Introduction

Every one desires to live long, but no one would be old.
- Jonathan Swift (1667-1745), Thoughts on Various Subjects, Moral and Diverting [1]

To lengthen thy life, lessen thy meals.
- Benjamin Franklin, Poor Richard's Almanack, June 1733 [2]

Calories are a primary cause of aging, and ***the*** limiting factor in lifespan.
Key insight: cutting calories slows the aging process and prolongs life.

Aging is due to a combination of years of age and total calories eaten in your lifetime.[3]
The road to aging is paved with calories.
The simplest way to reduce calories is to reduce portion size: use a small plate!

By my calculations, **every calorie above the absolute minimum *ages your body and your mind* and hastens death by about 31 seconds** (+/- 10). This means that you age one day (and lose one day of life span) for every 2800 calories you eat - above a starvation diet with good nutrition (adequate protein, fats, vitamins and minerals). Carrying an extra pound of weight for one year costs 2 days of life span. In dollar terms, a candy bar might cost $20 in potential lost wages. (See Effect of CR.xls for calculation details). A 40-year-old man can live 8 years longer by eating 25% less; a 15-year-old can live 16 years longer by eating 25% less. Slowing aging means MORE YOUTH, not more old age.

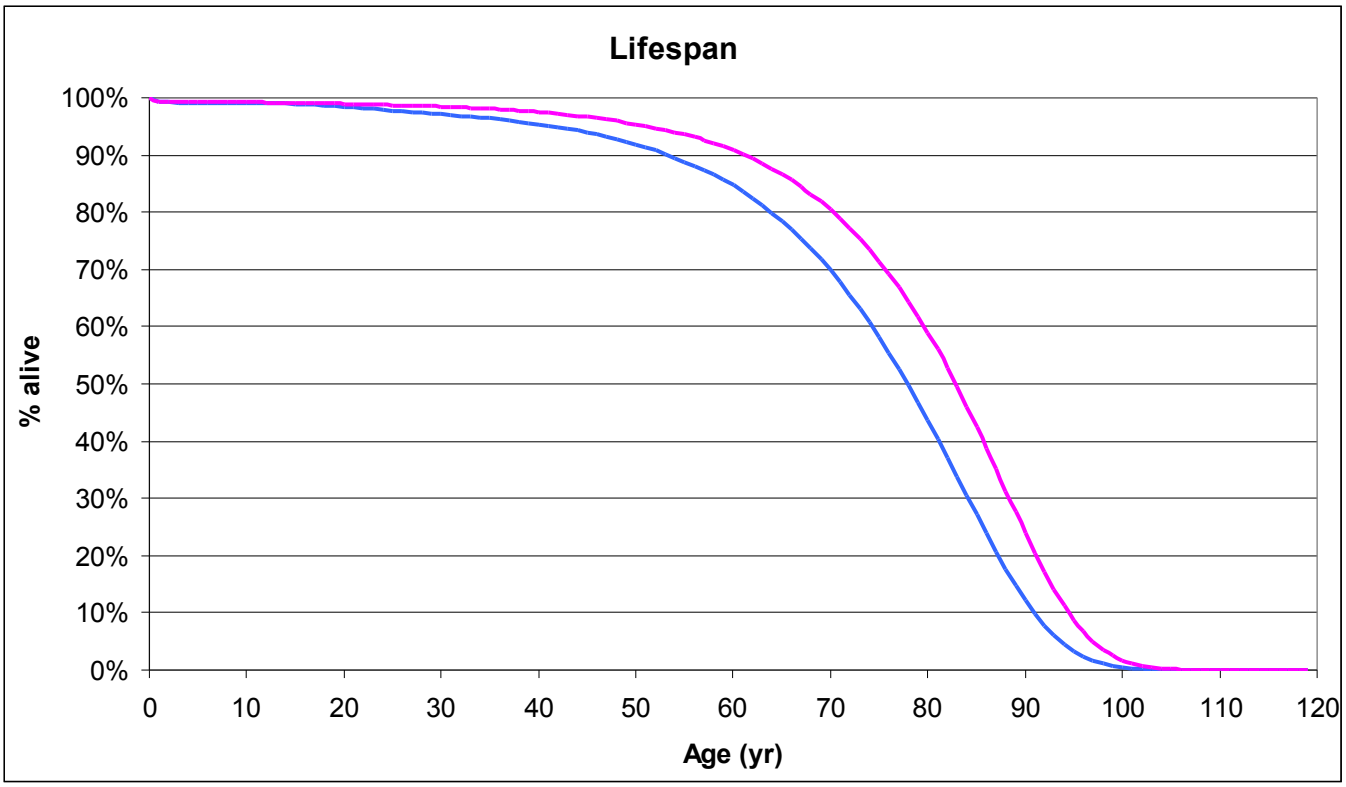
Turn this around: it is VERY expensive – in terms of money, aging, disability and early death – to keep your weight up!
Can **you** afford to stay plump?

