph is a closer indicator of tissue pH than is your arterial blood, since the blood operates as a compensatory mechanism to acidic or alkaline shifts.

In some patients with kidney impairment or respiratory difficulties, blood pH becomes too acidic. This altered pH has been shown to promote changes in the smooth muscle tone of arteries which hinders circulation and raises blood pressure. Many studies have been published in the last decade that demonstrate that acid-base disorders clearly affect the function of the inner lining (endothelium) of blood vessels. That’s a serious problem because that is where cardiovascular disease all begins.56

Everything in your cardiovascular system functions just fine when the pH of blood plasma is slightly alkaline, having a pH of 7.35 to 7.41. This has a wide array of implications: The inner lining of your arteries work best under alkaline conditions; your heart muscle functions better under alkaline conditions; your heart electrical system works better under alkaline conditions; and your blood stays thin for optimal circulation when it is alkaline. But when the blood plasma habitually grows relatively more acidic (pH less than 7.35), it begins to affect the cells and artery lining as a chemical irritant. As reported in the Journal of Physiology in 1997, extracellular acidosis causes endothelial dysfunction (artery restriction) by inhibiting calcium transport and initiating the beginning stages of hardening of the arteries (atherosclerosis).57 That can be a life-threatening condition.

There are other cardiovascular worries connected with acidity. When an acid pH reduces the movement of positively charged molecules, it impairs the ability of the muscles to contract. That means
the heart and arteries can’t tighten and loosen properly, making you more prone to heart disease.\(^5^8\) Also, when the blood becomes chronically acidic, this can also lead to dangerous aneurysms (ballooning of artery walls) and arrhythmias (rhythm dysfunctions of the heart) because magnesium is being depleted.\(^5^9\) Even the turbulence of blood flow can be a problem as blood thickens and may clot more readily.\(^6^0\) Keeping the blood alkaline is so important that if you suffer cardiac arrest, you better hope whoever is on the scene gives you some alkalizing sodium bicarbonate. The bicarbonate gives you a better chance of being resuscitated and surviving your heart stoppage.\(^6^1\)

So it’s no wonder that cardiovascular disease causes more deaths than any other health condition in the U.S. The acid load Americans put themselves through can strain the best of hearts. Our fast-food diets, over-prescription of medications, pollutants in our air and water, the pesticide and fungicide contaminants in our food and the synthetic chemicals in our furniture and houses inevitably alter our alkalinity for the worse.

**Thyroid Gland and pH**

When your body is chronically acidic, it hinders your thyroid, decreasing production of the thyroid hormones Free T3 and Free T4, which may signal mild primary hypothyroidism. This is no surprise since acidosis suppresses a long list of normal organ functions. But this represents another reason why people with low metabolism (which is common when your thyroid function is low) improve their health so much when they start eating an alkaline diet. Their fatigue, weight gain, dry skin, constipation, depression and poor fertility — linked to low thyroid function — all improve with meals containing alkaline, nutrient-rich foods.

**Human Growth Hormone (HGH) and pH**

Human growth hormone (HGH) circulates in everybody, but its levels rise dramatically when you are an adolescent and peak
between ages 21 and 30. After that, HGH levels precipitously decline at the rate of about 14 percent a decade. As a result, adults are generally HGH deficient by the age of 40.

We know that HGH production is greatly influenced by stress levels, nutrition, exercise and sleep. But you know your HGH levels are dropping when your abdominal fat expands, your muscles shrink, your strength declines and you can’t exercise as much because of fatigue and lack of motivation.

Of course, secretion of HGH and other related hormones slows in the face of metabolic acidosis. In particular, acidosis impairs your supply of IGF-1 (Insulin-like Growth Factor-1) which you need for proper cell division. IGF-1 is normally secreted after the release of human growth hormone, but metabolic acidosis interferes with this process. Conversely, HGH and IGF-1 interaction can be boosted when acidosis eases off. And researchers have shown that children whose growth has been retarded because their kidneys don’t eliminate acids sufficiently (a condition called renal tubular acidosis) get taller when they take alkaline supplements.62

**Immune System and pH**

Although acute acidosis may not severely impair your immune function, chronic metabolic acidosis clearly weakens it for several reasons. Acid-producing foods incite your immune system to inflammation, the underlying process of all illnesses. This inflammatory response can make you feel worn out even as it makes you more vulnerable to illnesses like arthritis, cardiovascular disease and cancer.

The most acidifying nutrients in the American diet are high fructose corn syrup and table sugar (sucrose), both of which contain glucose and fructose. Researchers reported in the *American Journal of Clinical Nutrition* that an oral ingestion of glucose depresses lymphocyte function almost like a poison. Sugar has also been shown to hamper the immune defense against bacterial infection.64

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Michael Cutler, M.D.
An acid pH also affects the body’s ability to keep mutations from developing into cancer. A popular theory holds that healthy cells living in an acidic environment may mutate into abnormal cells.

It is certainly true that your bladder’s immune defenses are also worsened by acid conditions. According to the *Journal of International Medical Research*, when you alkalinize your urine, your risk of urinary infection drops significantly. In other words, acidity allows pathogenic organisms to flourish, much as it does in blood (which you can observe with a high powered dark-field microscope). In the bladder, this can be ameliorated with cranberry juice which helps prevent bacteria from clinging to the walls of your bladder. In addition, relief can be found with 4 grams of the alkalizing agent called sodium citrate in a glass of water three times a day for two days.

Upper respiratory infections can also grow more dangerous under acidic conditions. Both bacteria and viruses are loath to invade an alkaline pH environment. And a study done at the Royal Free Hospital and School of Medicine in London reported that when you raise your pH level to a more alkaline level, you effectively increase your immune system’s ability to kill bacteria.

**Overweight, Obesity and pH**

As long as you’ve got an adequate supply of minerals and enzymes in your body, a healthy, slightly alkaline extracellular pH allows fat to be utilized efficiently for energy. Fat normally acts as an important fuel source; it is broken down to glucose and converted to energy molecules known as ATP. These biochemical reactions, involved in what’s called the Krebs cycle, are complex and extensive in a process that yields both carbonic acid and water from oxygen and sugar.

An acid pH, though, sets you up for developing a serious weight problem. Researchers believe that when you are chronically acidic, the body interprets this as a warning that it should take fat-storing precautions to get ready for what it believes is an impending famine. This causes the metabolic hormones insulin and glucagon to initiate the storage of energy in the form of adipocytes, or fat cells.
Acid and Alkaline Foods

Whether or not a food promotes an acidic or alkaline effect in the body has little to do with the pH of the food itself. Instead, it involves the physiological effects the food produces after it has been digested and assimilated. The major factor that determines the end result is the food’s mineral content. Foods rich in alkaline-forming minerals like calcium, magnesium and potassium help create alkalinity in the body. Foods rich in acid-forming minerals like phosphorous, chlorine, iodine or nitrogen, lead to acidity.

When you digest a food it is oxidized (burned) to form water, carbon dioxide and a residue compound that can be either acidic or alkaline. And even though raw foods like limes contain acidic compounds (mainly citric acid in the case of citrus fruits), after the lime is consumed and metabolized the end-products emerge as alkaline. On the other hand, meat has an alkaline pH before digestion but becomes acidic after it is utilized by the intracellular organelles. (As a matter of fact, nearly all animal products are acid-forming.)

When researchers measure the end result of consuming particular foods and the relative amount of acid that is subsequently released into the urine they are able to calculate the food’s acid load. As we have seen, this does not reflect the acidity of the food before you digest it.

Technically, the acid load is termed the Potential Renal Acid Load (PRAL). In 1995 two researchers named Remer and Manz calculated these values with various foods and came up with a list of PRAL quantities, represented by Table 1.
We can use the values to devise a variety of food charts, ranking foodstuffs according to their relative acid-producing or alkaline-producing effects. In a search of the charts compiled by various organizations, though, I have found that each differs from the others, so many of them are probably inaccurate.

I believe the variations result from the fact that not all these foods have had their physiological effects precisely calculated. If they had been accurately investigated, these charts would include references to the scientific literature on them. But that is not generally included.

The categories in Table 1 have been measured, however. As you can see, alkaline-forming foods are primarily vegetable and fruits, whereas acid-forming foods are derived from cheese, meat, fish and grain products.

The higher the value, the more acid a food produces. Negative values represent alkaline-producing values. Remember that a PRAL score of 0 is neutral. Negative numbers are alkaline and positive numbers are acidic. Therefore, fish with a score of 7.9 is clearly acidic along with meat at a score of 9.5. Milk products are varyingly acidic with scores from 1.0 to 23.6.

Alternatively, fruits, fresh (not bottled) fruit juices and vegetables are alkaline. You can surmise that herbs are also alkaline and all raw produce meals are predominately alkaline. You can also infer that refined sugars, high fructose corn syrup and other sweeteners (except the sweet herb stevia) are acidifying to the body. Likewise, sweet fruits and sweet vegetables such as carrots and beets tend to be acidifying rather than alkaline due to their higher sugar content.

It is now recognized that to restore and maintain optimum health, your diet should consist of at least 80 percent alkaline-forming foods and 20 percent acid-forming foods. This follows research on other well-known aspects of healing with foods: The higher the nutrient-density (micronutrients divided by calories) the more healing the food. (See the nutrient-density chart, Table 2.)

Note that alkaline foods come in toward the top of the chart and
The main micronutrients that determine pH balance are minerals. Minerals are found in different parts of every plant and concentrate within the plant in varying part: The leaves, roots, stems or seeds.

It’s important to understand that different parts of the same plant can yield either acid-forming, or alkaline-forming nutrients. Consider wheat for example. The husk of a grown wheat stalk may contain from 67 percent to 87 percent of the plant’s silica, an alkaline-forming mineral. But the seed of the wheat stalk contains no silica at all but is rich in acid-forming phosphorous. In general the minerals that concentrate in leaves, stems, flowers and seed husks contain alkaline-forming minerals while roots and seeds encompass acid-forming minerals. In animal foods, the muscles (meat) are the acidic-forming parts and the bones provide alkaline minerals.

Another way to remember which foods produce acid and which produce alkaline is the root, seed, muscle rule. Roots, seeds and muscles are acid-producing. To make a simple comparison, a burger and fries or a sandwich and chips is acid-producing because the bun or bread is the seed (grain), the chips or fries are the roots (potato),

### Table 1: Average Potential Renal Acid Loads (PRAL) of Specified Foods

<table>
<thead>
<tr>
<th>Food</th>
<th>PRAL* (mEq)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits and fruit juices</td>
<td>-3.1</td>
</tr>
<tr>
<td>Vegetables</td>
<td>-2.8</td>
</tr>
<tr>
<td>Fats and oils</td>
<td>0</td>
</tr>
<tr>
<td>Milk and dairy products</td>
<td>+1.0-23.6</td>
</tr>
<tr>
<td>Grain products</td>
<td>+3.5-7.0</td>
</tr>
<tr>
<td>Fish</td>
<td>+7.9</td>
</tr>
<tr>
<td>Meat and meat products</td>
<td>+9.5</td>
</tr>
</tbody>
</table>

*PRAL = mEq of Cl + PO4 + SO4 – Na – K – Ca – Mg
**Nutrient Density**: The highest score (100) is awarded to foods with the richest micronutrient content per calorie. Lowest score (0) is for foods with fewest micronutrients in comparison to calories.

