

Salvatore, who died in 2015 at the age of 110, started drinking from Molochio's fountain soon after he was born in 1905; given the exceptional longevity of so many of the town elders, it's tempting to think it might be the closest thing we have to a real fountain of youth. But while that's an interesting thought, I've spent most of my life studying the science of living long, and the truth is nothing so enchanted. You don't need to travel to Molochio to drink from its fountain of youth—but if you did, you would learn many of the secrets of longevity from its centenarians.

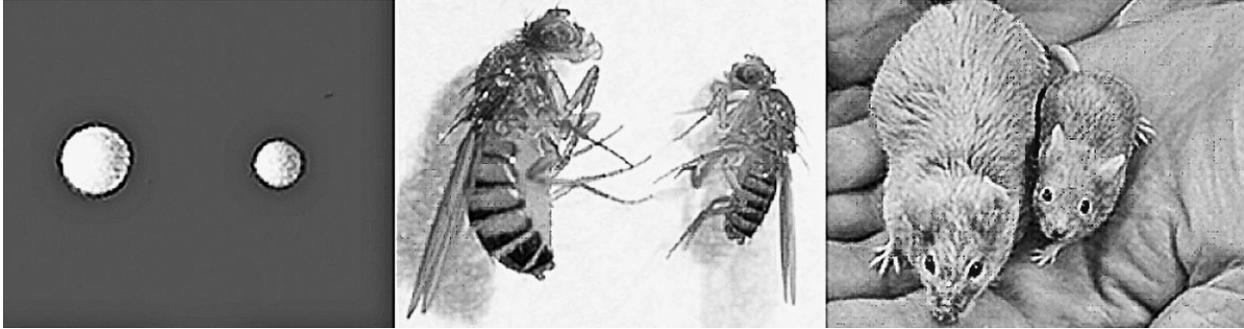


After being in Walford's UCLA lab for two years, I still had little insight into the secrets of aging. Mice were too complex to allow rapid identification of the genes that regulate and affect aging. Also seeing the angry faces of the Biospherians made me think that there must be a better way than chronic calorie restriction to delay aging, and I was impatient to find it. It prompted me to move to the biochemistry department, and the laboratory of Joan Valentine and Edith Gralla, to study aging in baker's yeast: a simple unicellular organism that allowed me to study the molecular foundation for life, aging, and death.

We think of yeast as an ingredient in bread and beer, but *Saccharomyces cerevisiae* (baker's yeast) is in fact one of the most studied organisms in science. This single-cell organism is inexpensive to work with and easy to study. It is so easy to work with that some scientists carry out yeast experiments at home. It's also easy to modify genetically, by simply removing or adding one or more of its roughly six thousand genes.



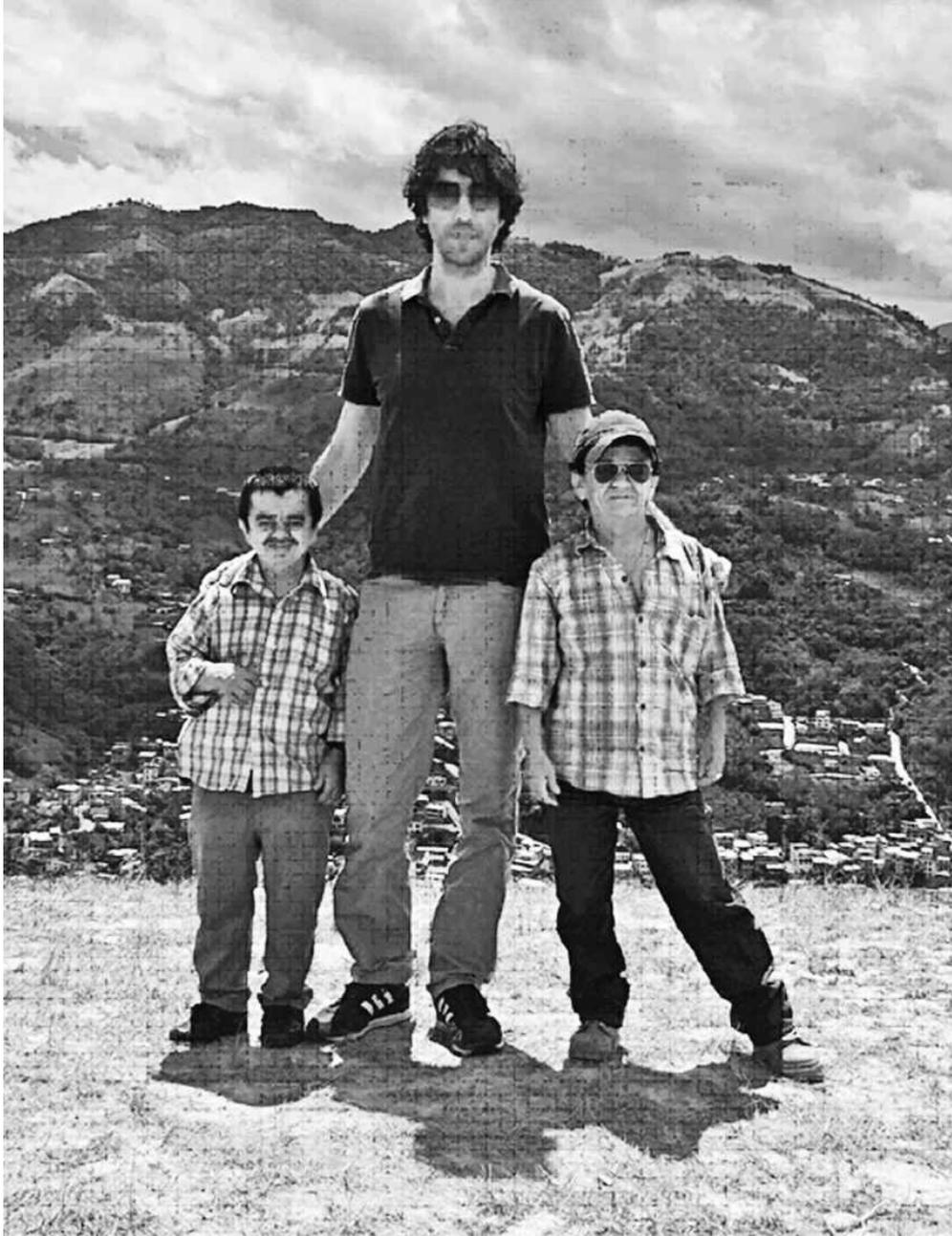
2.1. Roy Walford (far right) and the Biospherians at the beginning of the experiment, 1991



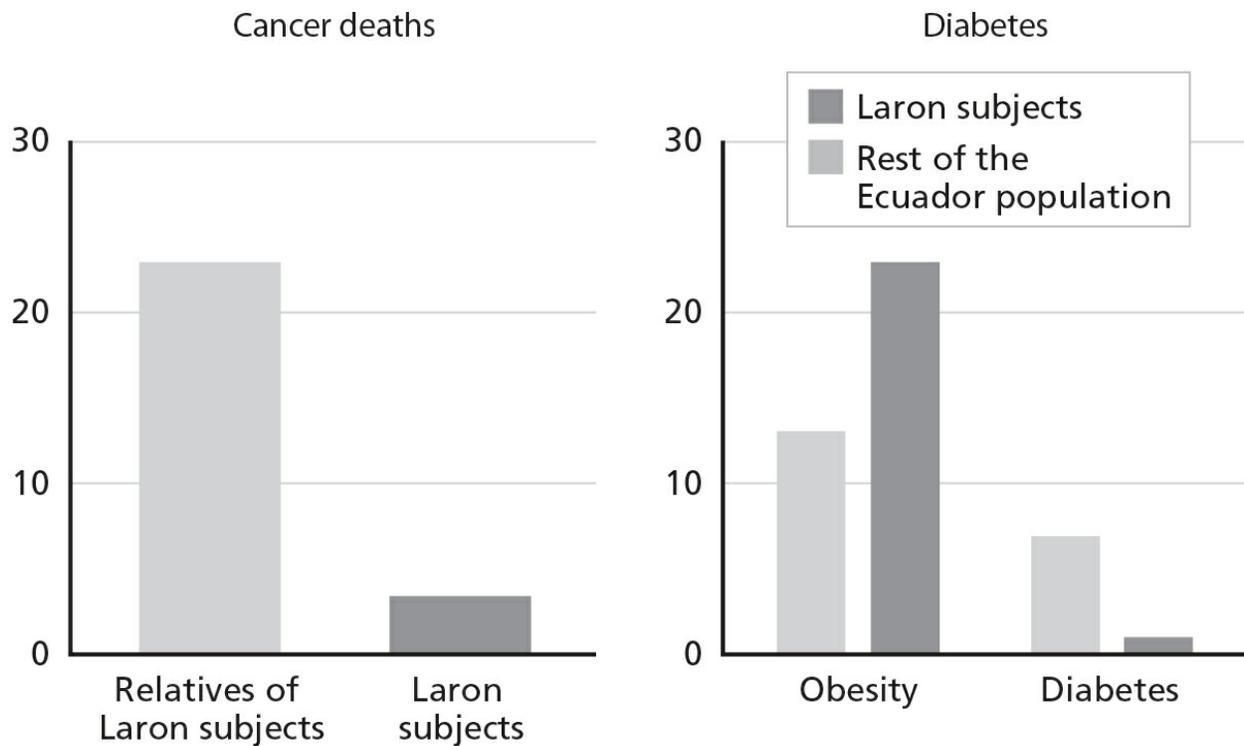
2.2. Yeast, fruit flies, and dwarf mice with similar mutations in growth genes all have record longevity.

It would take another six years for our data on genes activated by sugars to get published, along with the discovery of the pro-aging genes activated by amino acids and proteins (see fig. 2.2).³ Eight more years passed before different laboratories would confirm these data experimentally in mice, and another ten years before my own lab provided initial evidence that similar genes and pathways may protect humans against age-related diseases.⁴

Knowing that “dwarf yeast” with longevity mutations in the growth genes (TOR-S6K) could live up to five times longer than normal yeast, and that “dwarf flies and mice” with similar genetic mutations could live up to twice as long as normal mice, in 2006 I started research on the human version of the growth gene known to correlate to record longevity in mice (see fig. 2.2). Through my colleague Pinchas Cohen, who is now dean of the USC Leonard Davis School of Gerontology, I learned of the work of Jaime Guevara-Aguirre, an endocrinologist who had spent decades studying a community of extremely short people in Ecuador who lacked the receptor for growth hormone, a disorder known as Laron syndrome. After five years of working together, we published our findings concluding that there was a major decrease in the incidence of cancer and diabetes in subjects with Laron syndrome (see fig. 2.4), despite poor diet (consuming large quantities of fried food) and unhealthy lifestyle choices (smoking, drinking, etc.).⁵ Our finding made this group of short individuals from remote villages in Ecuador famous around the world—everyone wanted to hear about this group of little people who appeared to hold the secret that could protect everyone from cancer, diabetes, and possibly other diseases. We were even invited to present our research to the Pope, accompanied by one of our Laron subjects. Journalists described these people as being free from disease. “It doesn’t matter what we



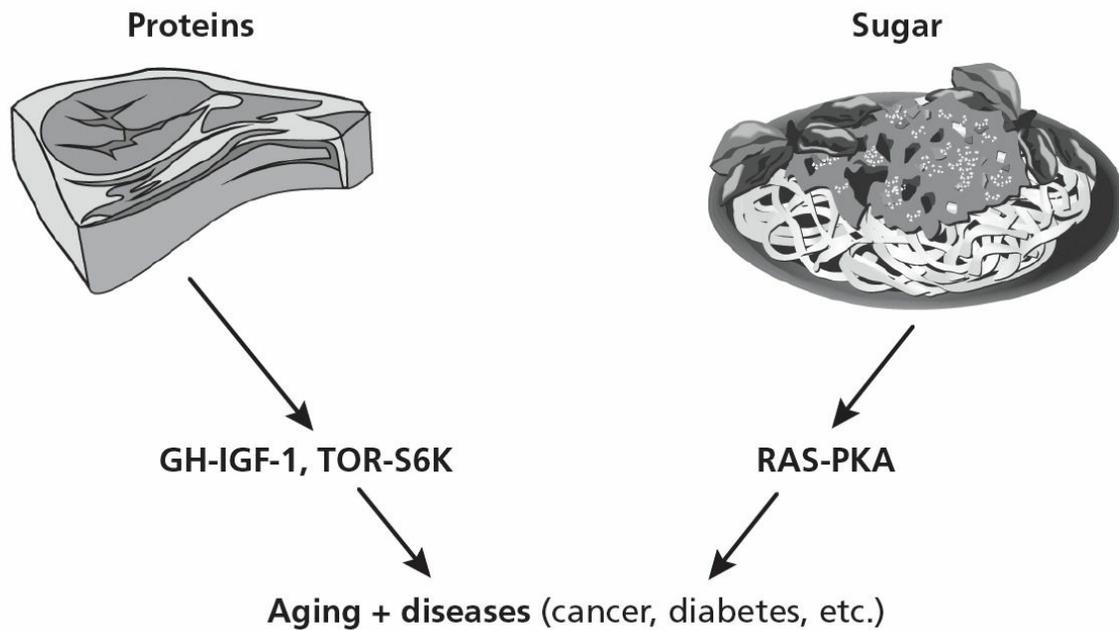
2.3. Me with Freddi Salazar Aguilar and Luis Sanchez Romero (both with Laron mutations) in their native Ecuador



2.4. *Individuals with mutations in the growth hormone receptor are protected from disease.*

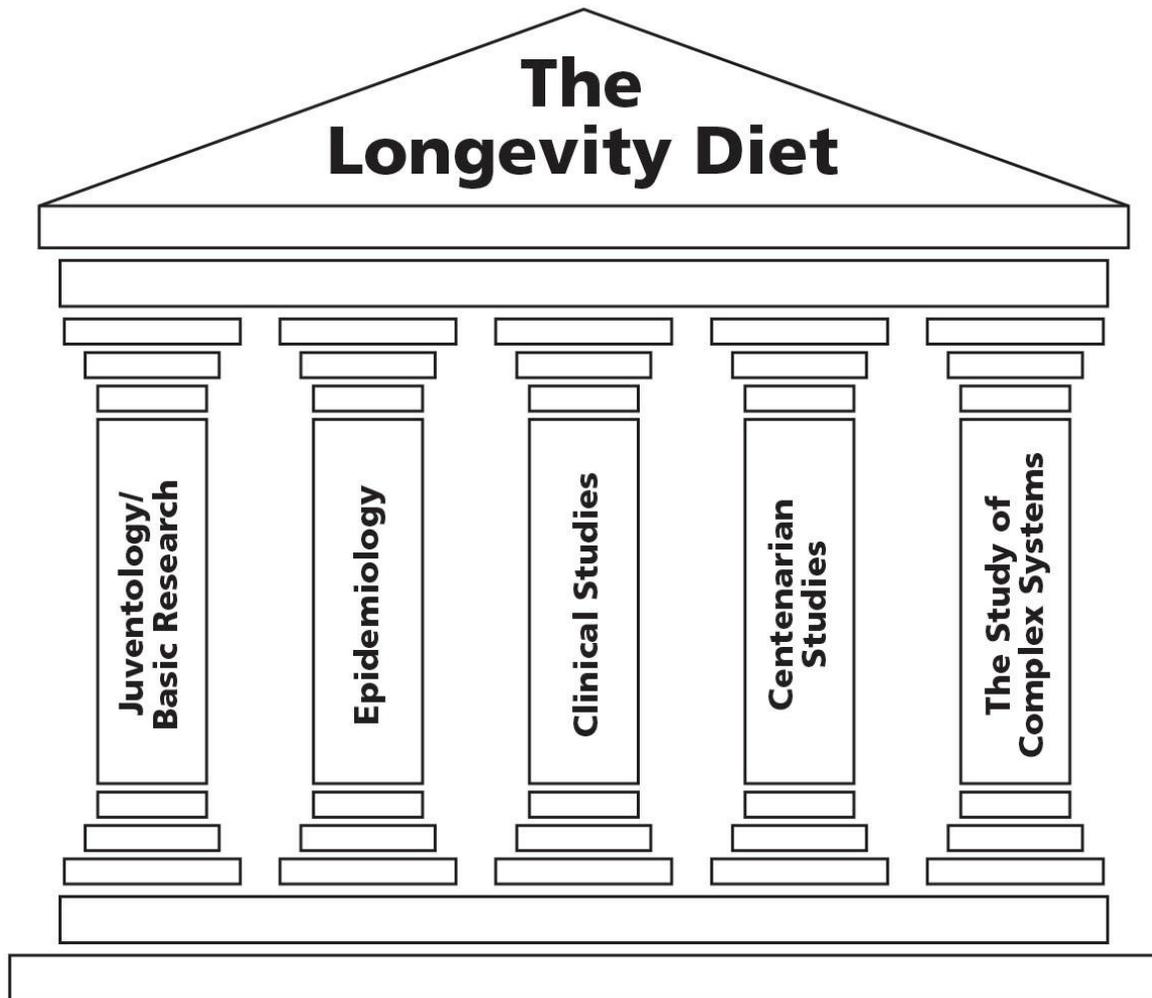
These findings were the last missing pieces to support my theory that similar genes and longevity programs can protect organisms, ranging from simple ones such as yeast to complex ones like humans, against aging and disease. These alternative programs, such as those found in the Laron people, have probably evolved to deal with periods of starvation by minimizing growth and aging, while also stimulating regeneration. The mutation in the growth hormone receptor gene that these Ecuadorians carry appears to force the body to enter and stay in an “alternative longevity program” characterized by high protection, regeneration, and low incidence of disease. The rest of the book takes advantage of this genetic knowledge to identify everyday diets and a periodic fasting-mimicking diet that can regulate genes that protect against aging and diseases.

apply the longevity program to all the diseases associated with aging. (See chapters 7 to 11 for disease-specific applications.) Clearly our strategy of studying the genetics and molecular biology of longevity in simple organisms paid off, though it took many years of hard work by groups made up of mostly geneticists and molecular biologists at universities all over the world.



