

Growing Older Slower by Rolling in the Clover

Phytonutrients in Sprouts & Microgreens

as Keys to Longevity

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The usual suspects of protein, vitamins, minerals, carbs and sugar are old and familiar as the basic components of nutrition. More recently, enzymes have entered into the arena of nutritional awareness, while the newest kids on the chopping block are phytonutrients. Unable to flee or hide, plants armor themselves with an arsenal of phytonutrients. With these, they defend themselves from adversities such as ultraviolet light, blight, heat, frost, and drought, and from adversaries such as bugs, bunnies, and us.

Phyto means *plant*, though we would not be altogether inaccurate to interpret the ancient Greek word to mean *fight*, which is how the word is pronounced. Phytonutrients in turn benefit us undeserving animals who eat them by boosting our stamina, lowering our blood pressure, reducing blood cholesterol levels, preventing infection, reducing inflammation, strengthening immunity, protecting brain cells, enhancing mood, and guarding against depression. Knowing all this, just thinking about *not* eating plants should be enough to make anyone feel depressed.

Pro- and Anti-Antioxidants

Every plant produces several-hundred phytonutrients. Nearly 20,000 have been isolated and identified, with more on the way. Many of these phytonutrients act as antioxidants. Pure oxygen can be dangerous and flammable. Oxygen rusts metals, fans flames, spoils foods, and ages living cells. We inhale oxygen as air in small doses, one breath at a time. Before filtration by our lungs, oxygen is diluted with several other gases. Dilution with only one other gas is insufficient. Nitrous oxide makes us silly, sulfur dioxide makes us sick, carbon dioxide makes us drowsy, carbon monoxide strikes us dead.

Antioxidants protect against, guess what, oxidants. And against free radicals gone amuck in the presence of oxidants. Free radicals are not some roaming gang of leftwing militants, but rather pesky nuclear matter with electrons gone missing. Those roving electrons can damage individual living cells and hasten their aging and dying. As go microscopic cells, so goes the whole neighborhood, which in our case are our organs. Free radicals are the root cause of six signature maladies of old age, namely cancer, atherosclerosis, dimming vision, dementia, memory loss, and I can't remember the sixth.

When plants are eaten by animals their antioxidants nourish the animals too. Their loss is our gain, which is cruelly ironic because it rarely benefits plants to be eaten. Heat destroys or reduces the bioactivity of antioxidants, but fortunately we can eat most plants raw. While animals, too, produce their own antioxidants, people who eat animals mostly eat them cooked, so such antioxidants hardly benefit the human animals who eat them. Even worse, cooked animal protein, especially when barbecued or burned, itself can be carcinogenic. Thus meat eating is an anti-antioxidant diet.

During the past two decades, tens of thousands of scientific studies have documented phytonutrients. Little wonder that phytonutrients have become hot new buzzwords for marketing food and dietary supplements. But *buzz* too easily descends into *hype*. Resveratrol in grapes and lycopene in tomatoes have provided marketers with ploys for selling wine and pizza, and consumers with excuses for drinking and eating them. Yet phytonutrients have been hidden inside plant foods all along, discovered or not, marketed or not. Any new phytonutrients that researchers discover and that marketers promote are just a tip of the iceberg lettuce.

Swallowing supplements is an inadequate path to nourishment because food is far more than the sum of its few isolated parts. So foods, and by definition plant foods, remain our best sources of phytonutrients. And remember, *phyto* means *plant*, so no self-respecting phytonutrient would be caught dead inside a hunk of meat.

Meet the Brassica Family

Phytonutrients tend to lend a sour or bitter taste to the fruits and vegetables that contain them, so hybridization that has increased the sugars in our fruits and vegetables at the same time unwittingly has left by the wayside their phytonutrients. Likewise for selective breeding for bigger size or for longer shelf life. While the phytonutrient content of cultivated plant foods has unintentionally been reduced, we still can depend upon vegetables to provide us with a broad spectrum of bio-nutrients. Of all our veggies, green (and red and blue and a whole rainbow of cultivars) leafy vegetables stand out as nutrient-dense once their water content has been reduced. And among green leafy vegetables, the Brassicas excel.

Brassica is the botanical name for the plant family formerly called cruciferous (*Cruciferae*) vegetables and for short formerly called coles, as in coleslaw. Brassicas include kale, broccoli, cauliflower, collards, cabbage, radish, mustard, and a slew of Asian greens. In the 1980s, food researchers first honored Brassicas for their military service as cancer fighters. In 1997, the humble broccoli sprout (and by association the sprouts of the entire Brassica family) further rose to the rank of Commander-in-Chief among cancer fighters. Credit for its high status goes to food researchers at Johns Hopkins University. Broccoli just happened to be the first Brassica they analyzed and its sprouts are milder tasting than most other Brassicas, but nutritional high ranking holds true for all the Brassicas.