Last updated 2007-01-06

This is a collection of information on health-related diet, habit and supplement interventions, as I see it. I collected this information as a way to organize it for my family and myself. *This is NOT medical advice. Some of these things are likely to prove useless or even harmful with time.* The collection is composed of four annotated reference documents (rtf = Rich Text Format, easily opened by most editor programs such as Microsoft Word and Open Office), and two spreadsheets:

1 Introduction (1 Introduction.rtf) – this document.
2 Aging (2 Aging.rtf)
3 Caloric Restriction (3 CR.rtf)
4 Diet Choices, Healthy Habits and Supplements (4 Diet specifics.rtf)
Diet spreadsheet (Effect of CR.xls), to calculate the benefit you could derive from caloric restriction.
Foods spreadsheet (Foods.xls), listing the nutrient values for several sources of protein and fats. The advantage of this format is that it lists these by weight portions or by **isocaloric portions**; this is very useful when you realize that every calorie counts: you should eat foods that give you the best nutrition for the calorie.

Other supporting documents:
The fundamentals of a good life.rtf
MiRFAA.rtf
Michale Rae - Zone Albatross.rtf



My own plot, based on actuarial data from the US Social Security Administration.[4] For women (pink), the curve shifts to the right by 5.3 yr., compared to men (blue). Life expectancy at birth for men (born in 2002) is 74.2 yr.; for women it is 79.5 yr.

I based this annotated, referenced collection of information largely on the following principles:

1. Good scientific basis, with support from:
   a. Studies in people.
   b. Studies in animals.
   c. Scientific principles.
2. Benefit must significantly outweigh the risk.
3. Long-term, all-cause ***life-span*** data is most important (vs. reduction in incidence of uncommon diseases). For instance, an intervention that dramatically reduces the rate of a rare cancer will NOT significantly lengthen maximum lifespan; an intervention that slows aging by 1% WILL significantly lengthen average and maximum lifespan.[5]
   a. "Squaring the curve" by reducing preventable premature death. (See the curve in the actuarial graph, above). This is less important: it lengthens average lifespan to a limited degree. To a large degree, Western nations have already achieved this. The big down side is that most of the added years come in the aged, along with the disabilities of age.
   b. "Shifting the curve to the right" by slowing the aging process. This is most important: it lengthens both average and maximum lifespan. Based on caloric restriction studies in animals, this might result in as much as 50% more youthful years – if started early: there is no reversal of the aging process, just a slowing of it.
   c. Note: substantial reduction in the rates of disabling disease such as Alzheimer's and cardiovascular disease is also very important for quality of life! You want a longer youth, not a longer period of pain, disability and dementia at the end of your life.
4. Don't sweat the small stuff.
5. Don't fall for relatively untested, "hyped" products or fad diets. I completely avoid commercial sites:

they are out to sell things and are thus biased. Two of the biggest problems with such products are:

a. They are often based on only lab animal studies, isolated studies, bad epidemiology, or poorly done research.
b. These products may well have a beneficial effect on one small thing, but may in fact prove harmful in the long run from side effects that were not known at first (e.g., vitamin E (alpha tocopherol), ibuprofen)

6. I do not like to spend much time on possible mechanisms of life extension interventions (but see "2 Aging.doc"). These are numerous, often contradictory, and often based on small short-term animal studies with little if any actual evidence to show they slow the aging process.

I think it is useful to categorize the healthy lifestyle in three ways: interventions that are helpful, disease prevention, and protection of body systems. I have made up the following three tables to match these organizational principles, but each table refers to the same interventions that are detailed in later documents. This summary is predicated on the assumption that you care enough for your health to avoid frankly stupid things such as smoking and heavy alcohol consumption.

Table: Personal goals, many not yet achieved

These parameters are directly affected by lifestyle choices (diet, CR, exercise, supplements, etc.), and have substantial effects on lifespan, quality of life, and risk of serious disease.