2.5. The regulation of aging and diseases by sugar- and protein-activated pathways

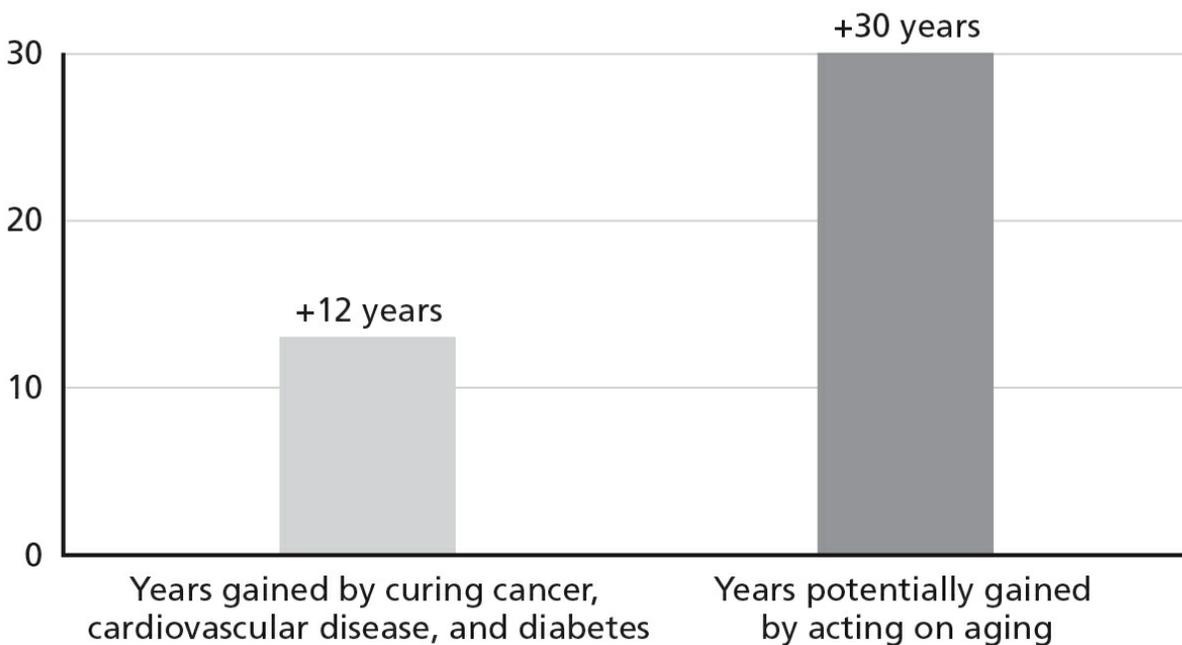
change. When dietary choices are based on all the Five Pillars, they are unlikely to be contradicted or undergo major alterations as a consequence of new findings.



3.1. *The Five Pillars of Longevity*

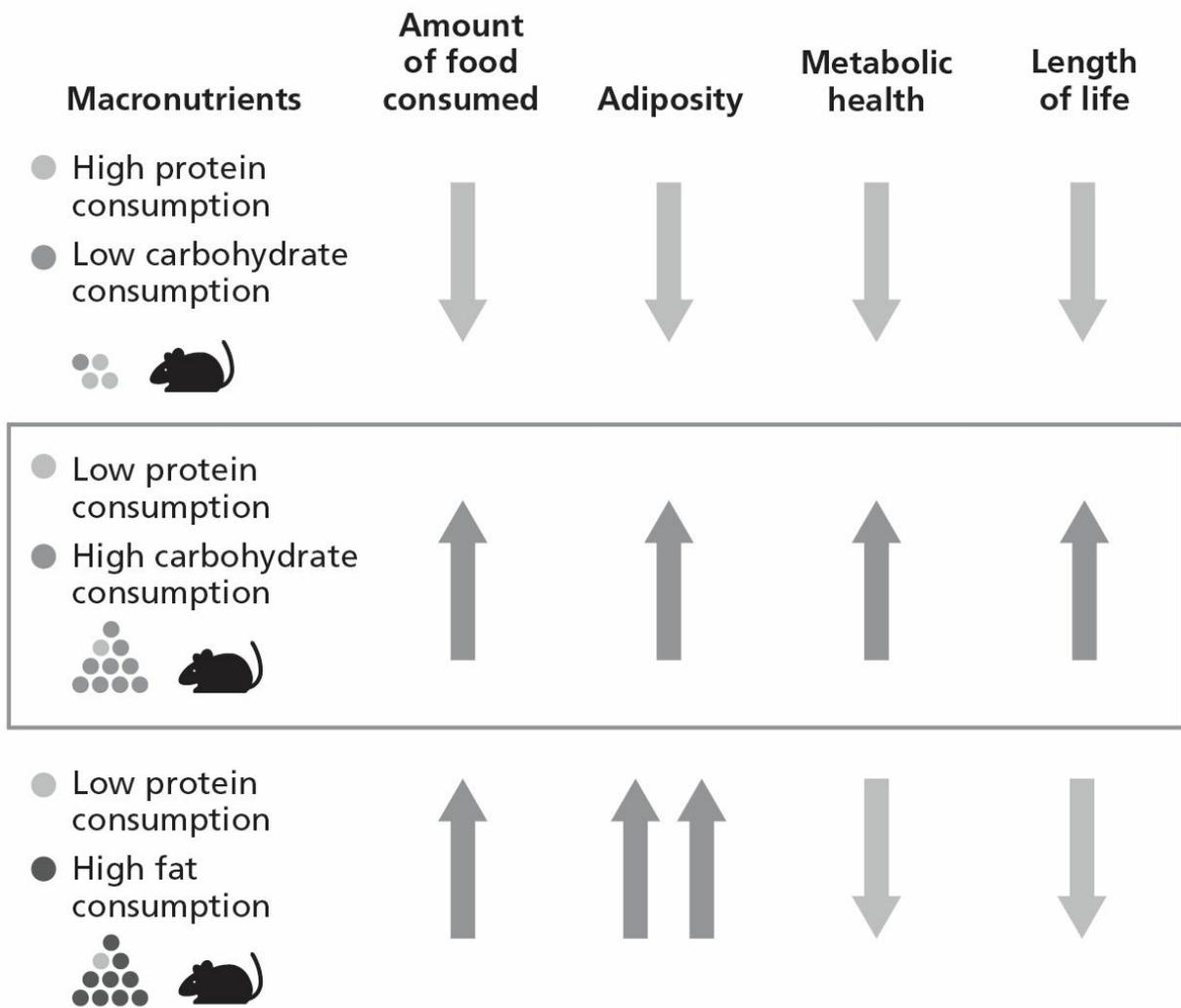
THE FIVE PILLARS OF LONGEVITY:

- **Basic/juventology research.** Without understanding how nutrients—such as proteins and sugars—affect cellular function, aging, age-dependent damage, and regeneration, it is difficult to determine the type and quantity of nutrients needed to optimize healthy longevity. Without animal studies to determine whether a diet can in fact extend longevity, in addition to

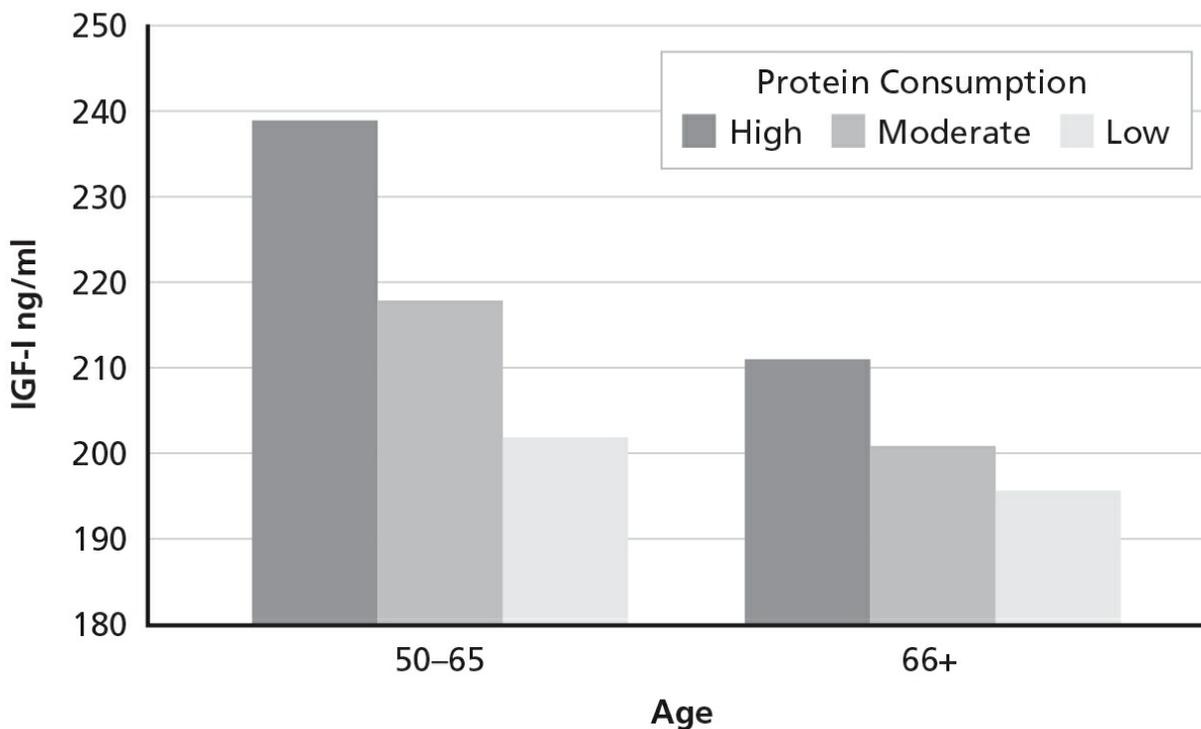


4.1. Comparison of the potential extension of longevity obtained treating cancer, cardiovascular diseases, and diabetes and delaying aging (with diet, etc.)

In the remainder of this chapter, I take advantage of the Five Pillars of Longevity to postpone aging and prevent disease by awakening the body's dormant ability to heal, protect, regenerate, and rejuvenate itself.

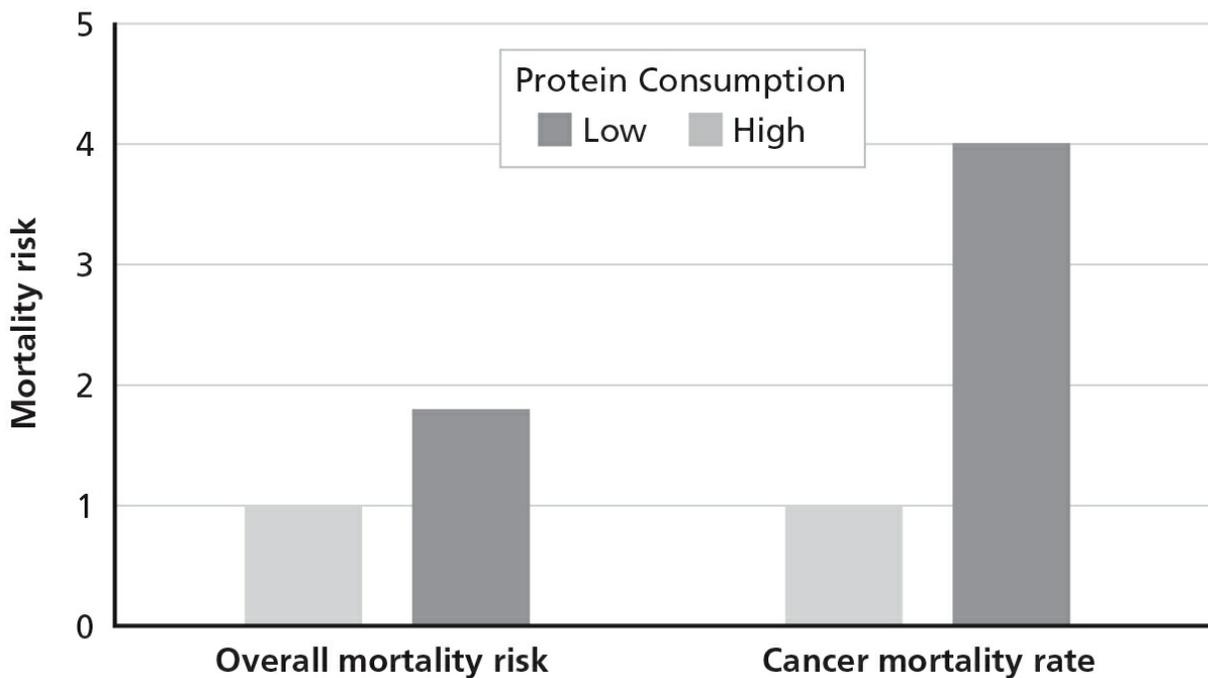


4.2. Low protein and high carbohydrate consumption produces maximum longevity and health in mice.



4.3. High levels of IGF-1 (growth factor pro-aging and cancer) are seen only in people with high consumption of protein before age sixty-five.

Although it was not a randomized clinical trial, Satchidananda Panda and his colleagues at the Salk Institute studied how the total number of hours that food is consumed daily and when that food is eaten are associated with sleep patterns and risk factors for diseases. They determined that people who consumed food over a period of twelve hours or more benefited from reducing the consumption timespan to twelve hours or less.²⁰ In support of a diet high in complex carbohydrates and good fats being the best even for weight management, when a diet very low in carbohydrates (less than 10 percent of calories) and high in protein (more than 20 percent of calories) and fats was compared with a moderate carbohydrate regimen similar to the Okinawan diet, fat loss was similar in both cases.²¹ However, the low-carbohydrate diet caused a much higher loss of water and proteins, indicating that the seemingly large effect of very low-carb diets on weight loss actually represents loss of water and muscle in addition to fat.



4.4. High consumption of protein before age sixty-five is associated with a 75 percent increase in risk of death and a fourfold increase in risk of death from cancer.

Pillar 4: Centenarian Studies

Areas of the world known to have the highest prevalence of centenarians—Okinawa, Japan; Loma Linda, California; small towns in Calabria and Sardinia, Italy; and in Costa Rica and Greece—all share diets that are (1) mostly plant-based with lots of nuts and some fish; (2) low in proteins, sugars, and saturated/trans fats; and (3) high in complex carbohydrates coming from beans and other plant-based foods. Most of these centenarians ate only two or three times a day, ate light meals in the evening, and were in many cases done eating before dark. They also consumed a limited variety of foods—ones typical of their homelands. In some cases they did modify their diet. For example, Okinawans used to get most of their calories from sweet purple potatoes, but today that is far less common.