<table>
<thead>
<tr>
<th>Score</th>
<th>Food Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Raw leafy green vegetables such as <em>spinach</em>, <em>kale</em>, <em>leaf lettuces</em>, <em>herbs</em></td>
</tr>
<tr>
<td>95</td>
<td>Solid green vegetables such as <em>artichokes</em>, <em>asparagus</em>, and <em>broccoli</em></td>
</tr>
<tr>
<td>80</td>
<td>Non-green, non-starchy vegetables such as <em>onions</em>, <em>garlic</em> and <em>tomatoes</em></td>
</tr>
<tr>
<td>60</td>
<td>Beans and lentils</td>
</tr>
<tr>
<td>50</td>
<td>Fresh fruits of all types</td>
</tr>
<tr>
<td>35</td>
<td>Starchy vegetables like <em>white potatoes</em>, <em>squash</em>, <em>corn</em> and <em>carrots</em></td>
</tr>
<tr>
<td>30</td>
<td>Whole grains like <em>barley</em>, <em>brown rice</em>, <em>millet</em>, <em>oats</em> and <em>wheat</em></td>
</tr>
<tr>
<td>25</td>
<td>Raw nuts and seeds such as <em>almonds</em>, <em>walnuts</em>, <em>pecans</em>, <em>sunflower seeds</em></td>
</tr>
<tr>
<td>20</td>
<td>Fish, white chicken</td>
</tr>
<tr>
<td>18</td>
<td>Dairy milk from a farm and the same for their cheeses</td>
</tr>
<tr>
<td>15</td>
<td>Poultry and eggs</td>
</tr>
<tr>
<td>8</td>
<td>Red meat, pork, lamb</td>
</tr>
<tr>
<td>5</td>
<td>Pasteurized milk</td>
</tr>
<tr>
<td>3</td>
<td>Processed cheese</td>
</tr>
<tr>
<td>2</td>
<td>White flour and white rice</td>
</tr>
<tr>
<td>1</td>
<td>Refined oils</td>
</tr>
<tr>
<td>0</td>
<td>Refined sugar</td>
</tr>
</tbody>
</table>
and the burger or lunch meat is the muscle (animal protein). Even eating just beans and rice will be acid-producing because you are consuming what is basically just a bowl of seeds. Alkaline vegetables and herbs must be present to get the balance you need for longevity and disease reversal.

This kind of eating is the focus of a natural raw and living food diet. And here’s an example of balance: Let’s say you make a dehydrated flax cracker and a dip of avocado and tomato to go with it. These choices alone are mildly acid-forming. However, if you sprinkle kelp flakes on the dip and include a green leafy salad along with the dish, you create a balanced or more alkaline-forming meal.

**Soft Drinks Convey Acidity**

In the year 2000 it was reported in the *Archives of Pediatric Adolescent Medicine* that teenage girls who regularly consume acidic soft drink beverages experience a three to five-fold increase in bone fractures.\(^6\) The acidity of carbonated sodas has been calculated to be very acid at pH 2.8 to 3.2. (And as we have pointed out, the kidneys cannot excrete anything less than pH 5 into the urine without damaging the urinary system.)

### Table 3

**Drugs and chemicals that promote acidity:**

- Aspirin
- Street drugs
- Pharmaceutical drugs (excluding potassium or other such direct alkaline supplements)
- Environmental chemicals and pollutants
- Pesticides
- Herbicides
- Fungicides
- Tobacco
To achieve a urinary pH of 5, a 12-ounce can of soda pop would have to be diluted with water 100 fold in order to neutralize the acid. That would require a 33-fold increase in urine output. Of course, this healthy dilution never occurs among teenagers (or adults, for that matter). Instead, one soda begets another soft drink, since these beverages make you thirstier, not less. Add to this the acidic, refined junk foods we typically eat along with soft drinks and you can see why osteoporosis from the ensuing bodily acidity is rampant in the U.S.

To offset the acid effect of soft drinks, a corresponding amount of mineral buffers have to be drawn from the body to neutralize the phosphoric acid overload. This buffer originates in the body’s sodium and potassium supply if reserves permit. If unavailable from the blood, then there is a corresponding loss of calcium, magnesium and other minerals from the skeletal bones. Frighteningly, the buffering needed to neutralize one can of cola is equivalent to the buffering capacity found in four Tums® tablets. Naturally carbonated mineral waters, in contrast, do not add this type of acid burden to the body.

**Condiments and Sweeteners**

Ketchup, cocoa (not including raw cacao bean), coffee, vinegar, mustard, sandwich spread, most salad dressings and other bottled condiments are all considered acid-generating. Added to this list are the acidifying artificial sweeteners aspartame, saccharin, sucralose, neotame and acesulfame potassium as well as table salt.

**Candies, Cookies and Other Refined Sugar and Flour Products are Acidic**

All processed sweeteners turn desserts into acid-producing foods. These carbohydrate-based foods carry the same acid load as grain products (as noted in Table 2). Included in this category are the processed sugars: Maple syrup, sulfured molasses, sucrose (table sugar), high fructose corn syrup and really every other
sweetener that is extracted or processed from a whole food. Even evaporated cane juice falls into this acid-promoting category. You might even notice the drastic difference you feel in your energy after consuming a high sugar (acid) load in contrast to what you feel after an alkaline meal. Whether the acidity or the other adverse effects of refined sugar and excessively cooked grains on the body leads to this energy drain is controversial. However, the adverse effects of refined sugars on the body are well proven. Please be aware that the sweet herb stevia leaf is a healthy sweetener that is alkalizing, has been proven to have a zero rating on the glycemic index (it doesn’t mess with your blood sugar) and can help decrease your risk of diabetes and obesity.

**Animal Meats and Sulfuric Acidic**

The Standard American diet typically produces an excess load of acid that technically is expressed as 100 mEq to 200 mEq per day. However, research has shown that the human body can only neutralize about 50 mEq of metabolic acids in a day. And that’s an optimistic projection which assumes you are eating plenty of fruits and vegetables that provide buffering minerals. Eat fewer than four servings of fruit and five servings of vegetables daily, and the body won’t even be able to neutralize the 50 mEq of fixed acids in 24 hours. What all this means is that the excess acidity forces your body to call out the bone-buffering reserves available in your bones. And that process leads to slow but persistent bone mineral matrix deterioration, the major mechanism responsible for our present day osteoporosis epidemic.

The researchers Remer and Manz found that 120 grams of protein (about 4 ounces of meat) can create a net acid excretion of 135.5 mEq/day. Moderate protein diets (95 grams a day of protein) yield an excess of acid of 69 mEq/day to 112 mEq/day. A lacto-vegetarian “low” protein diet (49 grams a day of protein) yields an excess of only 24 mEq/day of acid.

So when you eat a diet filled with high-protein animal products,
you can end up with a six-fold increase in excess acid. The researchers further showed that measurements of first-morning urine pH indicated the body had run low on the minerals necessary to buffer this acidity. The result: A corresponding increase in metabolic acidosis.

Scientists also measure the body’s net acid production by examining the amount of sulfur-containing amino acids (the components of proteins) that are broken down to create acid. Cysteine, cystine, and methionine are the main three proteins involved in these reactions, but any of the seven acidic amino acids (aspartate, glutamate, cysteine, cystine, proline/hydroxyproline, serine and threonine) can contribute to the body’s organic acid load.

Remember that the body gets its buffering salts (minerals) from fruits, vegetables, lentils/pulses, herbs and spices. Fresh vegetable juicing, for example, is a fantastic and highly recommended source of micronutrients and buffering minerals.

It has been calculated that 16 ounces to 24 ounces of juice from organic vegetables is necessary to offset 40 mEq/day to 50 mEq of excess organic acid.70 This balances the diet enough to raise the first morning urine pH of 6.5 to 7.5, which indicates the body has access to adequate buffering mineral reserves.

**Animal (Dairy) Milks are Acidic**

There’s so much animal protein in milk that it sends the body way over on the acidic side of the alkalinity/acid scale. In addition to producing acidosis in the body, animal milks are associated with more allergies than any other food.

Milk is very a problematic food. When you drink milk you:

- Increase your risk of ischemic heart disease.71
- Increase your risk of testicular cancer.72
- Increase your risk of prostate cancer.73 Research shows that consumption of 2.5 servings of dairy per day boosts prostate
cancer risk by more than 30 percent.

Increase your risk of ovarian cancer: Among 80,326 women in the Nurse’s Health Study, those who consumed one or more dairy servings per day had a 44 percent higher risk for all types of invasive ovarian cancer compared to those who consumed three or less servings per month.

Consume industrial pollutants including dioxin-like chemicals such as polychlorinated biphenyls which commonly contaminate milk.

### Healing (Alkaline-Promoting) Foods

The alkaline-promoting foods (fresh fruits, vegetables, herbs, spices and herbal teas) are the foods that are also at the top of the nutrient density chart. These are also referred to as living foods.

#### Fruits

The most beneficial fruits are fresh fruit (and fresh-juiced). Dried fruit are second best followed by frozen fruit, cooked fruit, preserved (canned or bottled) fruit and candied or processed fruit (made into jams or jellies).

#### Vegetables

Fresh vegetables are also the best for your alkalinity and nutrition followed by dried, which are better than frozen, which are better than steamed, cooked or baked, which are better than canned or bottled, which are better than pickled or preserved, which are better than processed.

#### Herbs

Herbal preparations and spices have always been considered to be tools of healing. They also promote alkalinity in the body. But, for the most benefit, the teas made from herbs should not be heated above 118 degrees Fahrenheit. In fact, most raw foods undergo significant, deleterious chemical changes when heated above 118 degrees. Being cooked causes their delicate protein
structures called enzymes to break down, losing their original three-dimensional structure and molecular connections. That conversion process destroys their enzymatic functionality.