Parameter	**Goal**	**Current**	**Date**
BMI (Weight)[6]	17 (115 lbs)	***20 (138 lbs)***	2006-07-15
Blood pressure[7]	≤ 115/75	114/66	2006-05-11
LDL cholesterol[8]	< 80	*83*	2006-05-05
HDL cholesterol[9]	> 50	70	2006-05-05
HbA1c[10]	< 5.0	*5.5*	2001-10-01
Fasting glucose[11]	< 90 or < 81	*88*	2006-05-05
Fasting triglyceride[9]	< 150	58	2006-05-05

Table 1: Interventions

This table summarizes what I think are the most important interventions, in order of *importance to health*. Rating is my own assessment of the intervention, based on its importance *and* my confidence in the scientific backing to support it (1 = very important with strong suggestive evidence; 5 = possibly helpful, with some evidence to support it).

Rating	Intervention	What I do or think should be done
1	**Caloric restriction with optimal nutrition** (abbreviated CR or CRON) Note well: this is approximately twice as important as everything else put together!	Goal body mass index approximately 17, by reducing calories, not just by exercise. N.b., Exercise is very good, but exercising *without dieting* is not the best way to live longer or slow the aging process.
1	Modify fat intake, including increasing Omega-3 fat & monounsaturated fats (MUFAs)	Caloric restriction **Completely avoid** partially hydrogenated oils (trans fats) Avoid saturated fats, avoid most animal fat **Eat moderate amounts of**: tree nuts (unsalted & raw), wild salmon, freshly ground flaxseed, extra virgin olive oil, avocado Cook with olive oil, preferably extra virgin
1	Reduce cholesterol and triglyceride levels	**Caloric restriction** Avoid trans-saturated fats, animal fat Eat flax meal, fruits & vegetables, tree nuts, high-fiber foods, orange peel Avoid most carbs (rice, plain bread, sugar, potatoes, pasta, foods made largely of white flour, etc.) Consider statin drugs (*only* if cholesterol is too high and other things fail)
1	Keep blood pressure low (less than 115/75)	**Caloric restriction** **Low salt intake**, exercise daily, use potassium chloride (instead of salt, or 50/50 with salt if needed), limit alcohol intake, high folic acid (4 mg/day), take 6 mg of melatonin each night, eat a high protein diet (mostly vegetable-based), soluble fiber, magnesium
1	Take safety precautions	**Drive safely**, **use seat belts, drive in a safe car with air bags**, fire safety, follow government hazard preparation recommendations, hip protectors for the elderly
1	Take certain supplements	**Vitamins D**, B12, folate (about 4 mg / day vs. HTN), magnesium, benfotiamine, green tea extract, melatonin, glucosamine & chondroitin A little zinc & selenium; iron if really needed Avoid vitamin E supplements (*alpha* tocopherol) Possibly: R(+) ALA
1	Exercise daily	Run 1 mile each day, do calisthenics and stretching.
2	Reduction of homocysteine (a major risk factor for heart disease & Alzheimer's)	Caloric restriction Eat a low-methionine diet: this can be done by getting protein from vegetables instead of animals (milk, eggs or meat) Take supplemental vitamins: folate & B12
2	Reduce glycation (damages proteins & hardens arteries)	Caloric restriction Reduce or eliminate "useless" carbohydrates, cook meat at low temperatures, reduce mixing sugar and protein in cooked foods, benfotiamine Possibly: R(+) ALA
2	Avoid sun damage	Clothes, zinc oxide- or titanium dioxide- based sun block, hat, UV-protection sunglasses, eat orange peel *But*, be sure to take 800 units/day of supplemental vitamin D in the form of D3