OKINAWA

Craig Wilcox and his colleagues have compared the dietary habits of typical older people from Okinawa with those of older citizens living in the United States.

As we can see, American seniors ate ten times more meat, poultry, and eggs and three times more fruit, but far less fish, half the vegetables, and one third of the grains that the Okinawans did.

Okinawans	Americans
3% meat/poultry/eggs	29% meat/poultry/eggs
2% dairy/seaweed	23% dairy/seaweed
34% vegetables	16% vegetables
6% fruits	20% fruits
12% soy and similar foods	<1% soy and similar foods
32% grains	11% grains
11% omega-3-rich foods (fish, etc.)	< 1 % fish

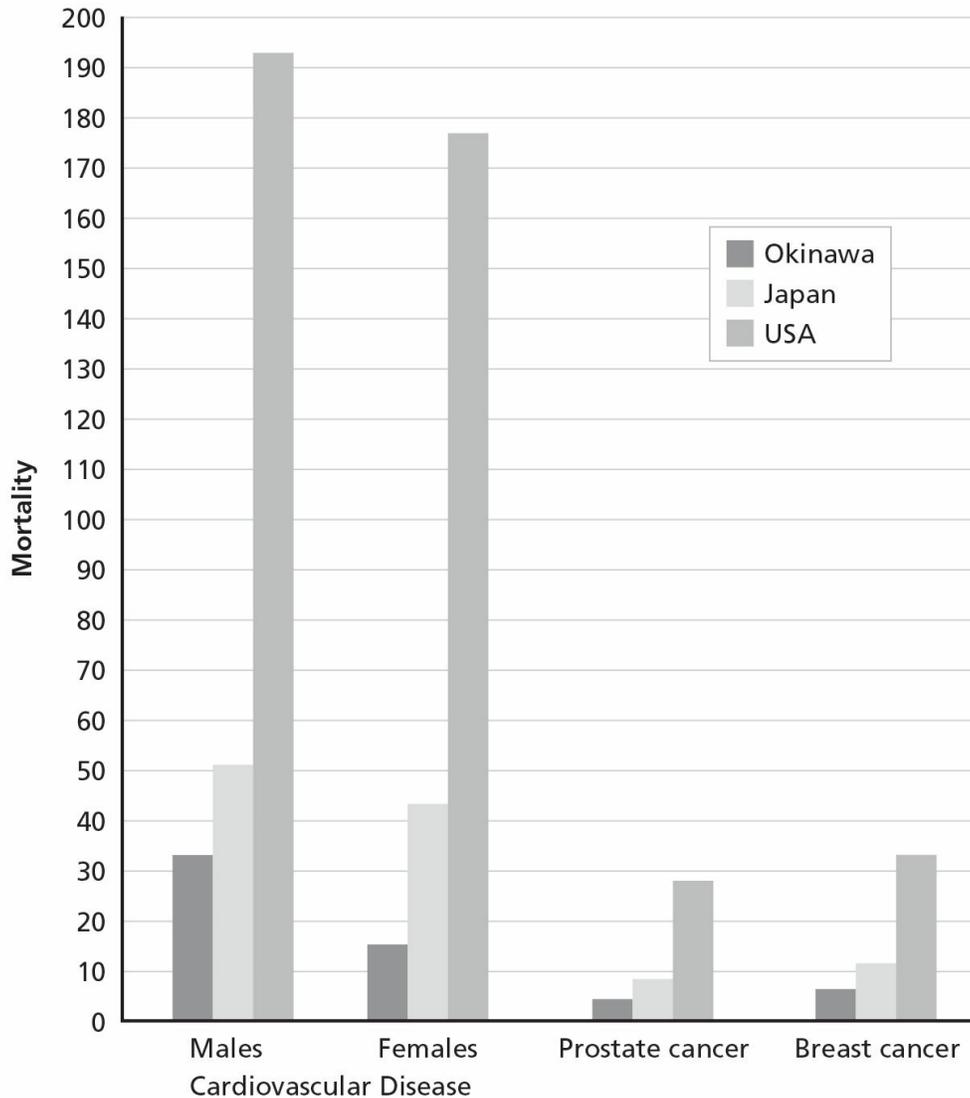
4.5. *Dietary habits of Okinawans versus Americans. Willcox, B.J. et al. "Caloric Restriction, the Traditional Okinawan Diet, and Healthy Aging," Annals of the New York Academy of Science, 2007.*

Life expectancy (world rank)	Location	Life expectancy	Breast cancer*	Ovarian cancer*	Prostate cancer*	Colon cancer*	Total cancer deaths (% increase versus Okinawa)
1	Okinawa	81.2	6	3	4	8	21 (0)
2	Japan	79.9	11	3	8	16	38 (80%)
4	Sweden	79	34	10	52	19	115 (547%)
8	Italy	78.3	37	4	23	17	81 (368%)
10	Greece	78.1	29	3	20	13	65 (309%)
18	USA	76.8	33	7	28	19	87 (414%)

* Cancer deaths per 100,000 people

4.6. *Risk of hormone-associated cancers (1990s, taken from Okinawa Program). Willcox B.J, et al. The Okinawa Program, Harmony, 2002.*

In figure 4.7, we see that far fewer Okinawans have cancer or cardiovascular disease than do Americans or even other people in Japan.



4.7. Mortality from diseases: Okinawa versus Japan versus USA. Wilcox BJ et al. "Caloric Restriction, the Traditional Okinawan Diet, and Healthy Aging," *Annals of the New York Academy of Science*, 2007.

Although it will be difficult to ever quantify this, my conclusion is that some centenarians find their strength in God, some in their families, but many find it in the joy of living—in tasting an egg after going through years of war and famine when they could only dream of eggs, or simply drinking a glass of wine. Which brings me to Italy, and two of my favorite people in the world.

SALVATORE CARUSO AND MOLOCHIO, ITALY

Not surprisingly, hardship played a key role in the historical diet of this region. In one of the documentaries filmed in Molochio, a French television journalist asked one of the other centenarians of Molochio how many times per week she ate meat in her younger years. At first, she didn't understand the question. When her daughter translated in the local dialect, she started to laugh. "Meat, yes, I had meat. My friends and I snuck into a wedding one time and we ate meat." We are so accustomed to thinking about meat consumption in terms of times per week that we did not realize that for some of the Molochio centenarians, the opportunities to eat meat were rare.



4.8. *With Salvatore Caruso*



4.9. *With Emma Morano*

A few years later, I was in another magical place I like to visit every year—the mountains of southern Ecuador, where I was studying the villagers with Laron syndrome—I was interviewed by journalist Stephen Hall, who was writing a cover story on parts of the world with extraordinary longevity for *National Geographic* (May 2013 issue). I told him about my grandfather’s village. “If you really want to meet people who make it to very old age without disease, then you must go to my parents’ hometown,” I told him. Stephen asked a few questions, but probably thought the same thing I did: it sounds a little too convenient. To my surprise, several months later he emailed me from there. “I’m in Molochio,” he wrote, “and I just confirmed that there are four centenarians and four 99-year-olds among its 2,000 inhabitants.” The Molochio centenarians became the centerpiece of the story.

One key observation, made in collaboration with my colleague Giuseppe Passarino, is that the Molochian centenarians tend to live with their sons’ or

Exercise Length, Strength, and Efficacy

How long and how strenuously should you exercise to optimize healthy longevity? Most studies linking exercise and longevity are sustained by just a single pillar, epidemiology, which is insufficient to reliably conclude a primary role for exercise in longer life. Nonetheless, exercise and longevity studies still provide very valuable information, particularly when hundreds of thousands of subjects are followed.

An Australian study looking for a link between exercise and longevity monitored 204,542 people ages forty-five to seventy-five for eight years. The group reporting more than 150 minutes a week of moderate to vigorous exercise displayed a 47 percent reduction in overall mortality, while the group exercising at moderate to vigorous levels for 300 minutes per week had a 54 percent reduction, so twice as much exercise did not provide much additional benefit.⁵ The effect was increased by another 9 percent in those who sometimes exercised vigorously.

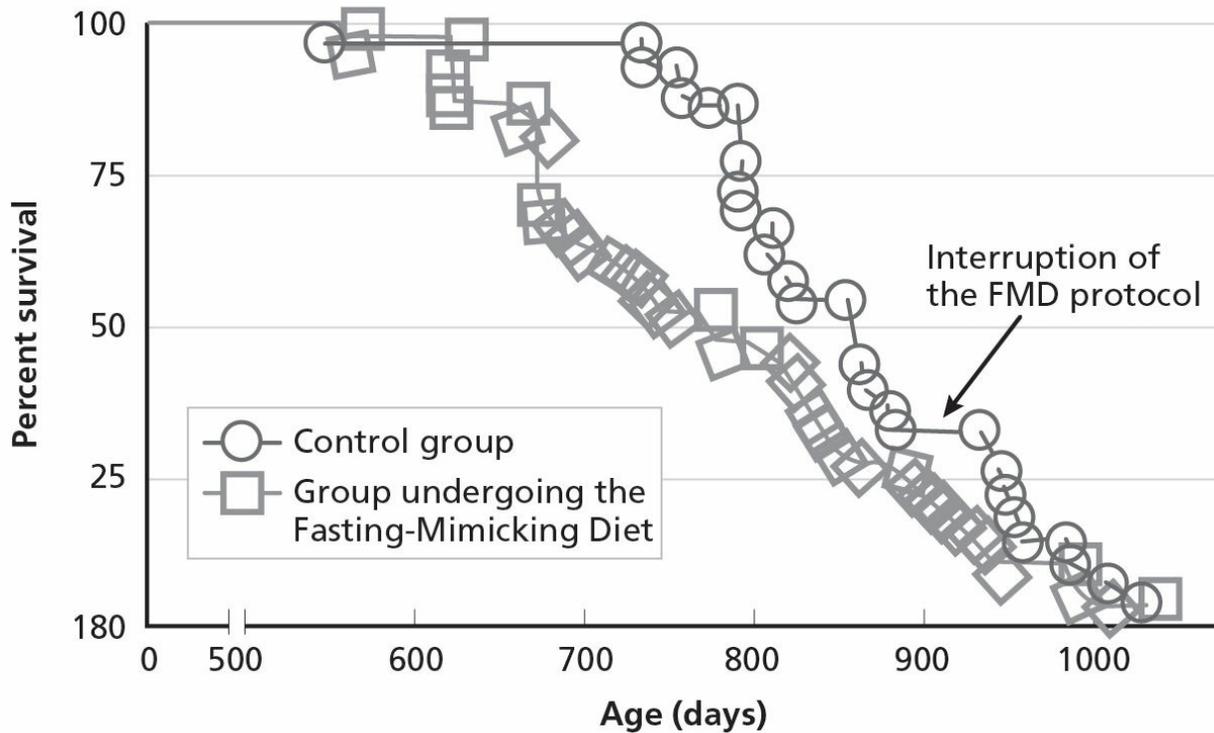
Light: up to 3 METs	Moderate: 3 to 6 METs	Vigorous: over 6 METs
Slow walking	Fast walking >4 mph	Climbing stairs/hiking
Slow bicycling	Bicycling 10–12 mph	Bicycling >12 mph
Standing, doing light work	Gardening	Playing soccer
Doing office work	Slow jogging	Jogging >6 mph

5.1. Exercise levels and corresponding activities.

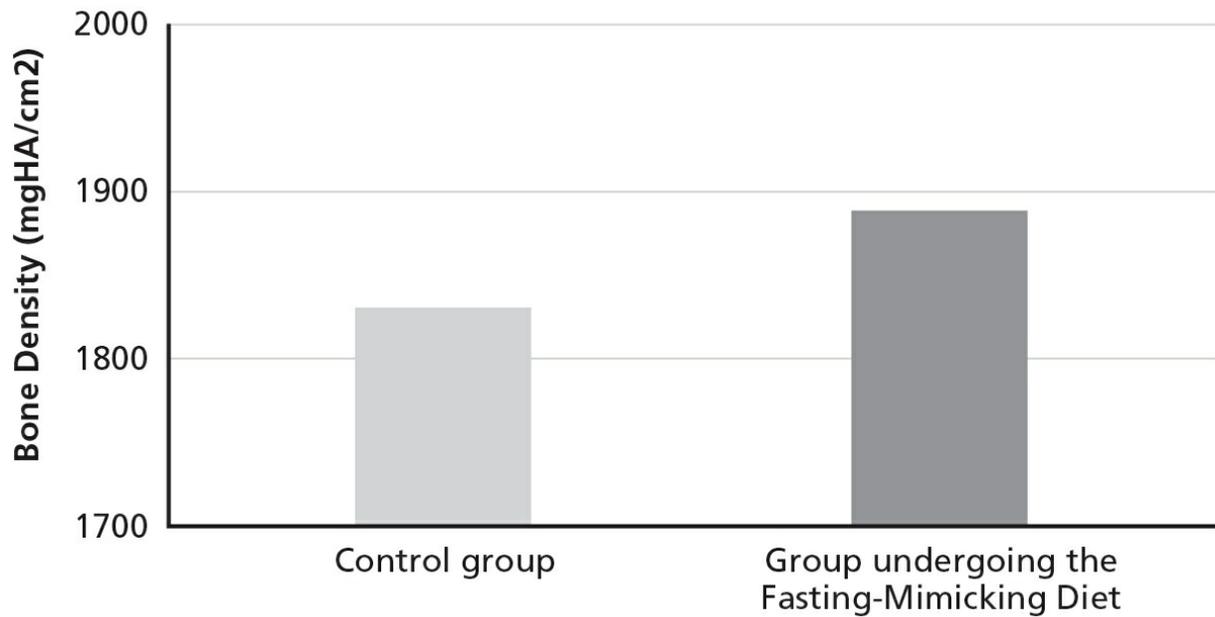
Metabolic equivalent tasks (METs) are commonly used to express the intensity of physical activity. One MET is defined as the energy cost of sitting quietly and is equivalent to a caloric consumption of 1 kilocalorie per kilogram per hour. Moderate exercise involves movement that burns three to six times the calories used when sitting still (3 to 6 METs). Vigorous exercise burns calories at more than six times the resting level (more than 6 METs).

Another very large study, combining data from six studies performed in the United States and Europe, followed 661,137 men and women (with a median age of sixty-two) over fourteen years. During that period, 116,686

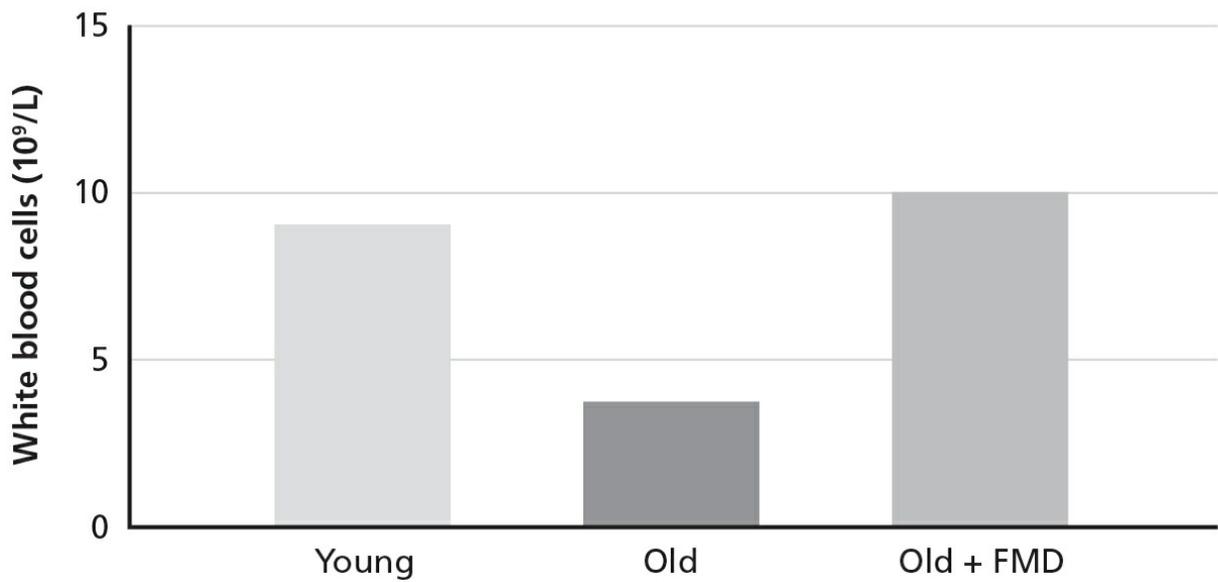
Consistent with our ProLon research in middle-age mice, we showed in several other mouse studies discussed in the following chapters that periodic fasting promotes stem cell–dependent regeneration in the immune system, nervous system, and pancreas. The fasting itself destroys many damaged cells, and damaged components inside the cells but it also activates stem cells. Once the mice begin eating again, these stem cells become part of a program to regenerate the organ or system, with the newly regenerated cells bearing characteristics of younger, more functional cells.¹ Additionally, the inside of a variety of cells is partially rebuilt as part of a process called autophagy, also contributing to cellular rejuvenation.