Researchers in Spain who measured the flavonoids (antioxidant phytonutrients) in broccoli found that fresh broccoli had the most, followed by steamed broccoli, conventionally cooked broccoli and microwave-cooked broccoli. Microwaving only left 3 percent of the flavonoids in the vegetable.75

Potassium-rich foods

Another important aspect of alkaline foods is their mineral content which is readily absorbed and available to buffer acids. And more than a few researchers equate their potassium content with their functionality as alkaline producers in the body.76 Not surprisingly, plenty of scientific studies have demonstrated a positive association between a high intake of alkali-rich fruits and vegetables with stronger bones.77

Table 4

<table>
<thead>
<tr>
<th>Food Serving</th>
<th>Potassium (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potato, baked with skin 1 medium</td>
<td>721</td>
</tr>
<tr>
<td>Prunes, dried ½ cup</td>
<td>633</td>
</tr>
<tr>
<td>Raisins ½ cup</td>
<td>598</td>
</tr>
<tr>
<td>Prune juice 6 fl oz.</td>
<td>530</td>
</tr>
<tr>
<td>Lima beans, cooked ½ cup</td>
<td>478</td>
</tr>
<tr>
<td>Banana 1 medium</td>
<td>467</td>
</tr>
<tr>
<td>Acorn squash, cooked ½ cup (cubes)</td>
<td>448</td>
</tr>
<tr>
<td>Tomato juice 6 fl oz.</td>
<td>400</td>
</tr>
<tr>
<td>Orange 1 medium</td>
<td>237</td>
</tr>
</tbody>
</table>

(USDA/ARS Nutrient Data Laboratory Food Database. Available at: http://www.nal.usda.gov/fnic/foodcomp/search/)
The effects of potassium also vary depending on what other element (anion) it is linked to in food or supplements. In some instances, potassium supplements have been shown helpful in reversing a number of acid-related conditions. On the other hand, potassium chloride, commonly used in processed foods, doesn’t have the same potent alkalizing ability as potassium citrate, found in living foods.\textsuperscript{78} Citrate is doubly beneficial because it is metabolized to bicarbonate in the body, thereby further adding to this compound’s buffering potential.

**Food Charts and Their Discrepancies**

Be very cautious about following the advice of the acid-alkaline food charts that have proliferated in books and online. In studying many of the published charts, I have found that quite a few contain obviously misleading information. Suspiciously, none of the published charts I examined (most of them online) had scientific references and I believe most all of them are merely inaccurate information copied from other misleading charts. Quite obviously, none of the chart makers have been doing measurements and following patients in any scientific manner.

For example, most published charts show dried figs and raisins to be extremely alkaline—more alkaline than oranges, grapefruits and lemons. This can’t be correct: We know that figs and raisins are some of the highest glycemic fruits, concentrated in sugar. Therefore, because of their sugar content, they must be relatively high in acid-forming residue (based on the scientific measurements we do have). Yet most of these misguided charts seem to agree that raisins, dates and figs are alkaline-forming in the body—without any evidence to support this assertion. It simply can’t be correct.

Another reputable clinic\textsuperscript{79} lists nut milks as acid-producing even though almonds are listed as being alkaline on that same chart. All oils are listed as acid-producing on this and most other charts, yet oils generally have a PRAL value of zero (neutral).
Alkaline Questions

Soy milk and tahini are listed as alkaline on some charts and acidic on others. So that makes me wonder why blueberries are listed as acidic-promoting and other berries, including strawberries and blackberries, as alkaline-forming.

So you can see that you have to be cautious about following these charts too closely. In general, you can rely on fruits and vegetables to be alkaline-producing in your diet. I wouldn’t be too hasty to believe that tomatoes are a big acid problem even though they are listed as acidic alongside sodas, artificial sweeteners and refined white sugar on a chart taken from Cleanse and Purify Thyself, by Richard Anderson, ND, NMD. Of course, other charts show tomatoes to be modestly alkaline-forming.

Other problematic claims that should inspire skepticism include:

- Almonds are sometimes listed as alkaline-forming even though walnuts are classified as highly acidifying.
- Ice cream is sometimes claimed to be far more alkaline than parmesan cheese.
- While dates and figs are listed as alkalizing, plums and prunes are classified as acidifying.

These questions could be answered by doing measurements of urine after consumption of each and comparing them to baseline. However, I cannot find much data on this.
The pH of Thoughts
And Emotions

When you endure heavy stress it causes significant physiological changes in your body. Distressing thoughts caused by excessive worry or anxiety can shift your metabolism. Starting with your brain function, stressful thoughts and emotions cause a cascade of events that trigger acid by-products.

Long-term stress forces your organs to work harder:

- Your kidneys have to filter more acids.
- Your liver sets to work creating more bile acids and keto acids linked to increased detoxification.
- Your heart strives to pump blood against arteries narrowed by the release of the stress hormones adrenaline and cortisol.
- Your digestive system struggles with poor digestion distorted by putrefaction and fermentation’s toxic byproducts.
- Even your pancreas may be taxed because it has to deal with sharp sugar swings resulting from your consumption of comforting dessert foods.

It is a fact that blood glucose climbs in times of physical or emotional stress. As the stress hormones adrenaline and cortisol are released by your adrenal gland the body responds by converting its stores of glycogen (chains of sugars) to the simple sugar, glucose, in order to fuel its fight or flight response.
Stress also leads your lungs to oxygenate less as you yield to shallow breathing—building more carbonic acid in the body. (Laughing or breathing hard during exercise can offset this development.) In addition, you may experience headaches, mental sluggishness, mood swings and unbalanced hormones from prolonged stress.

When stress chronically kicks the sympathetic nervous system into high gear (with fight or flight hormones called catecholamines), the unpleasant side effects pile up:

- If you have extended, deep, distressing feelings of rejection or the belief you are not loved you’re susceptible to weight gain.
- Financial strains can lead to persistent back pain.
- Emotional upsets and unhealthy thought patterns can bring on irritable bowel syndrome (IBS) and the muscle and joint dysfunction called fibromyalgia syndrome.

Interestingly, all of these conditions and others can be reversed when your thoughts and emotions consistently turn to confidence, love and gratitude. That is to say, every chronic illness has a mental and emotional root. The pH of the body is thought to become acidic during these stressful times (it can be measured in urine and saliva pH).

**The Spiritual Nature of Health**

One of my mentors on how emotions affect health is Gabriel Cousens, M.D., Diplomat of the American Board of Holistic Medicine, and Diplomat in Ayurveda, and Director of the Tree of Life Rejuvenation Center in Patagonia, Ariz. His latest book, *Spiritual Nutrition: Six Foundations for Spiritual Life and Awakening the Kundalini*, offers a wealth of insight into the spiritual nature of health and healing with foods from Mother Earth. He observes, “Repressed emotions, excessive anger, ‘acid’ thoughts, and other emotions can (all) increase acidity. I’ve documented that people with normally balanced pHs become acidic after
negative ‘acidic’ thoughts. In the Ayurvedic system, the pitta constitutional type tends to be acid. They become particularly acid with anger. The stress of an excessive lifestyle also contributes to acidity.”

Cousens continues, “The converse can happen as well. For instance, in one case, when a client of mine let go of her ‘acid’ negativities without any dietary change, her urine pH, which previously had been acid, became balanced. One patient, after a major psychological breakthrough from negativity, had her acid urine go to an alkaline pH of 7.5.”

**Improve Consciousness**

When people become conscious of their mental and emotional diseases and want to heal, they take specific actions to do so. One surefire method to accomplish this is to find peace in consuming raw fruits and vegetables and their juices. It is extremely helpful when your diet focuses on an increase in raw, biogenic foods, such as sprouted grains, nuts and seeds. When you sprout nuts, seeds, beans and grains they generally shift from being acidic-forming to alkaline-promoting. Protein taken in sprouted form is the best way to fulfill one’s dietary protein requirements and does not create the acidic internal environment which we know animal meats create in the body.

Folks who are conscious of their acid/alkaline balance also learn to squeeze a lime into water along with a squirt of liquid stevia to make an alkaline-boosting lime drink that actually quenches thirst (unlike the thirst-increasing effects of acidifying soda, beer, wine, coffee and sugary sweet drinks that so many people over-consume). Warm herbal teas should become a morning ritual for everyone who wants to be more alkaline.

**Less Stress**

In the search for a better mind-body relationship, you should become conscious of the influence the body produces on the mind and the benefits of minimizing your intake of animal meat, refined
sugars and refined oils. If you can learn quick and easy ways to prepare whole foods, you will significantly boost your health. Keep in mind: If you don’t want to eat raw vegetables, even cooked vegetables are better for body balance than acidifying foods.

Along with these food choices, becoming conscious of your thoughts and emotions often necessitates taking the time to do daily meditations and other stress-reduction techniques. A key tool for me is my favorite music streaming online at www.pandora.com where you can design your own internet radio station. I also love to find humor in life and ways to laugh at myself, all the while keeping in mind that my life’s journey is perfect and I will live forever, so there’s no need to be in a hurry.

Also, to lighten my stress, I exercise. Not to excess, but so that I am feeling the relaxing results of movement and physical release. This opens my pores, expands my lungs, gets my digestion moving, encourages my lymphatic flow, eases my arterial pressure (diastolic pressure drops during exercise in healthy people) and enhances my sex hormone production. Exercise is the poor man’s stress reduction technique (it’s free, it’s available 24/7) and I love it!
As you realize by now, your body has compartmentalized organ systems that operate best within specific pH ranges. Your body also has natural ways of eliminating excess acid through the lungs, kidneys and skin. Although it is not common for your blood pH level to shift into significant acidity, your pH can be measured and monitored and you can get a good idea of the pH of your tissues and metabolism.

Clinical determination of your systemic acid load can be made via a few different methods. First, you can keep a diet diary for at least three to seven days and record how much processed food and animal protein you consume relative to your fruit and vegetable consumption. This is the indicator that’s most commonly used. In fact, this method is usually sufficient to raise your awareness of how to boost your consumption of alkaline foods and create better long-term health for you.

But you can also measure pH by using a narrow-range pH indicator paper, also called litmus pH test strips. These can usually be found at your local pharmacy.

Remember that urine is slightly more acidic than saliva—urine is continually excreting excess acid as a mechanism to balance body pH. The urine excretion of acids varies according to your daily activities, foods and other acid loads of the day. Therefore, you will generally receive a more accurate reflection of your current tissue pH by testing saliva rather than urine.
Urine pH

Urine pH can change frequently. The extremes of urine pH values range from 4.5 to 9.0, with an ideal range between 6.0 and 7.0. The most accurate daily measurement of urine pH using litmus paper is the first morning urine. If your urinary pH ranges between 6.0 and 6.5 first thing in the morning then your body is functioning within a healthy range. Moreover, an evening urine pH between 6.5 and 7.0 also is normal.