		Caloric restriction (*Perhaps - it reduces the area exposed to the sun*)
2	Reduce inflammation	Caloric restriction Floss & brush teeth, treat infections and skin problems If you have risk factors for heart attack (especially older men), take a baby aspirin each day or every other day
2	Vaccinations – keep up to date	Influenza shot yearly, Pneumovax, hepatitis B, chickenpox / shingles, tetanus, etc. In short, take all that are recommended
2	Eat a high-fiber diet	Fruit & vegetables; bran (insoluble fiber), whole grains, freshly ground flax seed Soluble fibers: glucomannan, psyllium, methylcellulose and guar (these are concentrated sources of soluble fiber, shown to lower cholesterol levels by 10%)
2	Medical tests periodically	Blood pressure, CBC, HbA1C, colonoscopy (starting at age 50), PSA, cholesterol (HDL & LDL) & lipids, CRP, eye exam for glaucoma, breast & pelvic exams for women
2	Greatly reduce in diet	Food! (i.e., caloric restriction) Salt, red meat (worst if grilled, charred or cooked at high temperatures), omega-6 fat (corn, soy & cottonseed oils etc.), cured meats, excess fluoride, saturated and trans-saturated fats Possibly: soy, peanuts
2	Increase the proportion of certain foods	Eat a variety of tree nuts, berries, spinach, kale, sprouts, broccoli & related veggies, tomato paste, coffee, green tea (only as extract capsules), pomegranate juice, fruit
3	Reduce iron load	Caloric restriction (less total iron intake) Give blood if you are a man, avoid iron supplements, reduce or eliminate red (mammal) meat *However, take care to avoid iron deficiency*
3	Avoid certain cooking techniques	Charred meat, over-cooking of fish or meat, high-temperature cooking of most foods, cooking with polyunsaturated oils such as canola, sunflower or flax oil, cooking sugars and meats together
4	Eat more than the RDA of protein	**From vegetable sources** such as broccoli, spinach, lentils, peas and tree nuts (n.b., vegetables like broccoli & spinach have far more protein per calorie than do beans and nuts)
5	Avoid aluminum (possible cause of Alzheimer's disease)	Use non-aluminum-based deodorants, minimize foods that use alum-based baking powder (read the label), drink reverse-osmosis filtered water, avoid certain foods with aluminum (some pickles), avoid aluminum foil on foods, etc. Possibly avoid antacids such as Mylanta (most are made with aluminum)

Table 2: Disease Prevention

This table is another categorization of the same interventions, but oriented to specific problems. These may be useful for the *treatment* of high cholesterol and hypertension, but are only for *prevention* of the others.

Problem	Intervention
Aging	**Caloric restriction**. Period. Nothing else has been conclusively shown to affect the aging process itself
Dementia, particularly Alzheimer Disease (AD) and Parkinson Disease	**Caloric restriction** **Keep blood pressure low to normal** (≤115/75), **eat wild salmon**, **eat tree nuts** (raw), **exercise**, the statin drugs (lower cholesterol level), **avoid saturated and trans-saturated fats**, reduce homocysteine by taking supplemental folate, B12 (& possibly B6), eat MUFAs (mono-unsaturated fats, from olive oil, avocado, and tree nuts), drink one glass of red wine each day (for men >45 yr. and women >50 yr.), (possibly) avoid aluminum, eat lots of fruit and vegetables (reduces risk for stroke), fruit juice N.b.: Risk factors for AD: genetics (family history, ApoE type 4 lipoprotein), vascular disease, HTN, diabetes, high cholesterol, high homocysteine, low HDL level, head trauma, low

	education level, cognitive inactivity, possibly intake of copper (multivitamins!) or aluminum (baking powder and deodorant)
Arthritis	**Caloric restriction** Eat salmon, possibly glucosamine & chondroitin to prevent osteoarthritis, avoid trauma to joints.
Cancer	**Caloric restriction** **Avoid sun damage**, take supplemental folate and vitamin D, eat lots of specific vegetables (broccoli & the like, etc.) and fruits (tomatoes, berries, orange peel), periodic medical tests (colonoscopy starting at age 50, PSA for older males, pap smears for women, mammography for older women), reduce meat consumption, avoid overcooking or charring meat, eat soluble fibers (e.g., glucomannan, psyllium & guar), consider taking aspirin.
Cholesterol	**Caloric restriction** Fruit & vegetables, high-fiber foods, freshly ground flaxseed, reduce animal fat intake, eat soluble fibers (e.g., glucomannan, psyllium & guar), tree nuts, (turmeric?), orange peel.
Heart disease	**Caloric restriction** Modify fat intake: **including increasing Omega-3 fat & monounsaturated fats (MUFAs)**, **eliminate partially hydrogenated fats; greatly reduce salt**, reduce homocysteine by taking supplemental folate, B12 & B6, **keep blood pressure ≤ 115/75, floss teeth**, reduce iron load, treat infections and skin problems, drink one glass of wine each day, eat freshly ground flaxseed, (**take a little aspirin if your risk factors are high enough**), drink pomegranate juice, reduce LDL cholesterol and triglyceride levels, periodic medical tests (blood pressure, cholesterol & lipids, *possibly* C-reactive protein (CRP) or homocysteine), avoid prolonged exposure to air pollution See this web site to calculate your 10-year risk of a fatal heart attack: http://hp2010.nhlbihin.net/atpiii/calculator.asp?usertype=prof
Hypertension	**Caloric restriction** **Exercise, very low salt intake, ≤ 2 glasses of wine / day, potassium supplementation**, **follow a DASH diet** (fruit, vegetables, low-fat dairy and low in saturated fat), olive oil, high-dose folate, melatonin, sleep > 5 hr/night. Reducing high blood pressure can add 2 ½ years to your life.[12]
Macula degeneration	Caloric restriction Avoid smoking, exercise, control hypertension, eat fruit, (possibly: increase intake of vegetables with lutein (such as kale, spinach and broccoli) and zeaxanthin, increase omega-3 fats (fish), and wear UV-protecting sunglasses)
Osteoporosis	**Exercise daily**, **take adequate vitamin D** (about 2-4 x the RDA!), vitamin B12, reduce salt intake, reduce excess fluoride (toothpaste, tea and water), eat fruit and vegetables and avoid candy (note: caloric restriction will reduce bone mass but its effect on osteoporosis is unclear to me)