6.1. Mice receive FMD twice a month from the age of sixteen months.



6.2. Old mice exposed to FMD show less bone density loss (mgHa) when compared with those in the control group.



6.3. Mice that receive FMD in middle age experience rejuvenation of the immune system.

changes, which are modifications of the DNA and proteins that bind DNA)

Our randomized study of one hundred patients carried out at the USC medical center yielded impressive results. Participants who adopted an FMD for five days a month over a period of three months showed remarkable outcomes in the following areas:

Weight loss	More than 8 pounds in obese subjects, much of that from shedding abdominal fat
Muscle mass	Increased relative to body weight
Glucose	12 mg/dL decrease in subjects with high fasting-glucose (prediabetic) and a return to the normal range for prediabetic subjects; no effect in participants with low fasting-glucose
Blood pressure	6 mmHg decrease in subjects with moderately high blood pressure, but not in subjects with low blood pressure
Cholesterol	20 mg/dL decrease in participants with high cholesterol
IGF-1 (associated with a high cancer risk)	55 ng/mL decrease in participants in the higher-risk range
C-reactive protein (CRP; a risk factor for cardiovascular disease)	1.5 mg/dL decrease and, in most cases, a return to normal levels in participants with elevated CRP
Triglycerides	A 25 mg/dL decrease in participants with high triglycerides

6.4. Reduction in risk factors for diabetes, cancer, and cardiovascular diseases after three cycles of the FMD (one hundred subjects randomized clinical trial)

Three months after the last ProLon FMD cycle, test subjects still benefited from a significant loss of body fat and reductions in waist circumference, glucose levels, IGF-1, and blood pressure, all of which suggests that the use of the FMD every three months may be sufficient to reduce the risk of a number of diseases.

Awakening the Rejuvenation from Within

If a forty-five-year-old couple can have a near-perfect baby, then clearly the adult body holds all the information necessary to generate a new and viable set of cells, organs, and systems without transferring any of the damage present in the original oocyte and sperm cell. But is it possible to trigger the same regenerative process within adult organisms?

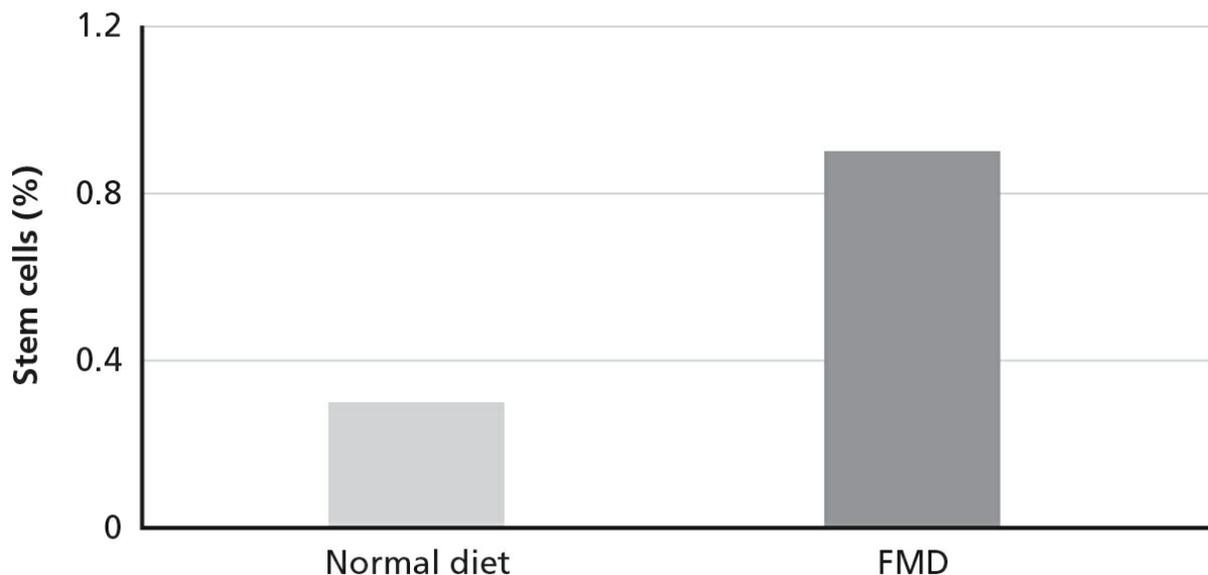


6.5. The sperm cell and egg of a couple in their forties can create a perfect baby.

Perhaps I'm biased because it was my group that discovered its beneficial effects, but I believe the FMD is probably the best way to start this regenerative and self-healing process, with minimal or potentially no side effects (see my TEDx talk, "Fasting: Awakening the Rejuvenation from Within," on YouTube). The randomized clinical trial results outlined above were achieved in just three months after three cycles of five-day FMD using human subjects. The findings are in keeping with our mouse studies, which

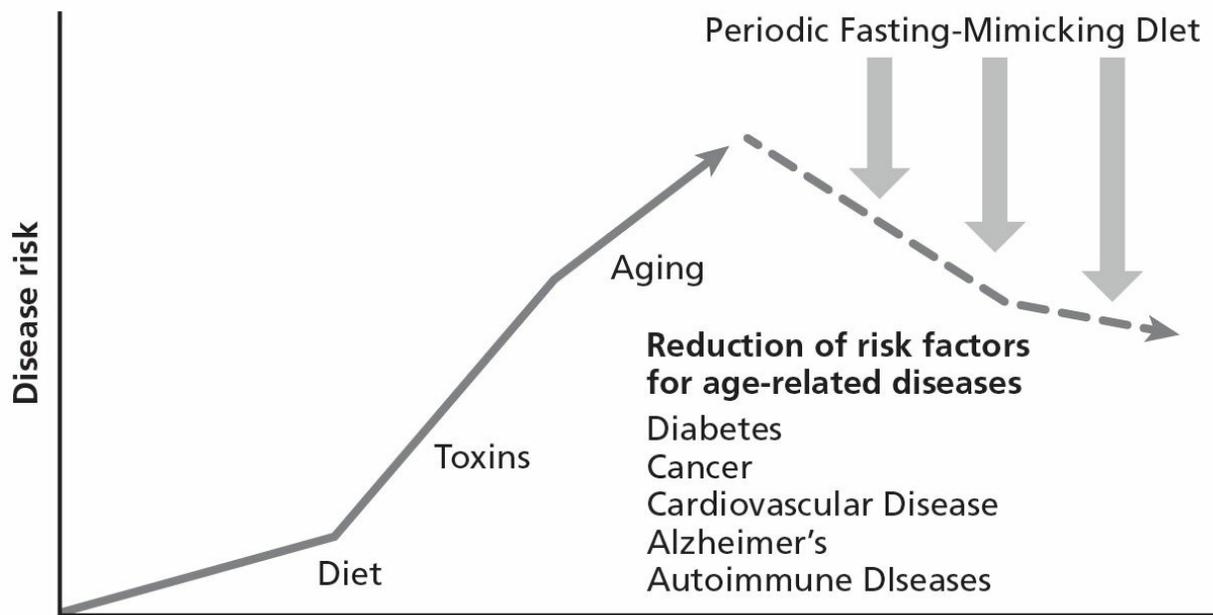
showed that FMD acts by breaking down and regenerating the inside of cells (autophagy) and killing off and replacing damaged cells (regeneration). In fact, both in humans and mice, we detected a transient elevation of circulating stem cells in the blood during FMD, which may be responsible for the regeneration and rejuvenation occurring in multiple systems.

By feeding people a very specific diet that tricks the organism into a starvation mode, most organs and systems eliminate unnecessary components (proteins, mitochondria, etc.) but also kill off many cells. As a result, the organism saves energy because it needs to maintain fewer and less active cells. In addition, both cells that are killed and cellular components broken down by autophagy can provide energy to other cells. A good analogy is to think of the body as an old wood-burning steam locomotive low on wood. To reach the next fueling station, the fireman can start burning the train's oldest and most damaged wooden seats and walls, making the train lighter while generating the steam needed to keep it going. Just as the seats can be rebuilt once the train reaches the fueling station, the streamlined cells, systems, and organs can be rebuilt by activating stem or progenitor cells and activating repair and replacement systems inside the cell to cause regeneration—once the body resumes normal feeding patterns.



6.6. Blood stem cells in patients during FMD

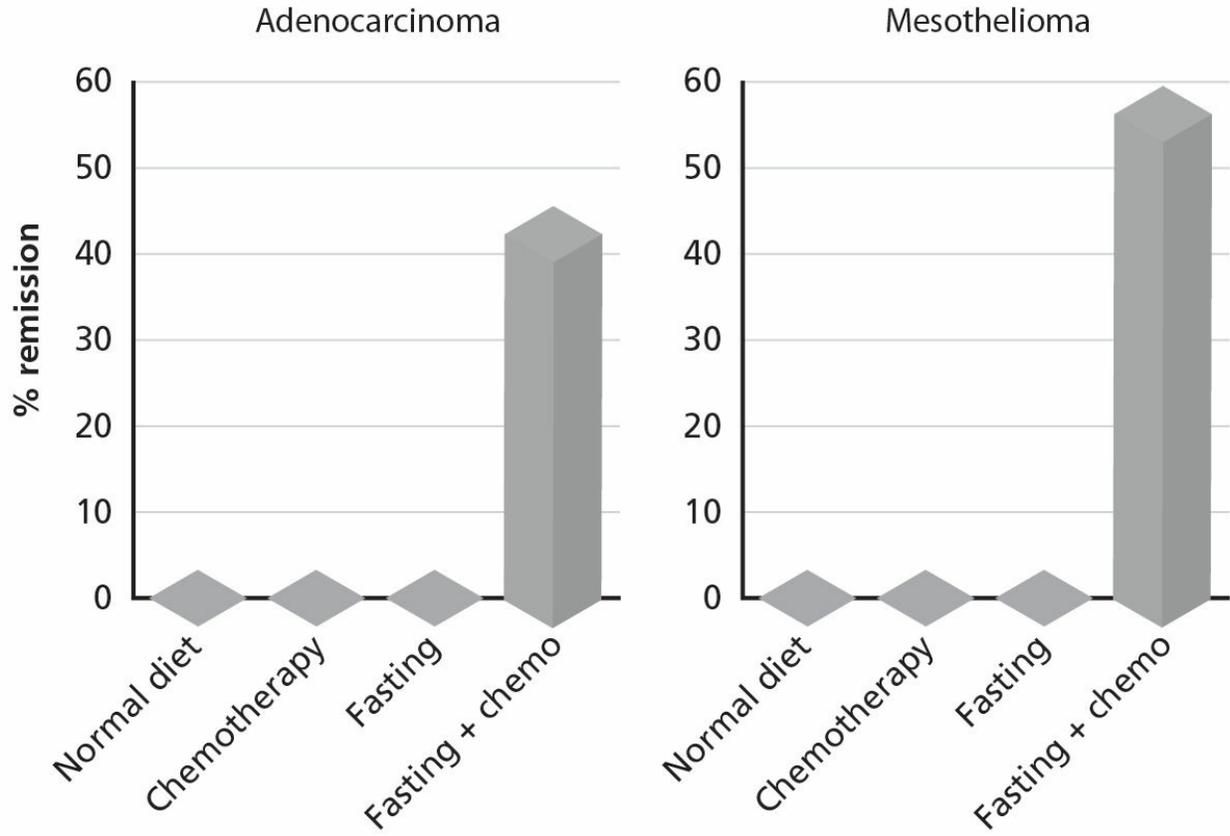
reduce fasting glucose and return prediabetic subjects to the normal glucose range. As pointed out below, in participants with normal blood pressure, glucose, cholesterol, and inflammation, we did not find big changes in the level of risk factors in response to three monthly cycles of the FMD, but we saw significant changes among those with the highest levels of risk factors before beginning the FMD. This is consistent with a rejuvenation effect—a true reversal of the physical damage or underlying problem, not simply the blockage of cholesterol synthesis or lowering of glucose levels achieved with statins or diabetes drugs.



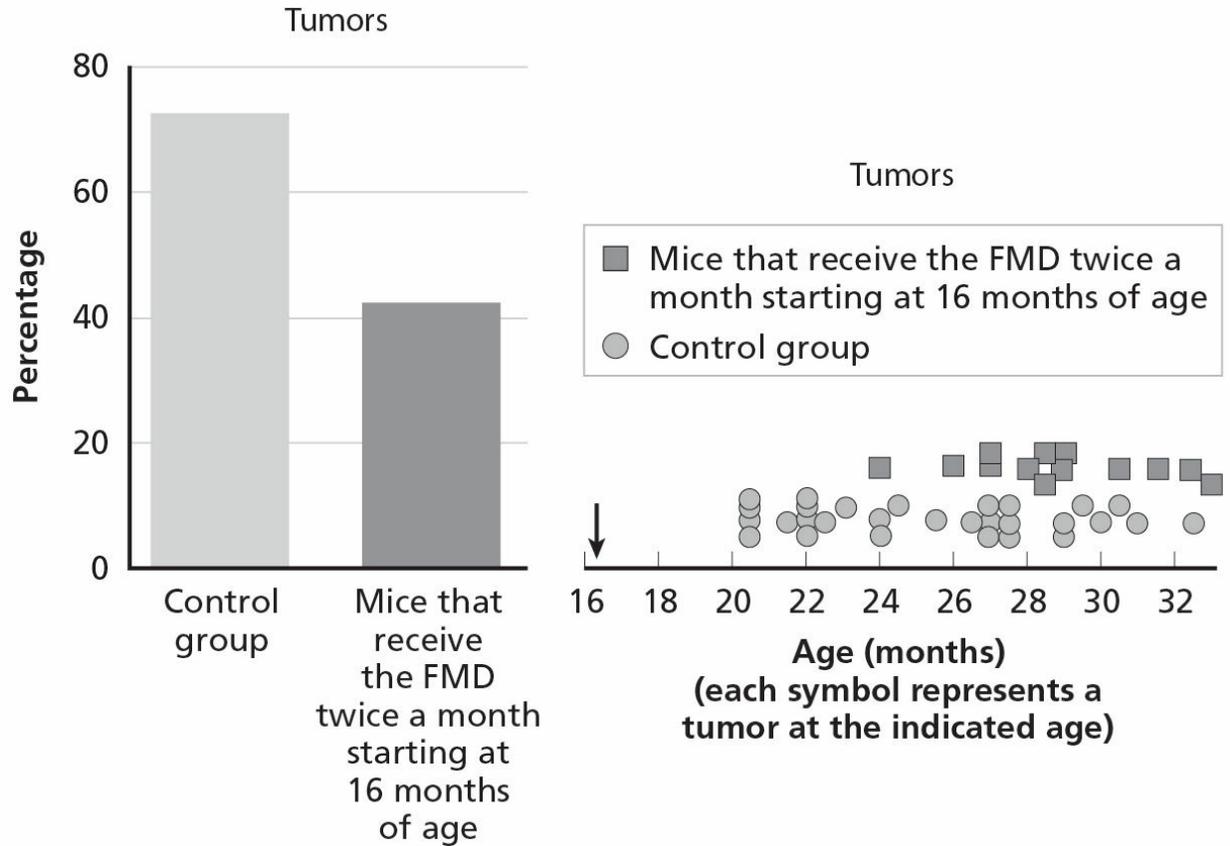
6.7. The rejuvenating effects of the FMD

The Fasting-Mimicking Diet

What follows is a simplified version of the FMD tested in our clinical study of one hundred patients at Keck Medical Center of USC and now also recommended to patients by thousands of US and UK doctors. At least ten thousand patients have undergone the ProLon FMD therapy, and there have been no reports of major side effects. The goal in this section is to provide general information that you can take to doctors and dietitians for help implementing the diet, rather than specific recipes for readers to implement



7.1. Percentage of lung cancer remission in mice subjected to the FMD with and without chemotherapy¹



7.2. Cycles of FMD reduce and delay cancer in mice

Having conceived the idea of a starvation-induced magic shield, I remembered a basic lesson from evolutionary biology: the great majority of genetic mutations (changes in the DNA) are deleterious, but their negative consequences usually appear only under certain conditions. Abundant mutations in the DNA sequence of cancer cells may well increase their ability to grow, but those same mutations will greatly impede the cancer cell’s ability to survive in challenging environments, for example under the double onslaught of starvation and chemotherapy.