Clinically, research shows that the urine pH changes after a meal in as little as two hours. To ensure accuracy, patient studies involve a fasting urine sample and allow for control of water intake during the fasting period. Also, intra- and inter-individual variability is further reduced by taking a variety of pH readings at varying times.
The results of urine pH testing indicate how well your body is assimilating minerals, especially calcium, magnesium, sodium and potassium. These acid buffers are used by the body to minimize acid build-up outside of the homeostatic pH of the blood. If acid levels are too high, the body cannot adequately excrete acid. Therefore, it must either store the acid in body tissues (a form of what’s called auto-intoxication) or buffer it by borrowing minerals from organs, primarily bones, in order to neutralize acidity.

The urine pH also reveals the alkaline (building) and acid (tearing down) metabolism of proteins and amino acids. It provides a detailed picture of the efforts of other organs of the body—adrenals, lungs and gonads—to regulate pH with buffering salts and hormones. And urine provides a fairly accurate snapshot of body chemistry; the kidneys filter out the buffering salts and urine testing allows measurement of the pH values of what the body is eliminating.

**Saliva pH**

Testing the pH of your saliva, which indicates the health of your extracellular fluids, is easier than urine pH testing. The optimal pH for saliva ranges from 6.6 to 7.5 and a reading below 6.4 indicates insufficient alkaline reserves. Right after a meal, your saliva pH should rise to around 7.5 or more but then should drop back to the normal range two or more hours later.

The results of saliva testing also reflect the activity of digestive enzymes in your mouth and other parts of your body, and can be used to estimate the pH of your lymphatic fluids. Remember, your lymphatic fluids occupy the spaces between cells throughout your body and are in communication with your blood. (Lymph mirrors conditions in the blood.)

The best time to test your saliva pH is about one hour before a meal and two hours after a meal.
Simply spit onto a spoon and dip litmus paper into it; or wet a piece of litmus paper with your tongue. Your litmus paper should come with a color scale allowing you to match the color of your wet paper (you may need to wait 10 seconds for the color to set) to the corresponding pH value.
The raw foods movement, which advocates restricting your diet to nothing but raw food, represents the most aggressive perspective on adopting an alkaline foods diet. The people involved in this movement are also transforming health, arguing for the wisdom of strictly eating foods that were provided by Mother Earth which contain the most nutrients and healing properties.81

Here are a variety of points of view from within this movement:

Markus Rothkranz 82

At age 27, Markus Rothkranz had heart problems, chronic bronchitis, allergies, anemia, poor vision and recurring viral illnesses. His diet was full of processed and refined foods, including animal meat, dairy and plenty of junk foods. Now he has shifted to alkaline foods—raw gourmet foods. At age 45 he looks better than he did 20 years before—like a rock star. He attributes it to the alkaline (living) foods that now make up his diet.

Morgan Spurlock

After Morgan Spurlock starred in the movie Supersize Me, where he trashed his body onscreen by eating nothing but McDonald’s® food for 30 days straight, he tells what happened to him and his health right after the film was completed: “My wife Alex put me on a detox diet—where she… cut out all sugar, all caffeine, all processed foods and all additives. It was basically all fruits and vegetables, whole grains, and there was nothing that was not somehow based on a natural product. My blood pressure had gone back to normal, my cholesterol had gone back to normal, my liver functions had gone back to normal… We (Americans)
have lived so long where we kind of enjoyed abusing our body… we drink, we smoke, we eat poorly, we don’t exercise… to make that complete 180 degree turn to start eating well and take care of ourselves is a whole other life! I think we’ve become so distanced from our food that we’ve forgotten what food (should be).”

Woody Harrelson

Woody Harrelson turned to a more base-producing diet in order to find more personal energy. He says, “I was basically on an energetic pursuit because I just didn’t want to have to go lay down. So I stopped eating all red meat and then eventually I stopped all dairy. I had tons of acne and red discoloration on my face… raw food is the best way to have the cleanest energy. We care more about the fuel that we put into our cars than the fuel we put into our body. Raw food is the cleanest burning fuel.”

Angela Stokes

Angela Stokes weighed more than 300 pounds with an underactive thyroid gland when she decided to eat a diet of raw foods. As seen on CNN in September, 2008, her story revealed that by consuming raw foods she lost half her body weight. She started the raw foods diet while working in a green house in Iceland of all places! She started with nuts, seeds, vegetables and fruits in their unheated, unprocessed condition—consistently eating them every day. And in two years she lost 160 pounds. She characterizes this type of diet as an amazing lifestyle choice we can make for ourselves. She recommends starting out by eating at least 50 percent of your food in the uncooked, whole food state. These, of course, are the alkaline living foods. Then you can easily take it further from there. She further recommends eating a variety of whole foods, starting with foods you are familiar with. You’ll also need to have plenty of social support, she says, since it can be very challenging emotionally and socially to eat so differently.

Dina Knight

Another interesting example is Dina Knight, who lost 115 pounds shifting to raw gourmet foods. She says: “That’s the
exciting thing—to make delicious foods that are so healing to your body.” She went from a dress size 24 to an eight. Not only did her energy improve dramatically, but it also improved her mood and how she feels about herself. “If you don’t put the right fuel into your body you don’t get the right information to your cells to create the ‘you’ that you want to be,” she exclaims.

**Matt Monarch**

Angela’s fiancé, Matt Monarch, tells his story of how he learned to eat alkaline, living foods and the health transformation he experienced: “I was actually handed a book. When I opened that book I couldn’t believe what I reading… certain things like what processed sugars and refined foods were doing to my body. I finished the book in one night and the next day I became a 100 percent raw food eater.” Now Matt consumes only living foods; primarily vegetables, fruits and nuts, micro-greens, coconuts and sprouted beans. With raw Nori, he says, you can make homemade sushi, using avocados, nut pâtés and spices. When eating out, his favorite is fresh juiced celery, dandelion and kale juice. He adds, “I don’t miss cooked foods anymore. The raw foods restaurants I go to are just amazing. I can actually duplicate any taste that I used to love; sweet, nutty… vibrant, live… even raw lasagna using zucchini for strips of pasta; yummy greens, mushrooms and tomato sauce with dried tomatoes.

**Tim Van Orden**

Tim Van Orden, a competitive athlete, shares his story on how and why he went raw. He feels raw food boosts his athletic ability better than steroids. He was sedentary for 17 years and was a computer consultant. Today, at 43, he’s training for the triathlon.

**Phillip**

Phillip used to weigh more than 400 pounds and was headed to gastric bypass surgery. Before surgery, however, he tried everything else including weight lifting at seven different gyms, physical trainers, Atkins™ diet, Blood Type diet, diet pills, fasting with water, vegetarian/vegan only, hypnotism for weight loss, guided imagery,
hospital nutritionist, nutrition counselor, juicing, martial arts classes and exercise videos. Nothing worked until he lost more than 125 pounds by eating raw food. On his video (http://www.thebestofraw-food.com/raw-food-diet-testimonials.html) he shows some of the foods he now enjoys including fresh apples, pears, rainbow chard, sprouts (micro-greens), juiced wheatgrass, young coconut meat, salad creations, raw tacos (flax taco shells), avocado macadamia nut appetizers and chocolate (raw cacao) blueberry pie!

Michelle

Michelle lost 160 pounds on her raw food diet in a little over one year. Her health improvements included an end to her sleep apnea, reflux, edema, lower back pain, oily hair, oily skin, heart flutters, chronic bronchitis and pneumonia, depression, fast-food cravings, lack of control of eating and intense food cravings. Now she is happy to report she has cut back on her medications, can finally fit in her bathtub, venture out to the supermarket and stop eating compulsively. She is feeling healthy and much happier now.

The Case for Keeping Your Body Alkaline

The science of pH balance in the body tissues, therefore, has tremendous scientific merit. I hope that by exploring the health issues influenced by your body’s pH I have made you realize that chronic low-grade tissue acidosis is a real phenomenon and can be reversed with simple, but rewarding, lifestyle and dietary changes. Chronic acidosis is linked to the standard American diet, prescription and over-the-counter drugs, environmental chemicals like pesticides and herbicides, and even stress, among many other causes.

In order to maintain your blood in the narrow pH range that supports life day-to-day, your body continually compensates by moving its minerals in and out of the cells. If you eat a highly acid-promoting diet, this eventually leads to tissue acidosis, bone mineral loss and can even slowly damage multiple other organs. Remember also that acid and lack of oxygen stimulates cancer growth.
The healthy solution is to keep your body alkalized by reversing the very same mechanisms that cause acidity over time. This health-renewing process starts with maximizing the amount of raw living foods you consume: Fill your diet with vegetables, fruits and herbs. Along with these foods, eliminate the acid-forming foods without compromising your nutrient intake. Of course, it simultaneously necessitates that you calm your thoughts and emotions, cleansing your mind of toxic thoughts while ridding your body of acid toxic build-up and acid-causing pollutants. You can monitor your own pH with a diet diary and/or test the pH of your urine pH and saliva pH.

Your health and longevity depend on your awareness of how pH shapes your wellbeing. So keep on the alkaline side of the pH scale. This will broaden your health horizons, help you reverse chronic illnesses and even defy the aging process altogether.
Alkalizing Recipes

BEVERAGES

Tomato Juice Plus
Serves 2

Ingredients:
3 cups chopped tomatoes
1 stalk celery
1 cucumber
3 drops stevia (optional)
½ teaspoon Himalaya sea salt
Black pepper
Cayenne pepper

Directions: Juice tomatoes, celery and cucumber in juicer. Add 3 drops of stevia if you desire sweeter juice. Add salt, black pepper and cayenne pepper to taste. You can also add ¼ onion, fresh oregano, basil and red bell pepper.
Chocolate Nutrition Hot Drink or Cold Smoothie
Serves 2

Ingredients:
1 teaspoon raw carob powder (or raw cacao)
1 tablespoon goji berries
½ teaspoon maca powder
1 teaspoon bee pollen
1 tablespoon hemp seed
1 teaspoon raw honey (or yacon root or few drops stevia)
1 teaspoon green powder (spirulina, chlorella or wheatgrass)
Few leaves of greens (such as spinach or dandelion)
Few scoops of coconut meat (optional)

If serving hot: Add 2 cups hot herbal tea
If serving cold: Add coconut water or water; ice to consistency

Directions: Mix all in a power blender.
Green Smoothie
Serves 2

Ingredients:
5 leaves of red leaf lettuce
½ avocado
2 stalks celery
½ lemon
5 stalks parsley or cilantro
2 cups water

Directions: Mix all ingredients in blender.

Carrot Juice
Serves 2

Ingredients:
4 pounds carrots
1 lemon
Yacon syrup, agave nectar or stevia liquid as sweetener

Directions: Juice carrots in juicer. Cut off most all lemon peel and juice ½ lemon. Add sweetener to taste.

