

Achieving Acid-Base Balance

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Traditional Chinese nutrition recommends a diet rich in fresh vegetables and fruits for promoting health and longevity. In addition to providing vitamins and minerals, fruits and vegetables are rich in bicarbonate precursors the body needs to maintain normal alkalinity. Typical modern diets are composed almost entirely of acid-forming foods, such as animal proteins; grains; legumes; and salt.

A team from the department of medicine and the General Clinical Research Center at the University of California, San Francisco, led by Anthony Sebastian, recently published research revealing that typical Western diets produce slight chronic systemic metabolic acidosis in humans. The research shows that such a diet accelerates aging; corrodes muscle and bone; and suppresses growth hormone secretion, while more alkaline diets have the opposite effects (*Eur J Nutr* 2001;40:200-213).

Hunter-gatherers consuming salt-free diets rich in fruits and vegetables have demonstrated a high immunity to age-related degenerative diseases. When Sebastian's team analyzed known hunter-gatherer diets, they found most were net base-producing by a wide margin (*Am J Clin Nutr* Dec 2002;76(6):1308-16).

Inhabitants of rural Crete have the lowest recorded rates of degenerative diseases and exceptional longevity. Their daily diet includes about two pounds of fresh fruits and vegetables, but only one pound of grain products; three ounces of meat, fish or eggs; and one ounce of legumes. At about two-thirds vegetables and fruits, this is a neutral or slightly alkaline diet.

The Okinawans, lauded for longevity, consume large amounts of vegetables. Until recently, their staple starch was the alkaline sweet potato, not acidic rice. However, unlike the people of Crete, they have a high rate of cerebrovascular disease. The Okinawan diet includes much more salt and much less fruit, making it more acidic than the Crete diet.

In *Chinese Foods for Longevity*, Dr. Henry Lu reports that Ji Han, a former Chinese physician, remarked, "Those who live on high mountains do not grow anything else but sweet potatoes. They ... eat them as the chief ingredient in their diet. They are famous for their longevity without eating many other grains as people in other regions do."

If you've lived in any northern city where salt is applied to roads to melt ice, you know how it corrodes metals. Sixty percent of salt is a reactive chloride ion which, in solution, has an affinity for hydrogen ions, generating corrosive, carcinogenic hydrochloric acid. Sebastian's team showed that chloride is responsible for salt's ability to induce hypertension, as well as urinary nitrogen and calcium losses, signaling erosion of muscle and bone.

Apparently, these effects were known to the author(s) of the *Nei Jing*, which states, "Too much salty taste can weaken the bones and cause contracture and atrophy of the muscles, as well as stagnate the heart *qi*." For a beneficial salty flavor, the *Nei Jing* recommends large beans; pork; chestnuts; and coarse greens, not mineral salt.

Epidemiology indicates nations with the highest intakes of meat and dairy also have the highest rates of osteoporosis. Metabolism of excess animal proteins produces sulfuric and phosphoric acids. Aged cheeses are the most acidic foods, and include both sulfur-rich protein and salt.

Unbuffered, acids dissolve calcium from bones and teeth, and facilitate soft-tissue calcification. They corrode cartilage and attack arteries, which (in self-defense) secrete a protective, buffering lipid-calcium complex. The body dilutes the acids by retaining water, but this action, combined with arteriosclerosis, creates hypertension, which can lead to heart and cerebrovascular disease.

Acid-producing (high-protein, high-salt) diets have been shown to cause urinary stones. Salt-induced chloride acidosis has been found to cause irritability, hyperactivity and insomnia.

Excessive salt consumption is associated with stomach cancer, and chloride acid reflux into the esophagus initiates esophageal cancer. Systemic acidity is probably carcinogenic in other tissues.

These problems can be prevented by counterbalancing dietary acid-formers - grains; legumes; meats; nuts; and salt - with adequate amounts of fruits and vegetables. A healthy dietary acid-base balance is obtained when salt sources are minimized and fruits and vegetables form about two-thirds to three-quarters of the diet by weight.

Simple Tips for Increasing Fruit and Vegetable Intake

- Eat two to three servings (one cup or fist-sized portion each) of fresh vegetables or fruits at each meal.
- Make fruits and vegetables, not bread or cereal, the center of your breakfast.
- Eat more sweet potatoes, winter squash and baked whole potatoes, and less bread and rice.
- Have fresh, dried or cooked fruits for snacks or desserts.
- Minimize salt intake; substitute herbs and spices for salt.
- Favor fresh foods and avoid processed foods.

In future articles, I will give more detailed, practical tips for incorporating more fruits and vegetables into one's diet.

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