Could this theoretical scenario actually work? Our animal studies and those of other researchers show that fasting, in addition to protecting normal cells, makes chemotherapy much more toxic to melanoma, breast cancer, prostate cancer, lung cancer, colorectal cancer, neuroblastoma, and many other cancers. In many cases, cycles of fasting (or of a fasting-mimicking diet) are as effective as chemotherapy at fighting cancer. However, neither strategy alone is optimal. Permanent therapeutic effects are achieved only

a young physician working in my laboratory in charge of following up and communicating with these patients' oncologists.

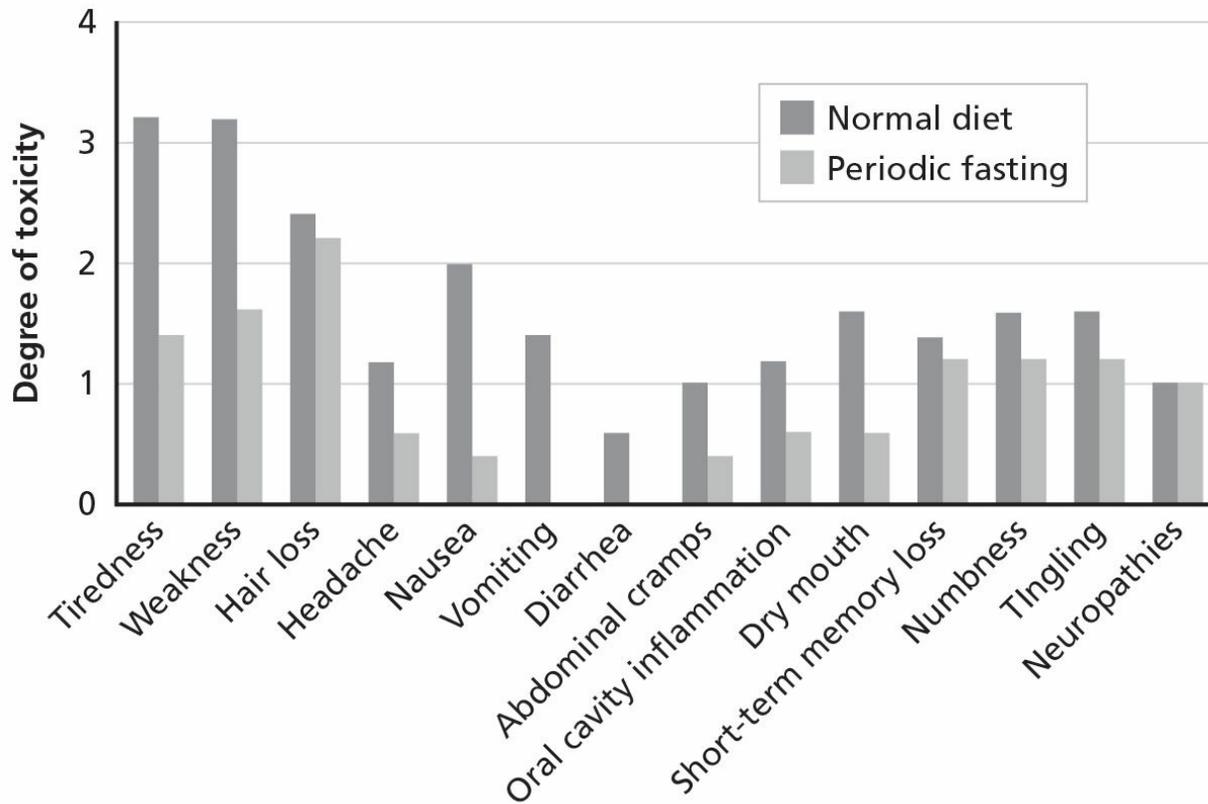
In our initial interactions with clinical oncologists, we were not taken seriously. But we had compared the effects of fasting with the chemotherapy drug of choice in the treatment of various cancers. We knew that combining the two had produced a synergic boost in efficacy, at least in mice.

We called the oncologists of each patient who had contacted us. Some wouldn't return our calls. In several cases, my researcher showed up at the clinic to personally request copies of the patients' files. Eventually we collected data on ten patients: seven women and three men, between the ages of forty-four and seventy-eight, diagnosed with different types and stages of cancer:

Demographical and Clinical Information of Patients

	Gender	Age	Primary neoplasia	Stage at diagnosis
Case 1	Female	51	Breast	IIA
Case 2	Male	68	Esophagus	IVB
Case 3	Male	74	Prostate	II
Case 4	Female	61	Lung (NSCLC)	IV
Case 5	Female	74	Uterus	IV
Case 6	Female	44	Ovary	IA
Case 7	Male	66	Prostate	IV/DI
Case 8	Female	51	Breast	IIA
Case 9	Female	48	Breast	IIA
Case 10	Female	78	Breast	IIA

7.3. Personal and clinical data of ten patients involved in the study focused on fasting and chemotherapy combination



7.4. Self-reported side effects after chemotherapy with and without fasting

Each of these patients had voluntarily fasted for 48 to 140 hours prior to and 5 to 56 hours following chemotherapy. They had received an average of four cycles of various chemotherapy drugs in combination with fasting. None reported significant side effects caused by the fasting itself, other than hunger and lightheadedness. Six patients who underwent chemotherapy both with and without fasting reported a reduction in fatigue, weakness, and gastrointestinal side effects while fasting. In patients whose cancer progression could be assessed, fasting did not impede the chemotherapy-induced reduction of tumor volume or tumor markers.

Since then, several other clinical studies have followed.

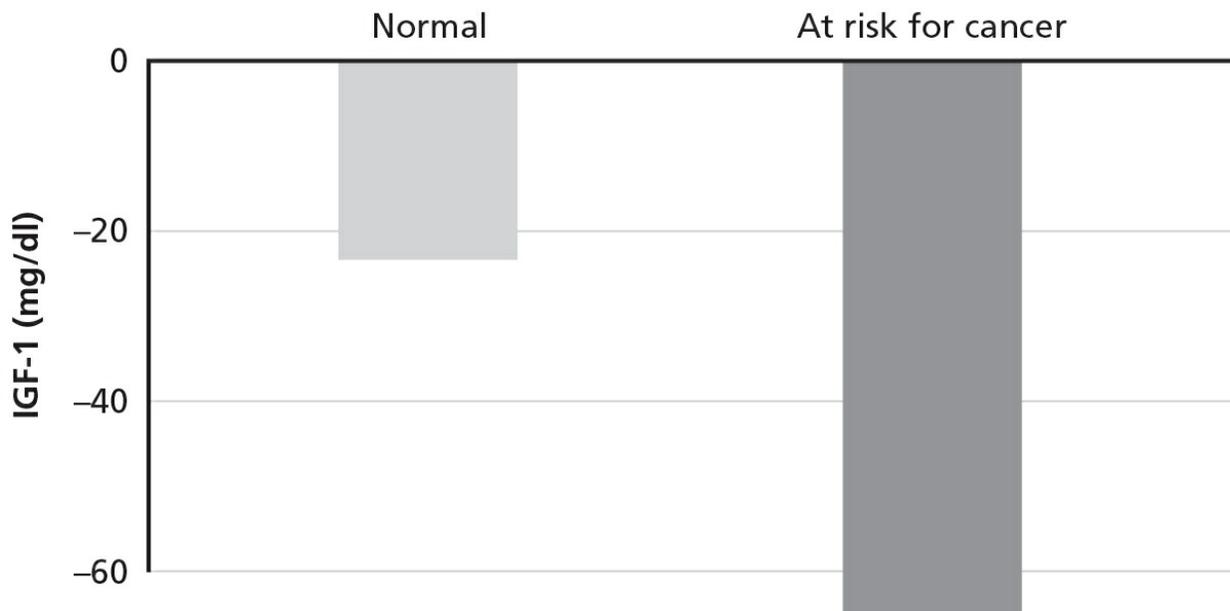
Clinical Trials

In collaboration with oncologists at the USC Norris Comprehensive Cancer Center, we performed a clinical trial with eighteen patients on a water-only

fast of 24, 48, and 72 hours' duration before receiving platinum-based chemotherapy.⁶ Below are the results. In terms of side effects caused by chemotherapy, 72-hour fasting was generally associated with more protection than 24-hour fasting was. However, the water-only fasting was so difficult for patients that it took over 5 years to complete this small study. This limitation led to funding by the National Cancer Institute of the US National Institutes of Health to develop a FMD specific for cancer (see below).

Toxicity	24 hours # (%) N = 6	48 hours # (%) N = 7	72 hours # (%) N = 7
Constitutional / General			
Fatigue Grade 1 or 2	6 (100%)	5 (71%)	6 (86%)
Alopecia Grade 1	6 (100%)	5 (71%)	7 (100%)
Gastrointestinal			
Nausea Grade 1 or 2	6 (100%)	6 (86%)	3 (43%)
Vomiting Grade 1 or 2	5 (83%)	3 (43%)	0
Constipation Grade 1 or 2	3 (50%)	2 (28%)	3 (43%)
Diarrhea Grade 1 or 2	2 (33%)	0	4 (57%)
Hematologic			
Neutropenia Grade 1 or 2	1 (17%)	3 (43%)	1 (14%)
Neutropenia Grade 3 or 4	4 (67%)	1 (14%)	2 (29%)
Thrombocytopenia Grade 1 or 2	4 (67%)	1 (14%)	1 (14%)
Laboratory / Metabolic			
Hyponatremia (Low serum sodium) Grade 1	1 (17%)	1 (14%)	1 (14%)
Hyponatremia Grade 3	1 (17%)	0	0
Hypokalemia (Low serum potassium) Grade 1	1 (17%)	2 (28%)	0
Hyperglycemia (Low serum glucose) Grade 1 or 2	4 (67%)	1 (14%)	0
Elevated AST/ALT Grade 1	4 (67%)	0	3 (43%)
Neurologic			
Peripheral Neuropathy Grade 1	3 (50%)	1 (14%)	1 (14%)
Dizziness Grade 1 or 2	1 (17%)	5 (71%)	2 (29%)

Although the Longevity Diet (see [chapter 4](#)) can be generally applied for cancer prevention, it has the potential to be especially beneficial for people with certain genetic mutations—such as the BRCA genes—which put them at a greatly increased risk of cancer. Prophylactic mastectomies and other surgical procedures can reduce the incidence of genetically induced cancers, but nutrition and FMD may also help. Dietary interventions additionally have the potential to reduce the chance of recurrence in previously diagnosed patients whose cancer is in remission. It is important to stress that patients should not attempt to replace prophylactic mastectomies with nutritional interventions whose efficacy remains to be established.

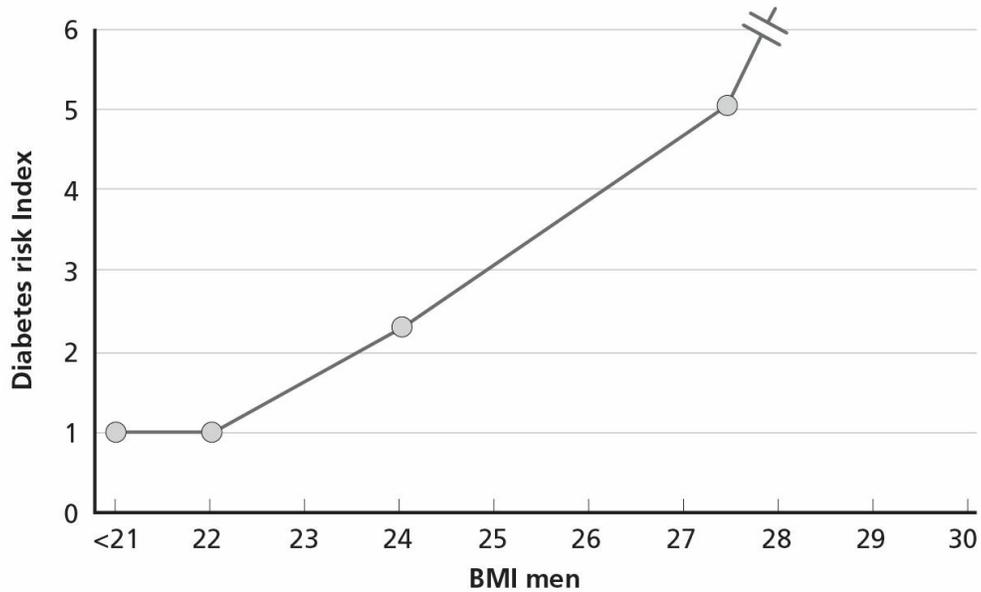
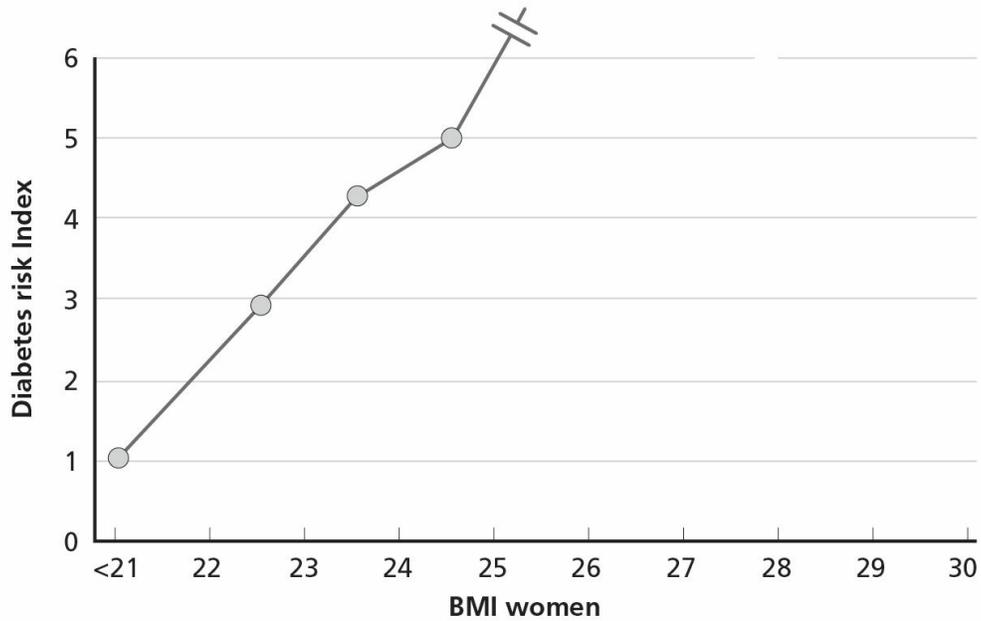


7.6. *Insulin-like growth factor-1, associated with cancer and aging, is reduced more effectively, after three cycles of FMD in individuals at risk for cancer (>225, or with IGF-1 levels above 225 ng/mL at the beginning of the trial)*

BELOW ARE DIETARY RECOMMENDATIONS FOR PEOPLE AT HIGH RISK FOR CANCER:

1. Follow the Longevity Diet, described in [chapter 4](#), with protein intake reduced to the lower range of about 0.31 grams per pound of body weight per day.
2. Limit fish intake to one or two times a week; otherwise stick to plant-based foods.