Optional: Juice some green leafy vegetables with the carrots for extra alkalizing minerals. (Consider using greens, kale, lettuce, celery, fennel and apple.)
Hemp & Berry Smoothie
Serves 2

Ingredients:
1 banana
2 tablespoon hulled hemp seed
1 bag frozen berries
1 cup water

Directions: Put all ingredients in high speed blender. Add enough water so all ingredients are covered. Blend well. Optional: 1 cup almond milk or rice milk instead of water.

BREAKFAST

Breakfast Smoothie
Serves 2

Ingredients:
1 mango fresh or frozen
1 banana fresh or frozen
1 cup pineapple
1 squeeze of agave syrup (or to taste)
Shredded coconut to taste
Ice (more or less depending on frozen fruits used)
Water for desired consistency

Directions: Water and fresh fruits go in blender first, then frozen fruits and ice. Use as little agave nectar as possible.
Zucchini Banana Bread
Serves 2

Ingredients:
1 small zucchini
Juice of ½ lemon
2 ripe bananas
1 lemon
½ cup raisins
1 ½ cups raw flaked oats or rolled oats

Directions: In food processor, combine one small zucchini, two ripe bananas and juice of one lemon. Puree. Stir in 1 ½ cups flaked oats and ½ cup raisins. Spread out on non-stick paper or fruit leather tray and dry at 95°F for 8 hours, then flip over and continue for 2 or more hours for desired consistency.

Fruit Porridge
Serves 2

Ingredients:
2 cups soaked almonds (soak at least 4 hours, then drain)
2 cups fresh raspberries or strawberries
¼ cup dried papaya or dried similar fruit (plum, apricot, etc.)
1 cup cucumber juice or coconut water

Directions: Place all ingredients in power blender and process to porridge consistency. Add in juice slowly to keep the porridge from becoming too runny.
Raw “Oatmeal”
Serves 2

Ingredients:
2 apples
1 banana
1 tablespoon golden flax seed
2 teaspoon cinnamon

Directions: Soak flax seeds overnight, then rinse. Using power blender, blend apples, banana and soaked flax seeds together, adding ¼ cup water (hot if you like) so mixture blends until smooth. Use more water if too thick.

Optional: Replace water with almond cream or fresh juice and add tablespoon of hemp seeds or soaked nuts and raisins. Also, you can add oatmeal the first few times you eat this to ease the transition away from grains.

Apple Raisin Walnut Oatmeal
Serves 2

Ingredients:
1 cup oat groats (pre-soaked in the fridge overnight, or at least 8 hours and then drained)
1 apple, peeled and cored (any tart apple will do)
¼ cup raisins (or more or less to taste)
½ cup shredded unsweetened coconut
½ cup walnuts, chopped
Agave nectar to taste
Cinnamon to taste
Balancing Body Chemistry

**Directions:** In food processor, chop oat groats until they resemble coarse oatmeal. Don’t blend too long; leave them textured. Then, cut apple into quarters and then cut each in half. Mix apples slices into food processor with oat groats and add cinnamon. Keep apples from getting pulverized. Remove from processor and in mixing bowl, add raisins, coconut, walnuts and agave. Heat or eat cold.

**Banana Pancakes**
Serves 2

**Ingredients:**
- 1 banana
- 4 tablespoon coconut meal or dried coconut
- Cinnamon

**Directions:** Mash banana with fork in bowl until very smooth. Add coconut meal and some cinnamon to taste. Mix well. Flatten banana/coconut dough and make small pancakes out of them. Either use dehydrator or leave them out in direct sunlight for about 1 hour and then flip over and leave for another hour.

**Granola**
Serves 2

**Ingredients:**
- Raw granola
- Coconut yogurt

**Directions:** Using raw granola (available at health food stores) add coconut yogurt or apple avocado mousse (see recipe below).
Apple Avocado Mousse
Serves 2

Ingredients:
1 avocado
2 apples
¼ cup water

Directions: Peel apples, add avocado meat. Put mixture in mixing bowl and mix well with a hand mixer or food processor.

Vanilla Yogurt
Serves 1

Ingredients:
½ cup coconut water
1 cup coconut meat
½ teaspoon vanilla extract

Directions: Open coconut with cleaver. Pour coconut water in high speed blender and some or all of the coconut. Blend well with vanilla. (You should get the consistency of yogurt.)

Optional: Add fruit of your choice such as peach, strawberries, mango or pear. Serve with granola for breakfast. (Blend with ice and you can make ice cream.)
Gazpacho Soup
Serves 2

Ingredients:
4 tomatoes, diced
½ medium white onion, diced
1 clove garlic, peeled and minced
Lemon juice to taste
1 cucumber, peeled and chopped

Hold aside for serving:
4 tablespoon freshly chopped cilantro
1 scallion, finely chopped, for garnish
1 red bell pepper, seeded, cored and diced
1 tablespoon raw virgin olive oil
¼ cup mango, diced in small cubes

Directions: Place all ingredients in power blender and puree. Strain (vegetable press is easiest) to remove any vegetable pieces and pits that are not fully liquefied (like tomato skins or seeds). Alternatively, put all ingredients in juicer, using a coarse screen. Chill overnight, if time permits. Before serving, sprinkle with chopped scallions, olive oil, some finely cut cilantro and mango.

Tip: Instead of red bell pepper, mango and cilantro, you can use pesto and fresh basil leaves as topping.
Romaine Roll-Ups
Serves 4

Ingredients:
1 large head of romaine lettuce
3 large tomatoes, finely chopped
1 avocado, peeled, pitted, and finely chopped
1 handful alfalfa sprouts
2 tablespoon fresh cilantro, finely chopped
Basil, oregano, or mint, finely chopped
Maui onion, finely chopped (optional)

Directions: Separate leaves of the lettuce and place on a plate. In a bowl, combine tomatoes, avocado, alfalfa, cilantro, basil, oregano, or mint, onion (if using) to make the filling. Spoon in a generous amount of the filling at one end of each lettuce leaf. Roll the sides of the leaf over, fold in half.
Zucchini Linguine with Basil Pesto
Serves 4

**Ingredients:**

**For the Basil Pesto:**
- 2 cups tightly packed basil
- ½ cup pine nuts
- ¼ cup pumpkin seeds
- 1 tablespoon lemon juice
- 1 clove garlic
- ½ teaspoon sea salt
- ¼ cup cold pressed olive oil

**For the Zucchini Linguini:**
- 3 large zucchini
- 2 medium tomatoes
- 8 to 10 dried olives
- ½ red capsicum
- 2 tablespoon pine nuts
- ½ cup basil pesto

**Directions:**

**For the Pesto:** Soak pine nuts and pumpkin seeds for at least 4 hours. Drain and rinse. Place all ingredients apart from water into a food processor and process until almost smooth. (Let it retain a little texture.) Add a little water at a time if it seems too dry. Store in a glass jar in the fridge for up to a week.

**For the Zucchini Linguini:** Use a julienne-type peeler (or spiralizer) to slice zucchini lengthways into long noodles and place in large bowl. Chop tomatoes and capsicum, chop the olives and add these with pine nuts to zucchini. Add pesto and mix thoroughly to combine. Leave to sit for one hour before serving to let noodles soften.
Spaghetti
Serves 4

Ingredients:

Spaghetti:
2 to 4 yellow/green zucchini cut on a saladacco slicer. Squirt fresh lemon juice and set aside.

Sauce:
2 cups cherry tomatoes
1 cup sun dried tomatoes (soaked for 1-2 hours)
1 teaspoon tomato concentrate
2 pitted dates
3 tablespoon olive oil
2 cloves garlic
3 tablespoon fresh parsley
1 pinch fresh oregano
1 handful fresh basil
1 teaspoon Italian seasoning
1 teaspoon sea salt

Savory Nut Balls:
1 small red onion
1 bell pepper
2 carrots
1 cup burdock puree (you can grate it on very fine grater, or blend with the water); the burdock root CAN NOT be replaced with a substitute, the burdock gives the burger a meaty flavor
1 cup soaked almonds
½ cup soaked sunflower seeds
¼ cup walnuts
2 cloves garlic
1 stick celery (minced)
Pinch of turmeric
1 teaspoon cumin
2 teaspoon dried cilantro or 1-2 cups fresh

Directions:
Sauce: Blend everything till smooth. Add tomato, and water to desired consistency. Toss with “spaghetti” and serve with savory nut balls.

Nut balls: Process everything in food processor. Add a little water if needed. Lay a piece of parchment paper on table, put your burger mixture on top, get another piece of parchment and put it on top of the mixture, using a rolling pin or the palms of your hand, roll the dough to ½ inch thickness. Then using cookie cutter or cup cut out patty shapes, and place patties on Teflex sheets, dehydrate in dehydrator for two hours at 145°F. (This time is specifically for the Excalibur dryer at this temperature.) Then bring the temperature down to 115°F. and continue to dehydrate until it has a desired consistency.
Lettuce Wraps
Serves 4

Ingredients:

- ½ cup hemp seed
- ½ cup lemon juice
- 1 ½ tablespoon chopped ginger
- ½ tablespoon red chili
- 1 tablespoon soy sauce
- 1 cup raw almond butter
- ½ head savoy cabbage, shredded
- 6 very large wild spinach leaves
- 1 carrot
- 1 ripe mango
- 1 handful cilantro leaves
- 1 handful torn basil leaves
- Sea salt
- 1 tablespoon raw honey

Directions: Cut carrot into matchstick-size pieces. Cut mango length-wise into strips, about ¼ inches (1 cm) thick. In power blender, puree honey, lemon juice, ginger, red chili and soy sauce. Add almond butter and blend at low speed to combine to get a thick consistency. Add water if it needs to be thinner. In bowl, mix almond butter dressing with cabbage with your hands or a large spoon. Now roll cabbage with dressing into a “lettuce” wrap. (Careful, this is kind of tricky.) Place spinach leaf on cutting board with underside facing up. Then put some of the cabbage mix on the leaf and add some hemp seeds, a few carrot sticks, a few pieces of mango and a few leaves of cilantro and basil. Roll up spinach leaf if at all possible using a toothpick to hold it in place. Do this for all the spinach leaves until ingredients have been used.
**Veggie Pot Pie**  
**Serves 2**

**Ingredients:**
- 1 cup oat flour (made from raw oat groats ground to a fine powder)
- ¼ cup sprouted spelt flour (same as above)
- Water—as needed
- 3 carrots
- ½ cup chopped white and red onions soaked in water overnight to reduce acidity
- 2 celery ribs
- 6 large crimini (baby portabello) mushrooms
- ½ cup pine nuts
- 1 cup water
- 2 tablespoon avocado
- 1 teaspoon apple cider vinegar
- ¼ teaspoon salt

**Directions:**

**Crust:** In a bowl, combine spelt and oat flours (plus ½ teaspoon salt and 1 teaspoon olive oil). Add water until a sticky dough forms or do this step in a food processor. Roll out dough onto plastic wrap and cover with plastic wrap, flatten until it reaches ¼ inch thickness or however you prefer. Cut out circles from dough using pot pie bowls to measure for size (they will shrink a little in the dehydrator). Re-roll excess dough and repeat. Dehydrate at 95°F while preparing vegetables.