Table 3: Protection of Body Systems

This table is another categorization of the same interventions, but oriented to protection of various body systems. Aging can be thought of as the gradual breakdown of many body systems; thus to delay the effects of aging I think we must protect all of the various critical body functions, including the senses. Just think of an example of a stereotypical "old man": stooped over, tremulous, with poor hearing and sight, slow of thought, taking medicine for his heart. If we can prolong life it should be a good life, with body functions kept intact as much as possible. In other words, it should be prolonged youth.

System	Intervention
Skin	**Caloric restriction** **Reflective-type sun block** (zinc oxide or titanium dioxide), hat, orange peel Stay indoors in mid-day in summer *However, be sure to get enough vitamin D: ≥1000 units, about 3x RDA*
Hearing	**Caloric restriction** **Ear plugs** when exposed to loud noise
Sight	Caloric restriction Sunglasses & a hat to prevent UV damage, **periodic ophthalmic eye exams** for "silent" diseases such as glaucoma, avoid smoking and control hypertension Eat fruit, fish, and certain vegetables (kale, spinach and broccoli for lutein)

Heart & circulatory	**Caloric restriction** **Reduce cholesterol,** drink a glass or two of red wine each day for men > 45 yr or women > 50 yr Reduce homocysteine by taking supplemental folate & B12 +/- B6, (turmeric?), freshly ground flaxseed **Eat a Mediterranean-style or DASH diet** **Keep blood pressure low, exercise daily, minimize salt intake**
Brain & neurologic	**Caloric restriction** Reduce homocysteine by taking supplemental folate, B12 +/- B6, **keep blood pressure low** or normal (≤115/75), **eat fish,** drink a glass of red wine each day for men > 45 yr or women > 50 yr, **exercise**, **vitamin D**, **minimize salt**, eat lots of fruit and vegetables, fruit juice, (turmeric?) Possibly avoid aluminum & copper (multivitamins), possibly avoid soy. The major preventative interventions that help with cardiovascular disease and hypertension appear to be helpful in preventing brain degeneration.
Gastrointestinal	Caloric restriction High-fiber foods, flossing & teeth cleaning, vegetables **AVOID: red meat, charred meats, cured meats**
Musculoskeletal	**Caloric restriction** **Exercise daily**, glucosamine & chondroitin, **vitamin D** (about 2-4 x the RDA - for BOTH muscles and bones), vitamin B12, reduce salt intake, reduce excess fluoride (toothpaste, tea and water), eat fruit and vegetables and avoid candy (note: caloric restriction will reduce bone mass but its effect on osteoporosis is unclear to me), hip protectors for the elderly
Immune	**Caloric restriction** Vaccinations, adequate zinc

I think it is most effective to reduce the likelihood of the things most likely to kill (heart disease, stroke, diabetes and cancer) or disable (aging, heart disease, stroke, hypertension, diabetes, arthritis, obesity, and mental/brain diseases). Certain specific habits, foods, dietary modifications, and supplements have been demonstrated to do these things.