A similar effect is observed in men with a BMI of 27.5 and 22, which indicates that a five-foot-eight-inch-tall male weighing 152 pounds would have a risk for diabetes that is five times lower than that of a man of the same height weighing 191 pounds (see fig. 8.1).¹



8.1. Diabetes onset risk increases with higher body mass index

2. Be nourished: eat more, not less, but better.

As discussed in [chapter 4](#), if you ate 5.3 ounces of pasta or pizza with 5.3 ounces of cheese, you could be consuming 1,100 calories in a relatively small portion that is deficient in important vitamins and minerals. If you instead ate 1.4 ounces of pasta (about 140 calories) and an additional 14 ounces of garbanzo beans (about 330 calories) plus 11 ounces of mixed vegetables (about 210 calories) and 0.5 ounce of olive oil (about 120 calories), you would reach only 800 calories, while eating a large portion rich in proteins, healthy fats, complex carbohydrates, vitamins, and minerals.

Option A (wrong choice)

5.3 oz. pasta (540 calories) + 5.3 oz. cheese (550 calories) + 2 oz. sauce (20 calories)

Option B (right choice)

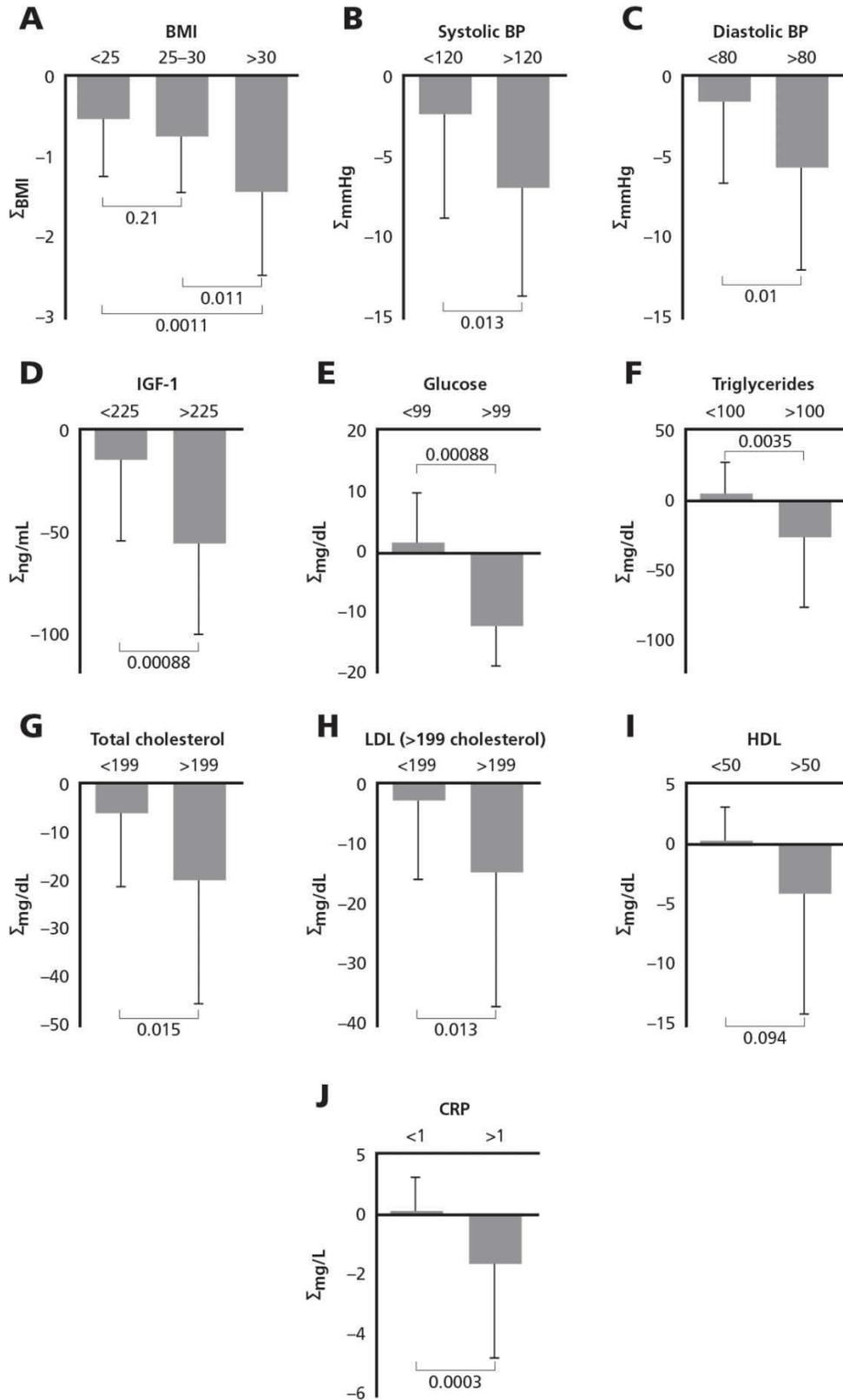
1.4 oz. pasta (about 140 calories) + 14 oz. garbanzo beans (soaked and drained, about 330 calories) + 11 oz. mixed vegetables (about 210 calories) + 0.5 oz. olive oil (120 calories)



8.2. Option A (left) = 12.6 ounces, 1,110 calories

Option B (right) = 27 ounces, 800 calories

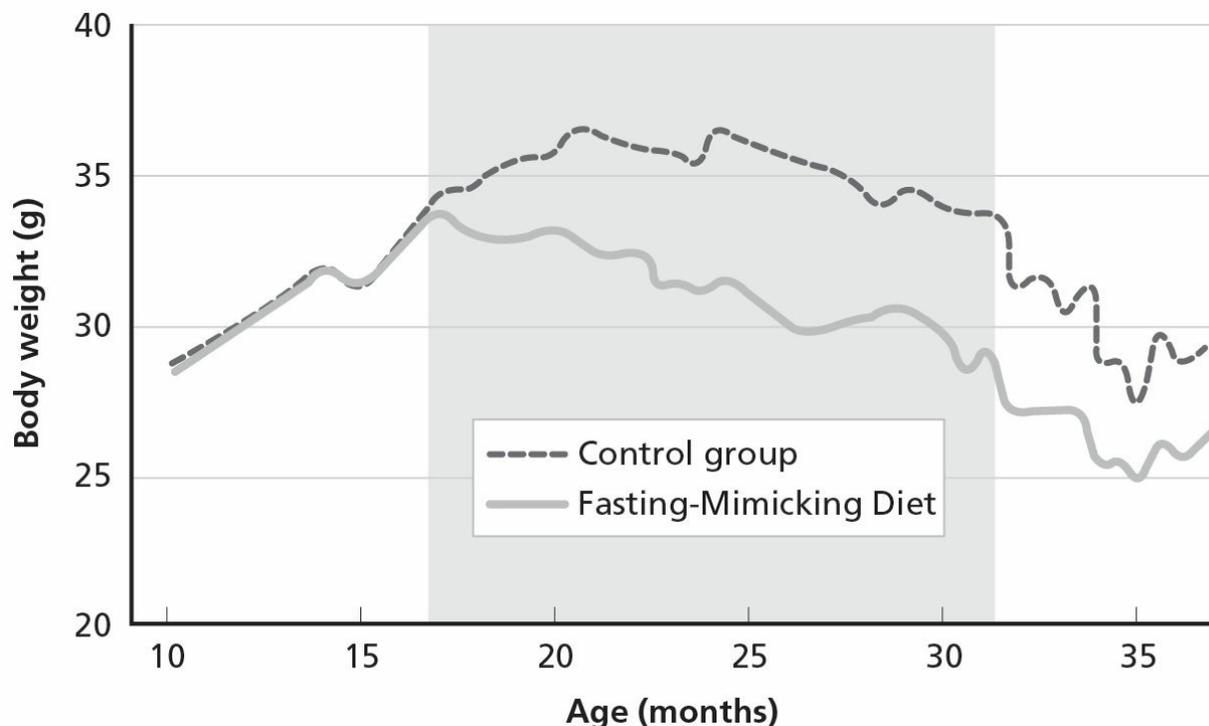
Option B is obviously a better choice, for multiple reasons:



8.3. Changes in risk factors for diabetes and metabolic syndrome and other diseases from a 100-subject randomized clinical trial testing three monthly cycles of the FMD. The figure reports effects in both low-risk (left) and high-risk (right) participants.

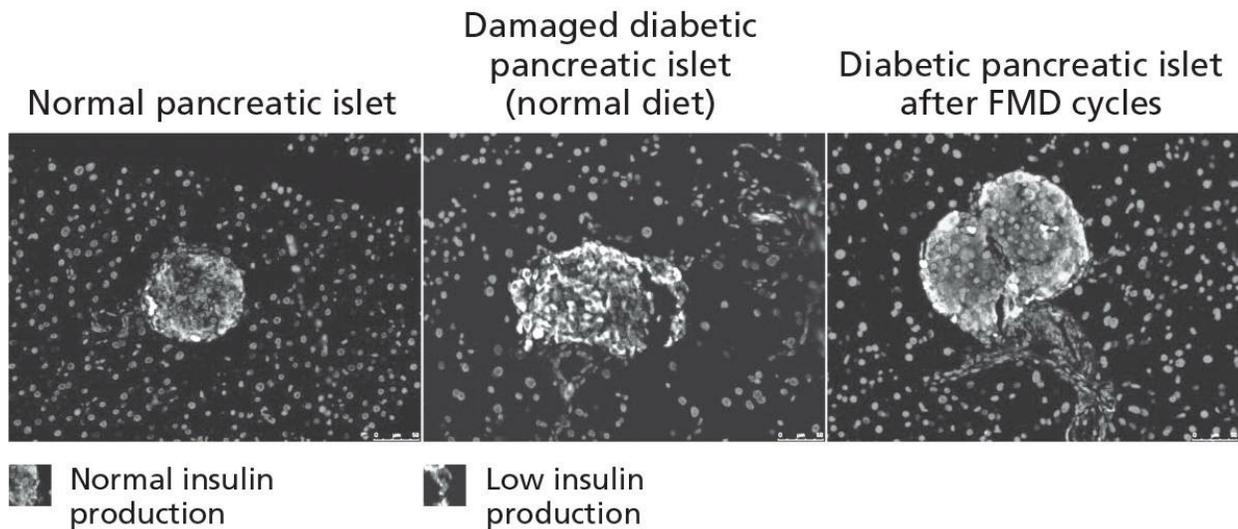
However, if you are at high risk for or suffer from diabetes, I encourage you to talk to your doctor and consider changing your everyday diet now, both for diabetes prevention and treatment. Our studies in mice and humans indicate that the FMD can prevent or potentially reverse diabetes by doing the following:

1. **Reducing abdominal and liver fat.** FMD pushes the body into a high fat-burning mode, mainly using abdominal/visceral fat but also liver fat, which are central to the promotion of diabetes and other diseases. Mice that undergo two cycles of the FMD a month, while eating the same total calories per month as mice on the regular diet, continue to lose weight, which suggests the fat-burning mode continues even after resuming a normal diet (see fig. [8.4](#)).



8.4. Mice exposed to a fasting-mimicking diet lose weight while eating the same per month

Fasting-Mimicking Diet cycles promote regeneration and reverse pancreatic damage and diabetes



8.5. FMD cycles promote pancreatic regeneration to restore insulin production and reverse both type 1 and type 2 diabetes in mice

FMD, PANCREATIC REGENERATION, AND REVERSAL OF TYPE 1 AND TYPE 2 DIABETES IN MICE

In a recent paper, we showed that cycles of the FMD, in addition to improving the function of insulin, could promote the regeneration of insulin-producing beta cells and the reversal of both type 1 and type 2 diabetes symptoms in mice in which the pancreas could not generate sufficient insulin, resulting in very high glucose levels.¹² Remarkably, the FMD caused the activation of many pancreatic genes normally activated during embryonic/fetal development, suggesting that it can trigger a natural and highly coordinated regenerative response able to result in new and functioning beta cells, which can make normal levels of insulin.

A note about insulin and water-only fasting or similar: While death in people undergoing a prolonged fasting period is rare, when it did occur, it was in several cases associated with insulin use. A few patients have died by combining fasting with an insulin injection, probably because insulin normally works poorly in diabetes patients, and fasting partially reverses this effect. The same insulin injection that normally decreases glucose to healthy levels in a diabetic patient can cause a much more precipitous drop in a diabetic patient who is fasting—resulting in hypoglycemic shock and, in

Diet and Prevention of Cardiovascular Disease

Now back to humans. In [chapter 4](#), I described the ideal Longevity Diet (which takes into account the Wisconsin and NIA monkey studies). However, milder versions of this diet exist, and their beneficial effects have been investigated in many studies. One of the most studied diets that has been shown to have effects on aging and disease, including cardiovascular disease, is the Mediterranean diet in its strictest form. The science behind its efficacy is rooted mostly in one of the Five Pillars—epidemiology—since few clinical trials and molecular studies have been carried out. Data from studies of centenarians show that extreme longevity has little to do with the Mediterranean diet per se. It is instead associated with specific ingredients and how heavily they are featured in diets common to the Mediterranean, Okinawa, Loma Linda, and Costa Rica. In other words, the Mediterranean diet *appears* to be a very good choice, but if we keep in mind all the pillars, the Longevity Diet, which includes the periodic FMD outlined in chapters 4 and 6, has the potential to be much more beneficial. Those unable to strictly follow that diet could still benefit by adding some components typical of both the Longevity and the Mediterranean diets.

Differences Between the Optimal Mediterranean and the Longevity Diet:

	Mediterranean Diet	Longevity Diet
Olive oil	High	High
Legumes	High	High
Unrefined cereals	High	High
Fruits	High	Low until old age, then higher
Cheese	Moderate	Absent/very low
Yogurt	Moderate	Low until age 65–70, then moderate
Wine	Moderate	Moderate

Meat & meat products	Low	Absent/very low
Milk	Low	Absent/very low
Eggs	Low	Absent/very low until age 65–70, then moderate
Butter	Low	Absent/very low
Protein levels	Not addressed	Low until age 65–70, then moderate
General food consumption	Not addressed	Normal until age 65–70, then sufficient to maintain a healthy muscle mass
Time-restricted feeding	Not addressed	11–12 hr eating window central to plan

Many studies have shown that the Mediterranean diet described above is associated with reduced incidence of chronic diseases, including cardiovascular disease.⁴ For example, a study at the University of Florence looked at data obtained from 4.1 million subjects and found a clear correlation between a lower risk for cardiovascular disease and a greater adherence to the Mediterranean diet.⁵