In addition to fiber and the ace vitamins A, C, and E, all which guard the body against cancer, Brassicas host a standing army of phytonutrients. If cancer already is present, they arm the body to suppress further cancer growth. One phytonutrient is the antioxidant sulforaphane. Bite-for-bite compared with mature broccoli, broccoli sprouts contain 20 to 50 times more of this phytonutrient. Sounds impressive. But most people who do eat broccoli sprouts eat 20 to 50 times fewer sprouts than they would mature broccoli. So for most people a plateful of mature broccoli may balance equally with a mouthful of broccoli sprouts. One important difference, however, is how we eat these foods. Most people eat broccoli sprouts raw, but full-grown broccoli cooked. Same for most (not all)

phytonutrients generally as for antioxidants specifically, they offer greater bioavailability when eaten raw.

Sprouts and Microgreens

Eating vegetables may prevent or cure diseases, while consuming copious quantities of meat can cause them. A garnish of basil or a sprig of parsley atop a lump of steak may amount to an ounce of prevention atop a pound of carcinogen, but an ounce is hardly enough.

Aging is inevitable, so all we can do is slacken the tempo of our funeral march toward death. Evidence suggests that one way to slow aging and thereby to delay dying is to eat plant foods that are living. Not potatoes deep-fried in cottonseed oil or frozen pizza microwaved at 1500 watts or chard charred over a gas grill, but sprouts still growing on your plate and greens freshly harvested from your kitchen garden. And not just spoonfuls, but platefuls and bowlfuls.

Sprouts have long been eaten and heralded for their therapeutic properties. Microgreens, however, are newcomers to our menus. First coined in 1997, even the word *microgreens* is new. Microgreens start as sprouts and then keep on growing. Sprouts are footloose, while microgreens put down some roots. Sprouts thrive under cover of darkness, while microgreens seek the light of day. Microgreens are cultivated with warmth and water, same as are sprouts, but also under light and upon soil. Microgreens are not just the holy trinity of sunflower greens, buckwheat lettuce, and wheatgrass that seem to form the foundation of some raw foods vegan diets. More than 50 other species of microgreens can be grown at home indoors. While microgreens were long known by the name *seedlings*, only with the new millennium have such seedlings begun to occupy a sizable portion on our dinner plates.

As yet, only one comprehensive study has documented their nutritional contents, while still not investigating any curative properties. Published in 2012, this study was conducted by the USDA research lab affiliated with the University of Maryland. Its abstract can be found at: <http://pubs.acs.org/doi/pdf/10.1021/jf300459b>

The USDA researchers analyzed 25 microgreens purchased from an organic microgreen farm in San Diego that were shipped overnight across the country to Maryland. So some nutrition was lost compared to what you might grow at home and move across your kitchen from windowsill to dinner plate. Still, results were impressive. As just one example of how microgreens compare ounce for ounce with their fully mature veggies, red cabbage microgreens contain 260 times the provitamin A; 6 times the vitamin C; 40 times the vitamin E; and 29 times the antioxidant lutein. Only a handful of vitamins and antioxidants were analyzed, so more evidence awaits.

Missing among all the above studies of sprouts and microgreens is one examining the longevity and aging of folks who eat lots of them, a study that is longitudinal over an entire human generation and epidemiological over an entire continent. The closest we

might come to this would be by monitoring the adherents to high raw vegan diets fortified with lots of sprouts and greens, a diet promoted at health spas such as the Hippocrates Health Institute, the Ann Wigmore Institute, and elsewhere.

Pardon my venture into the merely personal and anecdotal, but are not we all walking anecdotes? For more than 30 years, every three or four years I attended the annual conferences of two national organizations. Three of four years proved a sufficient time span for me to notice aging in the regular attendees who returned to these conferences year after year.

One conference was of the College Art Association (CAA), whose membership was comprised largely of art history and studio art professors. Most were brilliant scholars who held PhD's or creative artists with MFA's. As evidenced by the breakfasts and lunches they ate at the conference hotels, most consumed conventional American diets of red meat, white flour, white sugar, white milk, and black coffee. At evening social events, alcohol freely flowed and desserts became main courses. When I saw them every three of four years, most folks indeed looked three or four years older. In other words, they looked their age.

The other conference was of the North American Vegetarian Society (NAVS), whose regular participants all were vegans, and mostly high raw and wholly whole foods vegans at that. Though the meals were veritable banquets with unlimited portions, most folks ate frugally. The raw foods bar always was the first to run out. Evening events ended with watermelon parties. Before breakfast, early risers engaged in yoga or swimming or running or hiking or just plain old walking. Some held PhD's and MD's, but mostly they hailed from all walks of life. They all were the pictures of health. When I saw them every three of four years, most folks looked like they had hardly aged at all. In other words, they looked ageless.

I had little need to read any scientific studies, whether longitudinal or epidemiological or epistemological. In the athletic vegans' youthful faces and agile bodies, I could read the *Book of Life*. Each of their books already has filled many pages and holds promise to fill many pages more. Parodied in jingle and rhyme:

Fresh wheat grass juice
And raw sprout bread
Will make you live so long
You will wish you were dead.

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