**Vegetables:** Dice vegetables and combine in large bowl. In power blender combine all ingredients from pine nuts through salt and process until it has the consistency of a thin cream. Pour over vegetables. Evenly distribute mixture among serving bowls (makes 4). Use all the sauce. When vegetables are done, remove crusts from dehydrator. Wet edges of each individual crust and press over bowl to seal. Repeat with remaining crusts and bowls. With filling inserted, return each pot pie the dehydrator at 105°F for 2 hours or less to desired consistency.
**Tomato Basil Soup**
Serves 2

**Ingredients:**
- 1 cup cubed cucumber
- ½ zucchini
- ½ red, orange or yellow capsicum
- ½ avocado
- 2 tomatoes
- 1 cup tightly packed spinach
- ½ cup fresh basil
- 2 teaspoon unpasteurized miso
- 1 teaspoon tamari
- Juice of 1 lemon
- 1 to 2 cups water
- Sea salt and freshly cracked pepper to taste

**Directions:** Place everything in blender starting with cucumber and peppers and blend until smooth. Serve cold with extra chunks of tomato, cucumber and avocado.
Cream of Cauliflower Soup
Serves 2

Ingredients:
2 cups cauliflower
2-3 cups water
½ cup cashews or pine nuts
2 teaspoon lemon juice
Sea salt to taste

Directions: Put everything in high speed blender and blend till thick and smooth. Serve at room temperature.
Creamy Crunchy Avocado Soup
Serves 2

Ingredients for base:
2 avocados
1 large lime
2½ cups water (hot if you like soup warm)
½ cup olive oil
1 tablespoon raw vinegar (or to taste)
1 cup cilantro or coriander

Ingredients for veggies:
2 stalks of celery, chopped
2 carrots, chopped
1 cucumber, chopped
1 bunch of green onions, chopped
Any other favorite veggies

Directions: Place meat of avocados, juice of squeezed lime, (hot) water, oil, vinegar and cilantro in blender. Blend until creamy and hot if your blender heats it too. You may add more or less water to your preference. Chop up all your veggies and place in large bowl. Pour soup base over top. Add salt/pepper to your liking.
DIPS / SAUCES

Hummus
Serves 4

Ingredients:
1 large and ripe avocado, mashed with sea salt
1 peeled and chopped zucchini or ½ head of soaked broccoli florets without stems
1 small chopped shallot (green only)
1 pinch of lemon juice (optional)
1 clove garlic (optional)
1 sprinkle sea salt

Directions: Combine all ingredients (with a little water) for blending into food processor and mix until smooth. Add lemon juice after the first serving to keep it fresh for next day. This makes an excellent dip or salad dressing.
**Apple Butter**
Serves 4

**Ingredients:**
- 2 small apples
- 5 pitted dates
- ½ cup water (a tiny bit more if you need help getting the mixture to move)
- ¼ cup oats
- Sprinkle of cinnamon
- Pinch of cloves

**Directions:** Wash and core apples. Blend all ingredients together in blender or food processor. Ready to eat straight from the blender.

**Home Made Pesto**
Serves 2

**Ingredients:**
- 1 bunch of parsley
- 2 bunches basil
- ¼ cup pine nuts
- 1/8 teaspoon sea salt
- ¼ cup olive oil (or more if wanted for smooth consistency)

**Directions:** Put all ingredients in food-processor: It quickly becomes great pesto for salad dressings (add some lemon juice for this), and goes great with pasta sauce or with sprouted bread.
Spinach Dip
Serves 4

Ingredients:
10 oz fresh spinach
½ organic red onion
1½ cups raw almonds (soaked and dehydrated)
½ cups raw cashews (soaked and dehydrated)
¼ cup olive oil
1½ cups water
½ cup of fresh-squeezed lemon juice
4 garlic cloves
2 teaspoon sea salt

Directions: Chop spinach and red onion and place in mixing bowl. Put remaining ingredients in blender and blend until smooth. Combine blender contents in bowl and mix. Chill for 1-2 hours to increase the dip’s thickness. Garnish with chopped red bell pepper for color.
Guacamole
Serves 4

Ingredients:
3 avocados, pitted
1 onion, diced
2 tomatoes, diced
2 sprigs fresh cilantro, finely chopped
Juice of 1 lime or lemon
1 clove garlic
Cayenne pepper to taste
Sea salt to taste
½ cup coconut water (or water)

Directions: Scoop out avocado meat and cut into chunks, place in a large bowl and mash with a spoon. Gently stir in the onions, tomatoes and cilantro. Squeeze garlic through a garlic press and add. Add lime juice and stir in salt to taste. Add the water as desired.
Optional: Serve with flax seed crackers, Ezekiel bread or rosemary crackers or as a dip.
DESSERTS

Raw Brownies
Serves 4

Ingredients:
2 cups ground pecans
2/3 cup cacao powder
2 teaspoon agave nectar
2 cups pitted dates
2 teaspoon vanilla extract (estimate)

Directions: Process all ingredients in food processor. Press into brownie pan. Cool for at least 10 minutes to firm them up a bit. ENJOY!

Macadamia Squares
Serves 4

Ingredients:
1 1/2 cup macadamia nut paste (mix nuts and water in food processor)
1 to 2 tablespoon coconut oil
Seeds of one vanilla bean or vanilla extract to taste*

Directions: Mix all together in bowl, then pour into small dish and put in freezer until hard. Cut into squares

*To get the seeds out of a vanilla pod cut it down the middle lengthwise and scrape the seeds out of each side with a spoon or knife.
Apple Berry Strudel
Serves 4

Filling ingredients:
3 cups apples, peeled
1 teaspoon fresh lemon zest
1 tablespoon fresh lemon juice
1 cup blackberry, fresh or frozen
1 cup fresh strawberries, sliced
½ teaspoon sea salt
2 tablespoon cornstarch
1 teaspoon cinnamon, ground
1 cup blueberries, fresh or frozen
2 tablespoon coconut butter
¼ cup agave nectar or yacon syrup
½ cup coconut water (or water)

Pie crust ingredients:
3 cups soaked (and dried) almonds or cashews
3 tablespoon agave nectar
1 teaspoon vanilla extract

Directions:
Crust: Preheat oven to 425° F. Place ingredients into food processor and mix into paste. Place on lightly floured surface and roll out; transfer to pie pan. When filling is placed therein, flip up crust edge towards middle, pleating as you fold up.

Filling: Peel and thinly slice apples; place in bowl, top with lemon zest and juice; set aside. In large mixing
bowl, place strawberries, blueberries, blackberries, salt, cinnamon, cornstarch and agave nectar/yacon syrup; add water; blend together; set aside. Gently combine apple and berry mixtures.

Place fruit mixture into center of pie crust, leaving 1½ inch border around edge of crust. Place coconut butter pats on fruit filling.

**Baking:** Bake in preheated 425°F oven for 10 minutes keeping fruit from cooking all the way. Rotate 180° half way through baking. Cool on wire rack; serve warm or at room temperature.

**Carob Balls**

Serves 3

**Ingredients:**

- 1 cup carob powder
- ¼ cup coconut oil
- 2 pitted dates
- ½ cup unsweetened coconut
- 3 tablespoon agave nectar or yacon syrup

**Directions:** Mix ingredients in food processor in order to get dates to mix in. Make into balls on wax-paper covered baking sheets and place into freezer at least 30 min.
Chocolate-Strawberry Pie
Serves 4

Pie crust:
1 cup soaked almonds
1 cup soaked pecan nuts
1½ cup pitted dates
½ cup raw cacao powder
½ cup raw cacao nibs
½ cup dried coconut flakes
2 tablespoon agave nectar

Filling:
3 cups strawberries (save a few for decoration)
2/3 cup ground cashew nuts or almonds
Juice of 1 lime or ½ lemon
2 to 4 tablespoon agave nectar or yacon syrup

Directions:
Crust: put all ingredients in food processor and blend until mixture sticks together and form into a crust in the tart pan.

Filling: Mix strawberries with ground nuts adding some agave and lime/lemon juice. When mostly smooth but still a bit coarse pour over crust and decorate with fresh strawberry slices. Sprinkle gently with coconut flakes. Keep in freezer for an hour before serving.
Pecan Pie
Serves 4

Filling Ingredients:
¾ cup pecans
½ cup quick oats
2 large eggs, beaten
¼ cup unsalted butter, melted
½ teaspoon sea salt
½ teaspoon vanilla extract
2 tablespoon water
1 teaspoon molasses
¼ cup agave nectar or yacon syrup

Crust ingredients:
3 cups soaked (and dried) almonds or cashews
3 tablespoon agave nectar
1 teaspoon vanilla extract

Directions:
Crust: Preheat oven to 350° F. Place crust ingredients into food processor and mix into paste. Place on lightly floured surface and roll out; transfer to pie pan.

Filling: Assemble all ingredients. In large mixing bowl combine agave nectar, oats, melted butter, salt, beaten eggs, vanilla, water and molasses. Mix well. Add in pecans and finish mixing. Pour filling into crust. Bake at 350° F for 30-45 min. Serve hot or cold.
Cheesecake with Fresh Strawberry Topping
Serves 8

Filling:
1 lb (2 cups) cream cheese
½ lb (1 cup) Neufchatel cheese
4 eggs
1 tablespoon fresh lemon zest
4 tablespoon fresh lemon juice
¼ teaspoon sea salt
¼ cup agave nectar or yacon syrup

Topping:
2½ cups fresh strawberries cut in quarters
¼ teaspoon sea salt
1 tablespoon agave nectar or yacon syrup

Crust:
3 cups soaked (and dried) almonds or cashews
3 tablespoon agave nectar
1 teaspoon vanilla extract

Directions: Place crust ingredients into food processor and mix into paste. Place on lightly floured surface and roll out; transfer to pie pan.
Blend together filling ingredients, adding in one egg at a time. Pour this mixture into crust. Bake at 325°F for 45 minutes. Mix topping ingredients and refrigerate while cheesecake is baking. After cooled, topping goes on best to individual pieces.
Raw Chocolate Cake/Pie
Serves 10

Crust:
½ cup cacao powder
½ cup carob
½ cup ground (soaked) almonds
⅓ cup agave nectar
¼ cup coconut or cacao butter
Pinch of sea salt

Filling:
2 cups cacao powder
1½ cups agave nectar
1 cup coconut or cacao butter
1 tablespoon vanilla extract
1 teaspoon maca powder (optional)

Garnish:
Strawberries, raspberries or oranges

Directions:
Crust: Combine and mix all crust ingredients by hand or standing mixer until dough-like consistency. Press dough evenly into 7 inch tart pan with non-stick bottom. Chill in the fridge for at least an hour.