First place to look: Harvard School of Public Health: Nutrition Source. http://www.hsph.harvard.edu/nutritionsource/

First statement: everyone should be clear that caloric restriction (CR - simply eating less!) is by far and away the most important way to reduce or delay the incidence of virtually ALL of these problems, from mental decline to heart disease to cancer and even to death itself. For *prevention*, CR works far better than medicine, far better than fruit and vegetables, far better than reducing cholesterol (which CR itself does just as well as the statin drugs such as Lipitor) – in short the effects of CR are amazing. CR by itself has also been shown in human studies to dramatically reduce blood pressure, cholesterol, lipids, CRP, hemoglobin A1C, and many other risk factors for heart attack, stroke, and dementia. It has also been shown in numerous, large epidemiologic studies that people who eat less or are thin have a large reduction in rates of heart attack, stroke, cancer, disability, dementia, joint problems, etc. Severe CR is not yet proven to prolong maximum life-span in humans to the dramatic amounts seen in all lab animals; however it dramatically reduces both disease rates and risk factors and has repeatedly been proven to be remarkably effective in prolonging life span for short-lived animals of all types. Animals (and probably people) on CR look and act younger than their "ad-lib diet" cohorts. In nearly all measurable parameters, CR appears to prolong youth and extend life. In short, CR is the only intervention proven to slow the aging process itself. If you do nothing else for your health, practice CR to some extent. (*Caveat: moderate or severe CR is potentially dangerous for some and should be taken on slowly, carefully, and with optimal nutrition*.)

Modern medicine is "squaring the curve" of longevity. More people are living up to the typical maximum lifespan (say, 82 years): by reducing premature death from diseases of middle age: the average lifespan is increasing. However, the lifespan curve is not shifting to the right: the aging process has not been slowed, and maximum lifespan has not been increased!

So what does it matter? What if we could not just reduce but eradicate cancer, diabetes, heart disease, etc. – how much would be gained? It turns out that all this would NOT increase his life expectancy by more than a few years. The average person's longevity gain from the utter eradication of cancer from

human experience would be 3.2 years of life. Elimination of ischemic heart disease would add 3.6 years. Elimination of these plus all circulatory diseases and diabetes would result in a total of 15 years of longevity gain.[13] Thus aging catches up to us all even in the setting of elimination of the killer diseases – in essence the body wears out. On the other hand, there is strong evidence of a greater increase in lifespan from caloric restriction. By my own calculations based on animal data with some human data confirmation, moderate (30%) caloric restriction probably increases lifespan by about 15 years if started in youth (age 20). In addition, there are hints that reduction of inflammation, glycation and possibly free radical damage, may add yet more useful, happy years.

What kind of science are these notes based on?

Much of it is science based on observations disease rates of various populations. For example,

1. The Japanese have a low level of prostate cancer and Alzheimer's disease, and a high level of stomach cancer. On the other hand, Second-generation Japanese-Americans have the same rates of these diseases that Americans in general have.
2. Doctors observed that people who took aspirin for very long periods (such as those with arthritis) had a much lower rate of heart attacks.
3. Scientists were first alerted to the many benefits of the essential fatty acids (usually from fish) EPA and DHA in the early 1970s, when Danish physicians observed that Greenland Eskimos had an exceptionally low incidence of heart disease[14] and arthritis, despite the fact that they consumed a high-fat diet. The so-called "Mediterranean diet" (olive oil, fish, etc., best exemplified by the diet on the island of Crete) was also observed to be associated with a low incidence of heart disease.

Once these observations were made, studies were done to figure out which factors caused the observed differences. Certain things were shown to correlate to these differences (for example, women with the highest folic acid intake were shown to have the smallest number of children with spina bifida, a cause of cerebral palsy). This correlation does not mean cause and effect. To get that you have to do carefully controlled, prospective studies. This last step takes a lot of time, money, and careful science, and has been done for only a few factors. Even then, you cannot be certain there was not a confounding factor of which the scientists were unaware. Three contrasting examples:

1. Studies eventually proved that folic acid is indeed what prevents spina bifida, and that the recommended daily allowance of folic acid is insufficient. Other studies have since shown the high importance of folate for prevention of cardiovascular disease and colon cancer (75% reduction found in a study of multivitamin use in women, Annals of Internal Medicine, Vol. 129, No. 7) as well!
2. Decades ago, it was observed that high cholesterol levels in the blood correlated with a high rate of heart disease. At first, many experts recommended cutting down on cholesterol intake in foods. Since then several forms of cholesterol in the blood have been identified, and it has been shown that eating lots of saturated and trans-saturated fat makes your cholesterol level go up much more than does eating high-cholesterol foods.
3. Intensive research has discovered that the two fish fats (a.k.a. omega 3 = ω-3 = n-3 oils) that Eskimos consume in large quantities, EPA and DHA, are beneficial for most people (*n.b., perhaps not in the setting of moderate caloric restriction*). More recent research suggests that EPA and DHA play a crucial role in the prevention of atherosclerosis, heart attack, asthma, and cancer (associated with a >50% reduction in breast cancer risk[15]). Clinical trials have shown that fish oil supplementation is effective in the treatment of many disorders including sudden cardiac death[16], high blood pressure[17], rheumatoid arthritis, diabetes, ulcerative colitis, and Raynaud's disease. Epidemiological data from Japan and elsewhere suggest other benefits as well, including a reduced risk of prostate cancer. In addition, a randomized secondary prevention trial aimed at testing whether a Mediterranean-type diet may reduce the rate of recurrence after a first myocardial infarction (the "Lyon (France) Diet Heart Study"[18]) found a striking reduction in risk of heart disease from this diet.

Other studies[19] [20] showed that fish oil was effective in treatment of rheumatoid arthritis. (Other references on omega 3 oils: [21] [22] [23] [24] [25])

CAVEAT

You have to be very careful when interpreting studies. There are many sources of error and confounding factors. Humans are not genetically homogeneous, diet-controlled lab rats, in an environmentally controlled, life-long research lab. Thus the epidemiologic studies on people may have many problems and many alternative explanations.

For example, numerous studies have shown that people who eat more vegetables have better health (less cancer, less heart disease, etc.) Here are several alternate interpretations, and it may be that several or none is correct:

- vegetables are good for you
- only one of the vegetables is good for you (Broccoli? Carrots? etc.)
- if you eat more vegetables you eat less of things that are bad for you, such as trans-fats
- it is not the vegetables, but something on them that is good for you (e.g., salad dressing)
- people who eat vegetables have a genetic predisposition to better health
- people who eat vegetables tend to have habits that lead to better health

Thus, epidemiologic studies in people are at best suggestive, not definitive. Scientists get around these problems by looking at controlled studies of such things in lab animals.

Other examples:

1. Women who have a healthy life style can reduce their risk of heart attack and stroke by 80%. The recent (2002) NIH-sponsored Diabetes Prevention Program showed that a combination of exercise and diet prevented diabetes in 58% of a high-risk group of 3000 patients.
2. Up to 80% of breast cancer risk may be eliminated by increasing intake of vegetables and certain fatty fish, and reducing alcohol, sunlight exposure, and (non-fish) animal products.[26]
3. A study of 7th Day Adventists in California[27] estimated that "**Choices regarding diet, exercise, cigarette smoking, [and] body weight …, in combination, appear to change life expectancy by [up to ten] years.**"
4. One study showed that those people with few "life style-related risk factors, including cigarette smoking, physical inactivity, and under- or overweight" had **fewer disabilities until just at the end of life**. "The risk-factor-free group showed average disability scores near zero 10-12 years before death, rising slowly over time, without evidence of accelerated functional decline. In contrast, those with two or more factors maintained a greater level of disability throughout follow-up and experienced an increase in the rate of decline 1.5 years prior to death. For those at moderate risk, the rate of decline increased significantly only in the last 3 months of life."[28] I interpret this as showing that you can prevent age-associated disability by taking care of yourself. I also think (see below) that CR with good nutrition has been shown to be the best general approach to this.

Objections

"But some of these things are unproven."

On the contrary, they are proven to a reasonable level: there is an overwhelming weight of evidence, with clouds of witness point to them working. Do you want to wait around for the ultimate prospective, randomized, multicenter, controlled trial proof in 120 years?

"He's gone off the deep end…"

Not really. This is NOT the focus of my life. However, a *lot* of nutrition-based medicine has been investigated recently, and some has been found to have merit. I think I should pass these findings on to those I know and love.

WHOA…

What if I told you that there was a scientifically proven way to live longer, cut your risk of heart

disease, cancer, Alzheimer Disease and a host of other problems – and at the same time look and feel younger? A way that works better than any other known to modern medicine? The cost: less than free, it actually saves money (unless you end up eating more expensive foods). Caloric restriction *is* this "miracle". Eat less, live better, live longer, live cheaper, live!

"Medical care is getting better, and will keep me alive longer anyway."