As with the Longevity Diet, consumption of olive oil and nuts is consistently associated with longevity and protection from cardiovascular disease. To understand whether olive oil and nuts in fact provide protection from diseases, a study at Spain’s Barcelona University followed 7,447 men and women ages fifty-eight to eighty at risk for developing cardiovascular disease. These subjects consumed a Mediterranean diet supplemented with either one liter of extra-virgin olive oil per week or with 30 grams of mixed nuts (15 grams of walnuts, 7.5 grams of hazelnuts, 7.5 grams of almonds). Subjects in the control group instead consumed a reduced-fat diet.⁶ The research team observed a reduction in cardiovascular events (stroke, heart attack, etc.) in both the Mediterranean diet group supplemented with olive oil and the one supplemented with nuts.⁷ More than five years later, observation of the same group revealed that the intake of mono- and polyunsaturated fats, such as those contained in olive and other vegetable oils, was associated with reduced cardiovascular disease, but a diet rich in saturated and trans fats increased cardiovascular disease.⁸ Notably, the intake of saturated fats from fish and plant-based sources (nuts, etc.) was associated with reduced cardiovascular disease and death.⁹

additional markers associated with cardiovascular diseases.¹⁶

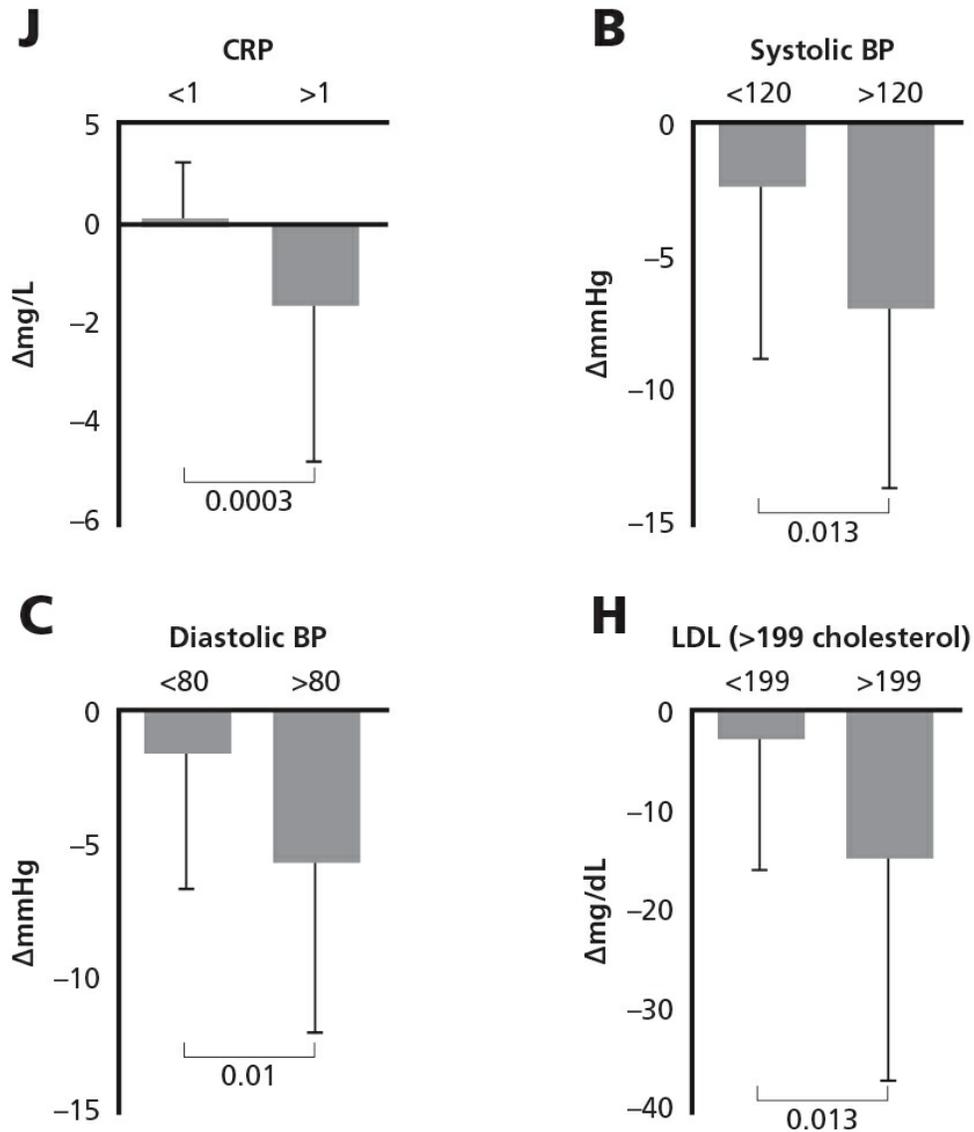
Taken together, these studies confirm that many of the risk factors for heart disease and stroke can be prevented and even very effectively treated by very specific dietary interventions. However, as we saw with the rhesus monkey studies, prolonged calorie restriction is an extreme intervention that produces both benefits and problems.

Risk Factor	Beginning of experiment	During experiment (undergoing caloric restriction)
Blood pressure (mmHg)	108/77	90/58
Cholesterol (LDL) (mg/dL)	105	60
Triglycerides (mg/dL)	115	80
BMI	23	19
Fasting blood glucose (mg/dL)	92	70

9.1. How the Biosphere 2 experiment influenced risk factors for cardiovascular disease

For example, as figure 9.1 shows, the body mass index after chronic calorie restriction typically reaches a value of 19, even for men. The average BMI of a Holocaust survivor was 14.2. Approaching an emaciated state can have a wide range of negative consequences on wound healing and the ability to fight infectious diseases.

We need to take advantage of what we learned from these powerful calorie-restriction studies and use this information to identify dietary and other effective interventions that don't lead to excessive weight loss and potentially severe side effects.

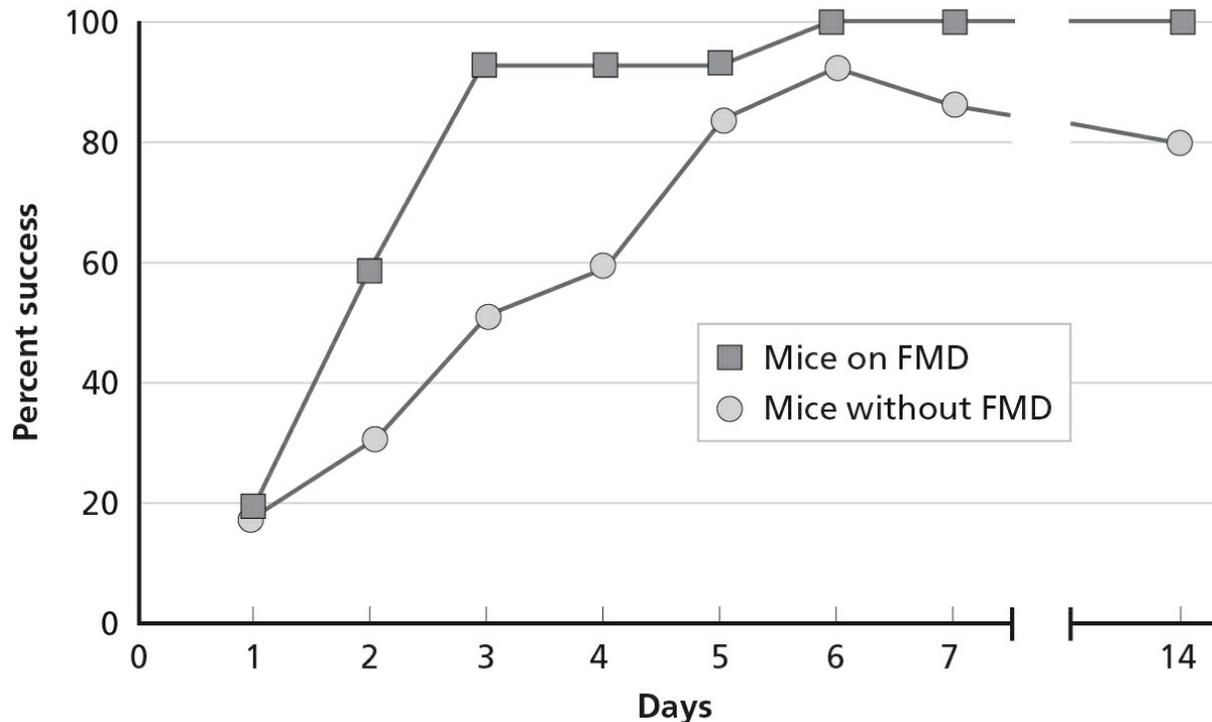


9.2. C-reactive protein, blood pressure, and LDL cholesterol, all risk factors for cardiovascular disease, decrease after three cycles of the FMD

TREATMENT

The best and safest strategy is to talk to your cardiologist about taking components of the Esselstyn, Ornish, Walford, and Longevity diets and combining them with new information emerging from clinical and epidemiological studies discussed in this chapter. For more specifics on all the below guidelines, see [chapter 4](#).

- No: red meat, poultry, or other meats (excluding fish)



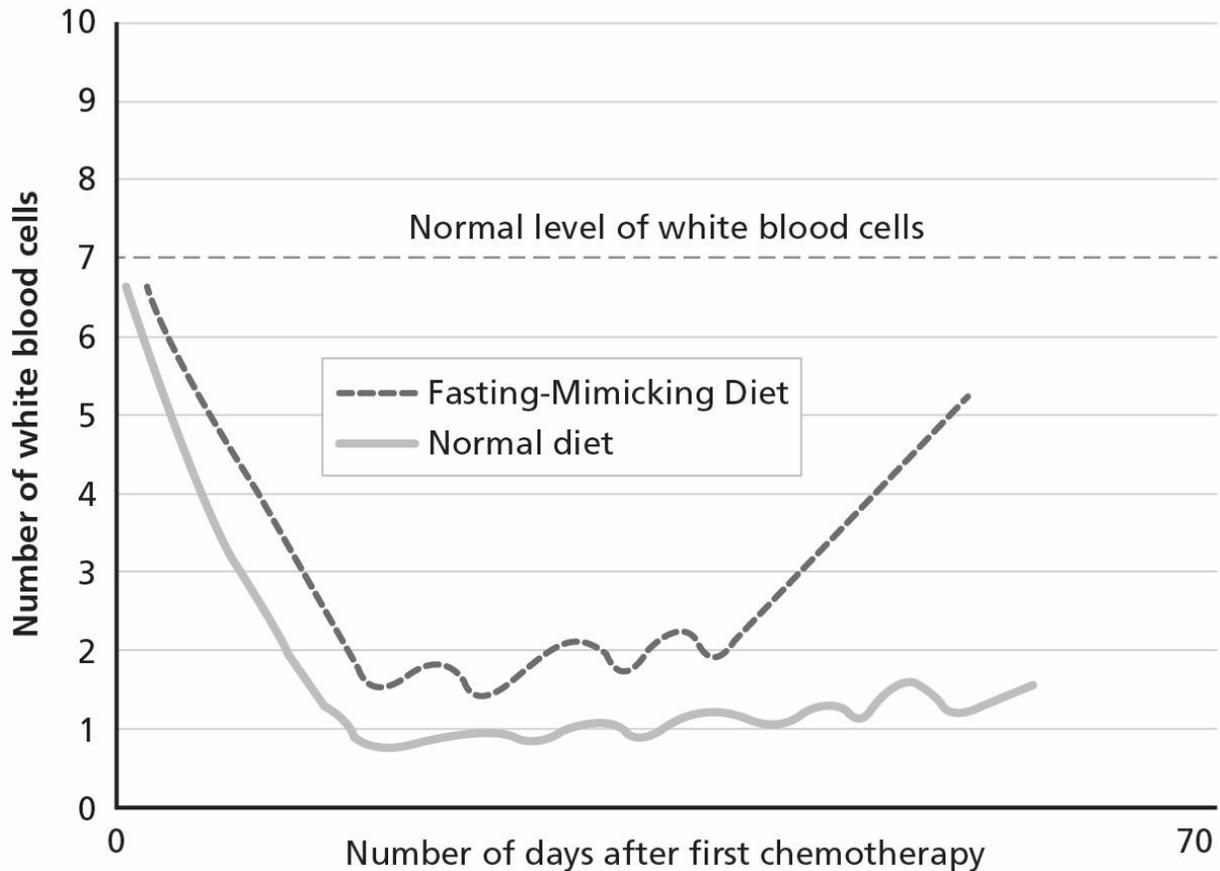
10.1. Improvement of cognitive tests in mice exposed to fasting-mimicking diet cycles

The FMD cycles had profound effects on genes that play key roles in the aging process, including aging of the brain. Researchers at the US National Institute on Aging have performed many studies in this area, focusing on alternate-day fasting. Receiving no food one day and a normal diet the next day, these mice consistently showed improvements in learning and memory function. The benefits applied to both normal mice and mice with Alzheimer’s disease.¹

We are now ready to begin clinical trials to test the effect of similar but less calorie-restricted diets in humans.

Dietary Prevention of Alzheimer’s Disease in Humans

The periodic FMD, because it promotes a longer and generally healthier lifespan, is recommended for most people, but because it provides a very low level of calories, it is not recommended for people over the age of seventy. What would be the point of adopting a diet that prevents Alzheimer’s disease if the same diet promoted a deficiency in the immune system or made the



11.1. Fasting cycles regenerates immune cells after chemotherapy

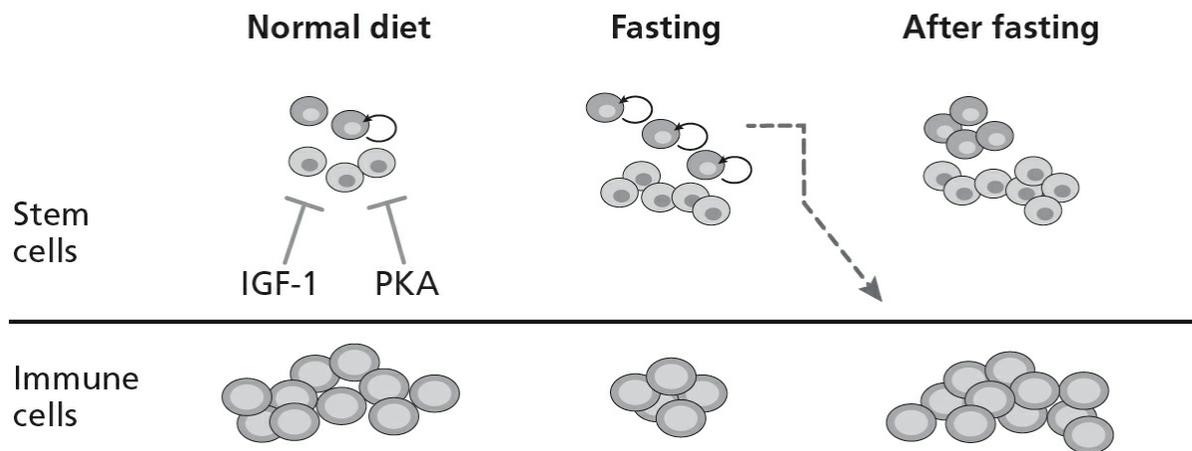
In the same study, we showed that during fasting, long-term hematopoietic stem cells are turned on and expanded. This type of stem cell, found in the blood, is capable of generating the various cells of the immune system. Two research questions followed this finding:

1. Does the fasting preferentially kill dysfunctional cells, including autoimmune cells?
2. When animals or humans return to their normal diet after fasting, will the stem cells generate only healthy immune cells or will the new cells also become autoimmune?

After we published our findings, I started receiving emails from people who, having read media accounts of our study, had attempted fasting to fight their

autoimmune disorders. Several reported to me that four or five days of FMD had reduced and in some cases even cured their autoimmune diseases.

The results of our first set of tests in mice were remarkable. To replace autoimmune cells with good ones, we hypothesized, we had to first kill off the bad ones. It worked. Cycles of the FMD not only reduced the severity of the multiple sclerosis in all mice; it eliminated all symptoms in a portion of the mice that had already developed the disease. Each cycle of the FMD killed a portion of the autoimmune cells, and three cycles eliminated disease symptoms in 20 percent of the mice. FMD worked in another remarkable way: it promoted regeneration of the damaged myelin in the mouse spinal cord.



11.2. Rejuvenation from within

Thus, FMD cycles reversed the autoimmunity in a subset of mice by (1) killing off bad immune cells, (2) generating new and healthy ones, and (3) turning on progenitor cells (cells similar to stem cells), which can regenerate damaged nerves. This is an example of what I call “rejuvenation from within.” FMD kills many cells, but it is particularly effective in killing off old and damaged immune cells that have lost the ability to distinguish between the cells of its own body and invading organisms such as bacteria and viruses. Fasting increases stem cells but reduces immune cells. After re-feeding, stem cells generate new and healthy immune cells (fig. 11.2).

In mice, FMD could do even more: it seemed to prompt the body to detect damage in the spinal cord—like it detects damage to the skin after a cut—and

WEEK 1*

DAY 1

Breakfast

Coffee, espresso or American; barley (no caffeine) is an acceptable alternative

Almond, hazelnut, or coconut milk, unsweetened and supplemented with calcium and vitamins B12, B2, and D (1 glass, 240 mL)

Whole-wheat focaccia and extra virgin olive oil (60 g)

Blueberry jam, no sugar added (20 g, 1 tbsp)

Lunch

Spinach with pine nuts and raisins

INGREDIENTS:

Spinach (150 g)

Pine nuts (9 g, 1 tbsp)

Raisins (9 g, 1 tbsp)

Olive oil (12 mL, 1 tbsp)

Salt to taste*

Spelt crackers (40 g)

Boil the spinach in water. Drain the water and mix the cooked spinach with the pine nuts and raisins. Cook for a few minutes on a pan, adding water to avoid drying. Turn off the heat, add oil, stir and let the mixture rest, covered, for 2 to 3 minutes. Crackers to be consumed on the side.