Filling: Blend all filling ingredients in blender until very smooth and pour into cake crust. Put the cake back in fridge and chill for at least another hour. Before serving, decorate cake with berries, orange or other fruit.

This is one of the best raw food desserts ever!
APPENDIX

The Meaning of Acidity

The pH, or “potential of Hydrogen” is a measurement of acidity. To understand what this means, first keep in mind that all molecules are composed of atoms. Every atom has a nucleus at its core that carries a positive electric charge and an outer shell of electrons with an opposing negative electric charge. The smallest atomic element is hydrogen. The next elements on the periodic table in increasing size (mass) are helium, beryllium, lithium, boron, carbon, nitrogen, oxygen and so forth.

The chemistry of hydrogen is what makes a substance acid or
basic. Acidic substances release hydrogen in a solution while basic compounds take hydrogen in and remove it.

In the formation of water, two hydrogen atoms combine with an oxygen atom to make H₂O (the chemical formula for water). When the connecting bonds of hydrogen to other molecules are weak, such as in hydrochloric acid (HCl) in a solution, then hydrogen carries a positive electrical charge (ion) and is called a hydrogen ion (H⁺). When a substance possesses an excess of hydrogen ions (H⁺) the substance is considered an acid; the hydrogen ions are available to be donated. Hydrochloric acid is the very powerful acid of the human stomach. Thus, the potential of hydrogen (pH) is on the acidic side of the acid-base measurement scale.

Conversely, when a solution has an overall deficiency of hydrogen ions, it is because hydrogen has combined with another element and together they carry an overall negative electrical charge. This is the case when hydrogen combines with oxygen to form the negatively charged hydroxyl ion (OH⁻). When a substance has an excess of hydroxyl ions (OH⁻) then the solution becomes a base (ready to take hydrogen atoms). In that case, the potential of hydrogen (pH) is on the alkaline (base) side of the acid-base measurement scale.

**The pH Measurement Scale**

The acidity of a substance is measured on the pH measurement scale, which is a logarithmic scale. The log scale is a power of tens measurement, meaning that each whole number represents 10 times the previous number. For example, on the pH logarithmic scale, 8 is 10 times more alkaline than 7, which is 10 times that of 6, and so forth. A log scale is used for pH measurements simply due to the massive number of H⁺ or OH⁻ ions that are required to make a substance acidic or alkaline.

The pH scale is a measurement in which 7 represents the middle ground, or neutral. At a pH of 7 a substance has no excess acid (H⁺) and no excess base (OH⁻). Once acid is added or produced
in a substance, then the increase of relative hydrogen ions (H+) is measurable. Increasing the relative hydrogen ion (H+) pushes the pH from 7.0 to 6.0 on the pH scale, thus making it more acidic. Contrariwise, increasing the relative hydroxyl ion (OH-) pushes the pH from 7.0 to 8.0 on the pH scale, thus making it more alkaline.

Solutions are measured from 0 (totally acid) to 14 (totally alkaline). As a reference for the human body, the optimum blood pH in a healthy person is slightly alkaline and should fall within the narrow range of 7.35 and 7.45. The human body is constantly struggling to maintain this healthy alkaline pH level. Staying within this slightly alkaline range is a constant challenge due to all the acids constantly being produced in the body from normal metabolism. Yet there are many other causal factors for acid production in the body. These are factors (processed foods, pollutants, environmental toxins) created by our modern society. Explaining what these are and what to do to reverse illnesses from acid overload is the primary focus of this report.

**The pH of Common Substances**

In order to get a feel for the pH of common substances, I have included measurements of acidity or alkalinity of commonly encountered items. We all know that soap (which is alkaline) burns the eyes and is bitter in the mouth. More dangerous is the extremely alkaline substance, bleach, which has severely caustic effects on the body and especially in the eye.

On the other end of the pH spectrum is hydrochloric acid. It is a highly corrosive, strong mineral acid used in industrial settings. It makes up a significant portion of the gastric acid of the stomach.

The saliva is the easiest body tissue to measure for pH because it can be done with simple, hand-held pH strips. It is a reflection of the lymphatic tissue, which is found throughout the body and therefore is a reflection of tissue pH. In contrast, the urine is variable because it is a measure of acids being excreted. Vaginal fluid can also be measured, but is less useful in determining
Balancing Body Chemistry

108

overall health than both saliva and urine.

When a person is dying of cancer, blood tests such as a complete blood count (CBC), chemistry panel and lipid panels will all be quite normal. Yet their blood microscopy will show all the signs of toxicity. At the same time, their pH levels will be extremely acidic.

<table>
<thead>
<tr>
<th>pH Level</th>
<th>Substance</th>
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<tbody>
<tr>
<td>14.0</td>
<td>Sodium Hydroxide: Alkaline</td>
</tr>
<tr>
<td>13.0</td>
<td>Lye (bleach)</td>
</tr>
<tr>
<td>11.0</td>
<td>Ammonia</td>
</tr>
<tr>
<td>10.5</td>
<td>Milk of Magnesia</td>
</tr>
<tr>
<td>8.4</td>
<td>Baking Soda</td>
</tr>
<tr>
<td>7.4</td>
<td>Human Blood</td>
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</table>

<table>
<thead>
<tr>
<th>pH Level</th>
<th>Substance</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.0</td>
<td>Pure Water: Neutral</td>
</tr>
<tr>
<td>6.6</td>
<td>Milk: Acid</td>
</tr>
<tr>
<td>5.5</td>
<td>Water Exposed to Air</td>
</tr>
<tr>
<td>4.5</td>
<td>Tomatoes</td>
</tr>
<tr>
<td>4.0</td>
<td>Wine and Beer</td>
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<tr>
<td>3.0</td>
<td>Apples</td>
</tr>
<tr>
<td>2.2</td>
<td>Vinegar</td>
</tr>
<tr>
<td>2.0</td>
<td>Lemon Juice</td>
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<tr>
<td>1.0</td>
<td>Battery Acid</td>
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<tr>
<td>0.0</td>
<td>Hydrochloric Acid</td>
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<tr>
<td>pH Range</td>
<td>Description</td>
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<tr>
<td>---------</td>
<td>------------------------------------------</td>
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<tr>
<td>7.8-8.0</td>
<td>Pancreatic juice (upper small intestine)</td>
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<tr>
<td>7.35-7.45</td>
<td>Blood</td>
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<tr>
<td>6.9</td>
<td>Liver</td>
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<tr>
<td>6.35-6.85</td>
<td>Saliva (mouth)</td>
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<td>5.5 to 7.0</td>
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<td>6.1</td>
<td>Muscle</td>
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<td>4.5-8.0</td>
<td>Urine</td>
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<tr>
<td>3.8 to 4.5</td>
<td>Vagina</td>
</tr>
<tr>
<td>1.2-3.0</td>
<td>Stomach Acid</td>
</tr>
</tbody>
</table>
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acid 7, 8, 9, 16, 17, 18, 19, 20, 21, 23, 24, 27, 28, 31, 34, 35, 36, 37, 38, 40, 41, 42, 43, 47, 48, 49, 50, 51, 52, 53, 55, 56, 57, 58, 60, 61, 62, 63, 64, 65, 67, 69, 74, 75, 105, 106, 107, 108, 109, 110, 111, 112, 114, 115, 116, 117

acid rain 16

acidic 7, 8, 9, 13, 15, 16, 17, 18, 19, 21, 33, 34, 36, 38, 39, 40, 41, 43, 44, 47, 48, 50, 51, 52, 53, 55, 56, 57, 58, 62, 64, 65, 67, 106, 107, 108, 114

acidic blood 15

acidic pH 7, 44, 114

acidity 7, 8, 12, 13, 14, 15, 16, 18, 20, 21, 34, 35, 39, 40, 41, 43, 47, 50, 51, 52, 55, 56, 57, 58, 64, 65, 67, 69, 74, 75, 90, 105, 106, 107

acidosis 5, 8, 9, 19, 25, 33, 35, 41, 46, 47, 48, 49, 58, 74, 110, 111, 114, 115, 116

adipocytes 50

adrenal gland 63

adrenaline 63

adrenals 69

Africans 40

alkaline 7, 8, 9, 10, 14, 17, 18, 19, 20, 21, 25, 28, 29, 35, 36, 40, 41, 42, 44, 46, 47, 48, 49, 50, 51, 52, 53, 55, 57, 59, 60, 61, 62, 65, 67, 69, 71, 72, 73, 74, 75, 106, 107, 108, 111, 116, 117

alkalinity 7, 8, 39, 40, 44, 47, 48, 51, 58, 59, 71, 107

Alkalize or Die 8

allergies 44, 58, 71

American Board of Holistic Medicine 64

American Diet 9, 21, 23, 30, 37, 46, 49, 57, 74

American Journal of Clinical Nutrition 8, 37, 49, 116

amino acids 18, 23, 27, 58, 69, 112

ammonia 39, 108

Anderson, Richard, ND, NMD. 62

anemia 29, 30, 71

aneurysms 48

Animal Protein 18, 25, 27, 36, 38, 39, 40, 55, 58, 67, 110, 112, 113

anorexia 46

anti-oxidant phytonutrients 60

antioxidant 29, 30, 31, 44

antiseptic 30

Archives of Pediatric Adolescent Medicine 55, 116
arrhythmias 29, 46, 48
arthritis 7, 15, 21, 29, 30, 49
Asai, Kazuhiko, Dr. 29
Aspartate 18, 23, 32, 58
atherosclerosis 47, 116
Atkins™ Diet 73
ATP 26, 34, 50
attention deficit hyperactive disorder (ADHD) 44
auto-intoxication 69
Ayurvedic 65