Remember the quote at the beginning, "Every one desires to live long, but no one would be old"? Better medical care lets you live longer as an old person with damaged hearts, bodies and brains. From the New York Times 2003-01-19: "These people aren't cured," Dr. Braunwald said. "They are maintained alive. We have converted heart disease from an acute illness to a chronic disease." On the other hand, slowing the aging process through caloric restriction lets you live longer as an effectively younger, energetic person. When you get older, the better medical care is there when you need it.

"But I hate taking supplements and medicines."

OK, you can have the life that your grandparents had if you want. A lot of good science in the last decade has shown many ways to improve your life, by slowing the aging process and reducing the risk of the worst and most common causes of disability and death, such as heart disease, stroke, cancer, mental illness, and arthritis. Personally, I started having children somewhat late, and I want to be healthy and active when my youngest child has children - I will be about 70 then. For me the potential trade-off is well worthwhile.

"I want to wait till I have problems, and THEN I will lose weight or take medicine."

Hmmm. Sorry, Charlie, this is NOT the best strategy. Prevention IS the best medicine. A study based on the long-term Framingham Heart Study, published in Circulation (2006-02-06)[29], showed that those who were free of cardiovascular risk factors (diabetes, hypertension, etc.) at age 50 had a much lower lifetime rate of cardiovascular disease, and lived much longer (11 yr longer in men, and 8 yr longer in women).

"What does it matter?"

Well, in the end, nothing. Especially when compared with the incomparable importance of salvation. Our bodies will end up as dust; our souls are eternal. Nevertheless, although nutrition and health are not worth obsessing about, I think it is worth a little effort to live properly here on earth.

"God will take me when he wants."

Yes. However, do you buckle your seat belt to reduce your risk of dying from an auto accident? Of course you do. We all avoid risks such as smoking or walking in the middle of a busy highway, and do things for our health such as taking medicine when we need it. These measures are similar. They are MUCH LESS EXPENSIVE AND MUCH LESS BOTHERSOME than the medications and medical care that will *try* to *mitigate* the problems from heart disease, Alzheimer's disease, etc. Do you eat certain foods because they are good for you? Then why not eat those foods that have been scientifically shown to be good for you (vegetables, tree nuts, fruit, whole grains, vitamins, etc.), and in a way that is scientifically proven in all studied species to be best (caloric restriction)?

Also… if you eat less, you will save on grocery expenses as well as live better and longer.

Warnings

Disclaimer: The opinions expressed are not medical advice. They are the private opinions of the author, and are not those of the Navy, the Department of Defense, or the US Government.

This is NOT medical advice, which would require evaluation of you personally by your doctor. Indeed, some of these approaches (such as caloric restriction) could cause harm or even death to someone with an underlying health problem. *Caveat: moderate CR (BMI = 17) or severe CR (BMI = 15) might be dangerous for some and should be taken on slowly, carefully, and with optimal nutrition*. The effects of CR on young children, pregnant women, and those with specific medical conditions are incompletely known to

me (although there is evidence that being overweight is harmful for these groups); I can not give recommendations on moderate or severe CR for these people.

Some supplements are downright dangerous, including vitamin E (at least in the common, high-dose, cheap form of alpha-tocopherol), and many others I have not given any thought to.

Some of these things are likely to prove useless or even harmful with time. Others will turn out to counter each other. Careful scientific studies on people are very hard to do, and even harder to do with nutrition. Some of these things may be good for some but harmful for others, based on genetics or other factors.

Many of these food and supplement changes can have side effects, such as stomach upset, gas, etc. Aspirin, vitamin E, and ibuprofen (note: I do NOT recommend the use of any of these things unless specifically recommended by a physician) can cause increased bleeding from surgical procedures, and even increase the risk of stroke in some, or cause other problems. Because of this, I suggest that if you adopt these suggestions, do so gradually so that if one causes you problems you can avoid it. In addition, if you already have a medical problem, check with your doctor before starting supplements or large amounts of vitamins.

A piece of friendly advice: stay away from hyped supplements. Stick with good nutrition and caloric restriction; add in interventions with the best scientific evidence as you deem wise.

Finally, I have a strange social warning. When you lose weight, you will look and feel better. But even when you are well-within the *normal* BMI range (18.5-25), people around you will think you are strangely skinny. They are used to increasingly fat people around them, and do not realize that *you are normal*, while the people around you are fat. They may even pressure you into eating more! Do not listen to unreasonable advice. Eventually they will realize that this is just how you are. In my experience, this takes about a year. At the same time, do not expect them to jump on the CR bandwagon: a few may; the rest will overeat and feel guilty – but they will still overeat.

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