B
bacteria 12, 50
Baroody, Dr. Theodore 8
benzene 17
bicarbonate 33, 35, 48, 61, 111, 115
bile acids 17, 63
blindness 43
Blood 8, 12, 13, 14, 15, 17, 19, 21, 22, 24, 25, 26, 28, 29, 30, 34, 41, 42, 43, 44, 45, 46, 47, 48, 50, 56, 57, 63, 67, 69, 71, 73, 74, 107, 108, 109, 115
Boron 22, 27, 105
bowel 15, 46
brain 22, 27, 43, 63, 110, 114
bright field microscopy 12
British Journal of Nutrition 38
C
calcium 21, 22, 24, 25, 26, 27, 30, 32, 35, 36, 37, 38, 39, 47, 51, 56, 69, 112, 113, 114, 117
Campbell, T. Colin, Ph.D. 36, 112, 113
capillaries 47
carbon dioxide 17, 51
carbonic acid 17, 19, 50, 64
cardiovascular disease 7, 31, 47, 48, 49
catecholamines 64
cautic hydrogen ions (H+) 19
Centers for Disease Control and Prevention (CDC) 43, 114
chelate 23, 32
chelated minerals 23
China Study 36
Chinese 40
Chloride 23, 26, 28, 61, 110, 117
Chondrit 14, 15
chromium 22, 28, 45
chromium picolinate 23, 28
chronic acidosis 9, 19, 74, 111
chronic diseases 9, 12, 14, 17, 117
Cleanse and Purify Thyself 62
Cleveland Clinic 19, 41
Clinical Cancer Research 41, 114
CNN 72
cobalamin 28
Cobalt 28
colloidal minerals 23
Colorado State University 24
complete blood count (CBC) 108
Condiments 26, 56
Consciousness 65
Constipation 46, 48
contrast microscopy 12
Copper 28, 29, 32
Cordain, Loren, Ph.D. 24
cortisol 63
Cousins, Gabriel, M.D. 42
Crohn’s Disease 29, 32
Crile, George W., Dr. 19
Cysteine 18, 27, 58
Cystine 18, 58

dementia 43
depressed myocardial contractility 46
depression 43, 44, 48, 74, 116
diabetes 7, 28, 30, 32, 42, 43, 44, 45, 57, 114
Diabetes Care 43, 114
diarrhea 26
diet 7, 9, 10, 12, 13, 14, 16, 17, 18, 21, 23, 24, 27, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42, 45, 46, 48, 49, 52, 55, 57, 58, 62, 65, 67, 71, 72, 73, 74, 75, 110, 112, 113, 116, 118
digestion 17, 22, 51, 63, 66
digestive enzymes 69
disease 7, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 22, 33, 34, 65, 116, 117
DNA 25

e
emotions 9, 13, 14, 19, 40, 42, 63, 64, 66, 75
Enderlein, Günther 11, 12, 14
endocrine 20, 110
endothelial dysfunction 47
endothelium 47
Energy 22, 26, 41, 46, 50, 57, 72, 73

Dairy 24, 25, 26, 53, 54, 58, 59, 71, 72, 117
dark-field microscope 12, 13, 50

E
environmental pollutants 9, 19
enzymatic 20, 60
esophagus 17
estrogen 27
European Journal of Nutrition 33

F
fatigue 32, 44, 46, 48, 49
fibromyalgia syndrome 64
Fila 13
Fluoride 29
formaldehyde 17
fructose 45, 49, 52, 56
fruits 12, 15, 19, 23, 24, 27, 37, 38, 39, 40, 44, 45, 46, 51, 52, 53, 54, 57, 58, 59, 60, 61, 62, 65, 71, 72, 73, 75, 79
fungi 12

G
gallbladder 17
Germanium 29, 30, 110
Germany 40, 118
Gerson, Max, M.D. 40
glucose 30, 43, 44, 45, 49, 50, 63, 116
Glutamate 18, 58
glycogen 63
gonads 69
grains 16, 24, 25, 26, 27, 28, 30, 31, 54, 57, 65, 71, 81

H
hair 27, 29, 31, 32, 74
Harrelson, Woody 72
heart 7, 15, 22, 29, 31, 43, 46, 47, 48, 58, 63, 71, 74, 116
heart disease 7, 15, 43, 48, 58
Heart Health 46
hemoglobin 28, 30
Herbs 45, 52, 54, 55, 58, 59, 75
herpes 32
HGH 33, 48, 49
Hippocrates 10
homeostasis 14
homeostatic 8, 69
homeostatic pH 8
http://www.thebestofrawfood.com/raw-food-diet-testimonials.html 74
human growth hormone (HGH) 33, 48, 49
hydrocarbons 16
hydrochloric acid 7, 17, 18, 28, 106, 107, 108
hydrogen 19, 25, 28, 105, 106, 107
hydrogen ion (H+) 19, 25, 28, 106
hypertension 7, 26, 29
hypoglycemia 28
hypoxia 41, 114

I
Iceland 72
immune 11, 13, 31, 49, 50
immune system 13, 22, 29, 47, 49, 50
inflammation 13, 49
insulin 28, 42, 43, 44, 50
insulin-like growth factor-1 (IGF-1) 33, 49
interleukin 8 41, 114
internal milieu 13, 14
Iodine 30, 51
iron 22, 28, 30, 31
irritable bowel syndrome (IBS) 44, 64
ischemic heart disease 58

J
Journal of International Medical Research 50
Journal of Nutrition 37
Journal of Physiology 47

K
keto acids 18, 63
kidney 8, 15, 17, 18, 25, 26,
McDonald’s® 71
metabolic acidosis 25, 33, 35, 46, 49, 58, 110, 114, 115
Metallic minerals 23
methionine 27, 58
microbes 14, 17
microminerals 22
microscopy 12, 14, 17, 108
mineral salts 19, 35
Minerals 10, 15, 21, 22, 23, 25, 27, 35, 37, 44, 50, 51, 53, 56, 57, 58, 69, 74, 78
Molybdenum 31
Monarch, Matt 73
mouth 17, 69, 107, 109

nails 27, 32
National Institutes of Health (NIH) 34
National Osteoporosis Foundation 34, 110
nausea 46
negatively charged hydroxyl ion (OH-) 25, 106
nerve pain 43
nerves 22, 24, 29
nitrogen wastes 16
Nurse’s Health Study 59
nuts 16, 25, 26, 27, 29, 30, 39, 54, 65, 72, 73, 81, 86, 90, 92, 95, 98, 101

O
obesity 7, 50, 57
oncologists 41
organs 22, 43, 63, 69, 74
osteoblastic 36, 111
osteoclastic 36, 111
osteopenia 21
osteoporosis 7, 21, 24, 25, 29, 34, 35, 36, 37, 38, 39, 40, 56, 57, 110, 111, 112, 113
ovarian cancer 41, 59, 117
Overweight 45, 50
oxygen 17, 19, 28, 30, 41, 50, 74, 105, 106

P
pancreas 42, 43, 63
Pasteur, Louis 11
pathogenic organisms 12, 50
pathogenic viral 14
pathogens 12, 13, 22
Pauling, Linus, Ph.D. 22
peripheral nerve disease 43
pH 7, 8, 9, 10, 11, 13, 15, 18, 19, 20, 21, 26, 33, 34, 36, 39, 40, 41, 42, 44, 46, 47, 48, 49,
Michael Cutler, M.D.

pH measurement scale 106
pH Medicine 11
Pharmaceutical metabolites 16
pharmaceuticals 11
phosphates 37, 39, 111
Phosphorus 25, 26, 27, 35, 39
physiological 17, 19, 21, 22, 44, 51, 52, 63, 111, 113
positive electrical charge (ion) 106
Postmenopausal 27, 37, 111, 112
potassium 19, 21, 22, 24, 26, 28, 33, 35, 39, 51, 55, 56, 60, 61, 69, 110, 111, 112, 113, 117
potential of Hydrogen (pH) 105, 106
Potential Renal Acid Load (PRAL) 38, 51, 52, 53, 61, 116
premature aging 7, 31, 33
prescription drugs 16
prescription medications 9
Proline 18, 58
prostate cancer 58, 117
Protein 18, 25, 27, 31, 34, 36, 37, 38, 39, 40, 41, 46, 55, 57, 58, 59, 65, 67, 69, 110, 112, 113

R
Recommended Dietary Allowances (RDA) 24 25, 26, 27, 28, 29, 30, 31, 32
red blood cells 13, 15, 28, 30
Remer 51, 57, 115, 116
respiratory alkalosis 19
RNA 25
Rothkranz, Markus 71
Royal Free Hospital and School of Medicine 50

S
saliva 12, 67, 69, 107, 108, 109
Saliva pH 40, 64, 69, 75
seeds 16, 24, 25, 29, 30, 32, 39, 45, 53, 54, 55, 65, 72, 81, 84, 86, 88, 89, 98
Selenium 31
Serine 18, 58
Simply Raw 42
sinus infections 44
skeleton 21, 25, 35
skin 7, 15, 20, 27, 29, 48, 67, 74
skin disorders 43
sodium citrate 50
soft drink 26, 27, 40, 55, 56
Spain 60
Spiritual Nutrition: Six Foundations for Spiritual Life and Awakening the Kundalini 64
Spurlock, Morgan 71
standard American diet (SAD) 9
Stene, Lars C., Dr. 43
stevia 44, 52, 57, 65, 76, 77, 78
Stokes, Angela 72
stomach peristalsis 46
stress 15, 21, 49, 63, 64, 65, 66, 74
stroke 43
sucrose 49, 56, 116
Sulfur 27, 39, 58, 112
Sulfuric Acidic 57
Supersize Me 71
Supplements 23, 25, 26, 28, 38, 49, 55, 61
surgery 11, 73, 113
sweat 26
Sweeteners 44, 52, 56, 62, 116

T

taurine 27
tears 26
testicular cancer 58, 117

The Journal of Nutritional Science and Vitaminology 39
Thoughts 9, 63, 64, 65, 66, 75
Threonine 18, 58
Thyroid Gland 30, 48, 72
toluene 17
Tree of Life Rejuvenation Center 64
Tree of Life sanatorium 42
tubular acidosis 49, 116
Tums® 56

U

United States Department of Agriculture (USDA) 27, 45, 60
University of California, San Francisco 37
Upper respiratory infections 50
uric acid 17, 31
urinary 20, 36, 37, 38, 39, 50, 55, 56, 68, 111, 112
urine 12, 18, 27, 31, 36, 38, 39, 40, 50, 51, 55, 56, 58, 62, 64, 65, 67, 68, 69, 75, 107, 108, 109, 116

V

vaccine 11
Van Orden, Tim 73
vasoconstriction 46, 115
vegetables 12, 16, 19, 23, 24, 25, 27, 28, 29, 30, 31, 37, 38, 39, 40, 45, 46, 52, 53, 54, 55, 57, 58, 59, 60, 62, 65, 66, 71, 72, 73, 75, 78, 90
veins 46
viruses 50
vomiting 26, 46

W
water acidity 43

www.pandora.com 66
www.simplyrawmovie.com 42

X
xanthine oxidase 31
xylene 17

Z
zinc 22, 23, 24, 30, 31, 32, 35
Notes:
Balancing Body Chemistry

Go from ACID to ALKALINE and watch joint pain, digestive problems, mood swings, memory lapses and fatigue miraculously disappear.

By Michael Cutler, M.D.