Snack

Coconut milk, unsweetened (1 glass, 240 mL)

Nut and whole-grain dark chocolate bar; choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark chocolate and no milk

Dinner

Pasta with broccoli and black beans

Black beans, boiled (150 g wet,* drained)

Broccoli, boiled (200 g)

Pasta, whole grain (40 g)

Olive oil (25 mL, 2 tbsp)

Garlic (1 clove), sliced thinly

Hot pepper

Salt and pepper to taste

Parmesan cheese (5 g, 1 tbsp)

Bring a large pot of water to boil. Add salt, the black beans, broccoli, and pasta. Cook until the pasta is ready. Drain and toss with the olive oil, garlic, hot pepper, and Parmesan cheese.

*Suggested dessert:** walnuts (25 g) and unsweetened dried cranberries (20 g) or other unsweetened dried fruit

Take a complete multivitamin and mineral pill and one omega-3 oil soft gel.

WEEK 1

DAY 2

Breakfast

Tea with fresh-squeezed lemon (use 2 teabags: 1 green tea and 1 black tea)

Cereal (60 g) with almond milk (240 mL)

Lunch

Wild rice and green beans with garlic and fresh tomato

Wild rice (40 g)

Green beans (150 g)

Fresh tomato (150 g)

Garlic (2 cloves)

Salt (add based on taste, trying to keep as low as possible)

Olive oil (12 mL, 1 tbsp)

Lemon

Fresh basil

Pepper

Cook the wild rice. In a separate pot, cover the green beans with water and add the tomato, garlic, and salt. When the beans are tender, add the oil and basil and let them rest for 2 to 3 minutes before serving over the rice.

Side dish: leafy green vegetables (e.g., chicory or kale), boiled and seasoned with olive oil and lemon (200 g)

Snack

Hazelnut milk, unsweetened (1 glass, 240 mL)

Nut and whole-grain dark chocolate bar; choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark chocolate and no milk

Dinner

Salmon fillet (wild caught) with asparagus

Salmon fillet (150 g)

Asparagus (300 g)

Olive oil (12 mL, 1 tbsp)

Lemon juice to taste

Salt and pepper to taste

Whole-wheat bread (60 g) (to be consumed on the side)

Steam or bake the salmon fillet and asparagus. Serve drizzled with the olive oil and seasoned with lemon and salt and pepper.

Side dish: mixed green salad with tomatoes, carrots, fennel, and green peppers seasoned with balsamic vinegar (200 g)

Suggested dessert: hazelnuts (25 g) and dried cranberries (30 g)

WEEK 1

DAY 3

Breakfast

Coffee or tea
Whole-wheat bread, toasted (60 g)
Mixed berry jam, no sugar added (40 g, 2 tsp)

Lunch

Spelt and zucchini with garlic, olives, and parsley

Spelt (40 g)
Zucchini (300 g)
Garlic (1 clove)
Cut cherry tomatoes (100 g)
Olives (25 g)
Parsley
Olive oil (12 mL, 1 tbsp)
Salt

Boil the spelt in salted water. Drain and set it aside. In a separate pan, boil the zucchini with the garlic, cherry tomatoes, and olives. When the zucchini is tender, drain the water, stir in the parsley, the cooked rice, and the olive oil. Let it rest for 2 to 3 minutes before serving.

Side dish: green leafy vegetables (e.g., Swiss chard), boiled and seasoned with oil and lemon (200 g)

Snack

Garbanzo bean bread (*farinata di ceci*) with raw vegetables (e.g., carrots and/or celery); or fresh mixed-berry smoothie (150 g) with hazelnut milk (125 mL)

Garbanzo bean flour (240 g)

Water (240 mL)
Olive oil (2 tbsp, optional)
Pinch of salt and pepper

To make this gluten-free bread—a typical recipe from Liguria, Italy—place the garbanzo bean flour in a bowl and add the water and oil. Whisk until smooth. Pour the batter in a metal pie pan and bake in a preheated 350°F oven until edges begin to brown (about 15 minutes). Alternatively, cook the farinata in a pan over medium heat. Sprinkle with salt and pepper.

Dinner

Garbanzo bean minestrone with pasta

Mixed minestrone vegetables (250 g)
Garbanzo beans (150 g wet weight)
Pasta (40 g)
Olive oil (25 mL, 2 tbsp)
Salt and pepper (keep salt as low as possible)
Parmesan cheese (5 g, 1 tbsp)

Bring a large pot of water to a boil. Add salt, the mixed vegetables, and soaked garbanzo beans. When the vegetables are tender, add the pasta. When pasta is cooked, drain and add the olive oil. Serve the soup sprinkled with Parmesan cheese.

Side dish: mixed green salad with tomatoes, carrots, fennel, and green peppers, seasoned with olive oil and lemon

Suggested dessert: cherries (100 g) or dried cherries (20 g) and almonds (25 g)

WEEK 1

DAY 4

Breakfast

Coffee or tea (with ½ squeezed lemon)
Cinnamon raisin bagel or 2 pieces of toast (80 g)
Apricot jam, no sugar added (20 g, 1 tbsp)

Lunch

Barley salad with olives and nuts

Barley (40 g)
Tomatoes (150 g)
Mushrooms, raw (75 g)
Peppers, raw (150 g)
Corn (20 g)
Pickled vegetables: artichokes, cucumber, and spring onions (150 g)
Pecans (9 g)
Olives (12 g, 1 tbsp)
Olive oil (12 mL, 1 tbsp)
Salt and pepper to taste
Other herbs (optional)

Boil the barley in salted water following the package instructions. Cut the tomatoes, mushrooms, peppers, and corn into a salad bowl. Add the pickled vegetables, pecans, and olives. Season in water with salt and pepper, and/or other herbs. When the barley is ready, let it cool briefly before adding it to the prepared mix. Add the olive oil. Serve it warm or store it in the refrigerator to enjoy as a fresh summer dish.

Snack

Coconut milk, unsweetened (1 glass, 240 mL)

Nut and whole-grain dark chocolate bar; choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark chocolate and no milk

Dinner

Pasta and lentil soup (*pasta e lenticchie*)

Lentils (150 g drained)
Potato (1 medium)
Carrot (1 medium)
Tomato (1 medium)
Garlic (2 cloves, cut in half)
Rosemary (as desired)
Pasta (40 g)
Olive oil (25 mL, 2 tbsp)

Boil the soaked lentils in a large pot of salted water with the potato, carrot, tomato, garlic, and rosemary. When the lentils are tender, add the pasta. When pasta is cooked, stir, and let the water evaporate until the soup reaches the desired consistency. Turn fire off, and add olive oil.

Suggested dessert: pineapple (100 g) or dried blueberries (20 g) and walnuts (25 g)

Take a complete multivitamin and mineral pill and one omega-3 oil soft gel.

WEEK 1

DAY 5

Breakfast

Coffee, espresso or American

Oats, steel cut (90 g)

Oats, steel cut (90 g)

Almond milk (1 glass, 240 mL)

Honey (10 g, 2 tsp)

Fresh fruit (e.g., 1 medium banana and 1 kiwi)

Cook the oats in water for 30 minutes. Let them cool. Add honey and fresh fruit.

Lunch

Escarole, olives, tomatoes, and basil

Escarole (150 g)

Pine nuts (9 g, 1 tbsp)

Olive oil (12 mL, 1 tbsp)

Sun-dried tomatoes (150 g)

Basil (5 leaves)

Brown bread, toasted (40 g) (on the side)

Boil the escarole. Drain and allow it to cool slightly. Add the olive oil, sun-dried tomatoes, olives, and basil.

Side dish: fresh carrots (150 g), raw (seasoned with oil, salt, and lemon) or boiled in water (seasoned with oil, salt, and pepper)

Snack

Hazelnut milk, unsweetened (1 glass, 240 mL)

Nut and whole-grain dark chocolate bar; choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark chocolate and no milk

Dinner

Octopus with potato (*polpo e patate schiacciate*)

Octopus, fresh or frozen (60 g)

Potato (1 medium)

Cherry tomatoes (150 g)

Olives (20 g)

Olive oil (25 mL, 2 tbsp)

Parsley

Lemon

Salt

Brown bread, toasted (40 g)

Boil the octopus and potato in separate saucepans. Drain both. Cut the octopus and mash the boiled potato in a bowl. Add the cherry tomatoes, olives, and oil. Season with lemon, parsley, and salt.

Side dish: mixed green salad with cucumber, tomatoes, and carrots, seasoned with balsamic vinegar (200 g)

Suggested dessert: cranberries (50 g) or dried cranberries (20 g) and almonds (25 g)

WEEK 1

DAY 6

Breakfast

Coffee or tea (with ½ squeezed lemon)
Whole-wheat dried focaccia with olive oil (60 g)
Fresh fruit (1 apple and strawberries)

Lunch

Grilled eggplant with feta cheese and tomatoes

Eggplant (250 g)
Olive oil (12 mL, 1 tbsp)
Cherry tomatoes (150 g)
Feta cheese (20 g)
Basil
Salt and pepper
Rye crackers (40 g)

Slice and grill the eggplant. When the slices are tender, place them in a heated pan with the olive oil, cherry tomatoes, and feta cheese. Season with basil and salt and pepper. Cover and let it rest for 2 to 3 minutes. Serve with the rye crackers.

Snack

Almond milk, unsweetened (1 glass, 240 mL)
Nut and whole-grain dark chocolate bar; choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark chocolate and no milk

Dinner

Pasta e vaianeia (Molochio recipe, see [chapter 4](#))

Navy beans (150 g, wet, drained)
Green beans (150 g)
Carrots (2 medium), sliced
Potato (1 medium, cubed)
Zucchini (150 g), sliced
Tomato (1 large)
Garlic (2 cloves, cut in half)
Basil (5 leaves)
Pasta (40 g)
Olive oil (25 mL, 2 tbsp)
Salt to taste
Parmesan cheese (5 g, 1 tbsp)

Bring water to boil in a large pan. Add salt and the soaked navy beans. When the beans are tender, add the cut green beans and carrots. Boil the mixture for 30 minutes, then add the potato and boil for another 15 minutes. Add the zucchini and boil for 5 minutes. Add the whole tomato, boil it until tender, then smash it and remove its skin from the pot. Add the garlic, basil, and pasta. When pasta is cooked, add the olive oil, salt, and pepper. Stir until evenly mixed and heated through.

Side dish: mixed green salad with tomatoes, carrots, corn, and cucumber, seasoned with oil and lemon

Suggested dessert: hazelnuts (25 g) and dried blueberries (20 g)

WEEK 1

DAY 7

Breakfast

Coffee, espresso or American
Almond milk (1 glass, 240 mL)
Fruit and nut cereal (60 g)
Fresh fruit (1 medium)

Lunch

Brussels sprouts with garlic, pine nuts, and Parmesan cheese

Brussels sprouts (250 g)
Garlic (2 cloves, sliced)
Pine nuts (9 g, 1 tsp)
Hot pepper (optional)
Olive oil (12 mL, 1 tbsp)
Parmesan cheese (5 g, 1 tbsp)
Salt and pepper
Dark whole-grain bread (40 g) (on the side)

Boil the brussels sprouts in salted water. Drain, reserving a little of the cooking water. Transfer the sprouts and reserved water to a heated pan. Add the garlic, pine nuts, and hot pepper, stirring for 2 to 3 minutes. Let the mixture rest. Add the olive oil. Sprinkle with Parmesan cheese and add salt and pepper to taste.

Side dish: mixed green salad with red peppers, tomatoes, carrots, and mushrooms (200 g total), seasoned with vinegar

Snack

Goat's milk yogurt (125 g)
Nut and whole-grain dark chocolate bar; choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark

chocolate and no milk

Dinner

Spaghetti with clams and mussels

Clams and mussels (60 g total)

Garlic (2 cloves)

Tomato, chopped

Parsley (based on taste)

White cooking wine (40 mL)

Spaghetti (40 g)

Olive oil (25 mL, 2 tbsp)

Salt and pepper

Cook the clams and mussels in a pan with water and the garlic, tomato, parsley, and cooking wine. In a separate pot, boil the spaghetti in salted water. Drain the pasta and place it in the pan with the cooked clams and mussels. While the pan is still hot, stir in the olive oil. Add salt and pepper to taste. Serve with fresh parsley.

Side dish: leafy green vegetables, boiled and seasoned with oil, salt, and pepper

Suggested dessert: dates (20 g) and walnuts (25 g)

Take a complete multivitamin and mineral pill and one omega-3 oil soft gel.

WEEK 2

DAY 1

Breakfast

Coffee or tea (with ½ squeezed lemon)
Oats with almond milk, chocolate, nuts, and berries

Oats, steel cut (80 g)
Almond milk (1 glass, 240 mL)
Fresh mixed berries (150 g)

Cook the oats in water for 30 minutes. Remove them from heat, mix in the dark chocolate, nuts, and berries.

Lunch

Greek salad with feta, olives, onion, and peppers

Mixed lettuce (150 g)
Feta cheese (20 g)
Peppers, green and red (200 g)
Cherry tomatoes (150 g)
Onion (optional)
Olives (20 g)
Olive oil (12 mL, 1 tbsp)
Salt to taste
Brown bread (40 g) (on the side)

Snack

Hazelnut milk, unsweetened (1 glass, 240 mL)
Nut and whole-grain dark chocolate bar; choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark chocolate and no milk

Dinner

Garbanzo bean salad and vegetables with garbanzo bean bread

Garbanzo beans (150 g), cooked or canned (drained)

Onion (1 medium), chopped

Olive oil (25 mL, 2 tbsp)

Salt and pepper to taste

Spinach, boiled (200 g)

Lemon juice

Garbanzo bean bread (60 g) (recipe, [here](#))

Season the garbanzo beans with the onion, olive oil, and salt and pepper. Boil the spinach separately in salted water. Add the spinach to the seasoned garbanzo beans, adding more oil and lemon juice as needed. Serve with garbanzo bean bread.

Suggested dessert: pecan nuts (25 g) and dates (20 g)

WEEK 2

DAY 2

Breakfast

Coffee or tea (with ½ squeezed lemon)
Hazelnut milk, unsweetened (1 glass, 240 mL)
Walnut bread (60 g)
Strawberry jam, no sugar added (20 g, 1 tbsp)

Lunch

Pumpkin soup with croutons (broccoli soup may be substituted)

Pumpkin or squash, peeled, seeded, and chopped (300 g)
Olive oil (12 mL, 1 tbsp)
Chili flakes (optional)
Onion (optional)
Parsley
Salt and pepper to taste
Croutons (40 g)
Pumpkin seeds (9 g, 1 tsp)

Boil the pumpkin or squash in salted water. When cooked, drain the water. Add the oil, chili flakes, onion, parsley, and salt and pepper to taste. Stir well. When soup reaches the desired consistency, puree it with a hand blender. Serve in a bowl garnished with the croutons and pumpkin seeds.

Side dish: mixed green salad with cucumbers, carrots, and tomatoes with brown bread (40 g)

Snack

Fresh mixed-berry smoothie (150 g) and banana (1 medium); or hazelnut milk (1 glass, 240 mL) and a nut and whole-grain dark chocolate bar;

choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark chocolate and no milk

Dinner

Pasta with tuna, olives, capers, and tomato

Pasta, any type (40 g)
Tuna (60 g)
Olives (20 g)
Tomatoes (150 g) (cut in cubes/pieces)
Garlic (optional) (cut in half)
Olive oil (25 mL, 2 tbsp)
Parsley
Salt and pepper

Bring a large pot of water to boil and cook the pasta. In a separate pan, cook the tuna, olives, tomatoes, and garlic in a little water. Add the drained pasta when it's ready. Stir in the olive oil and let the mixture rest for a few minutes. Add parsley and salt and pepper to taste.

Side dish: artichokes (150 g), boiled and seasoned with oil and lemon accompanied with brown bread (40 g)

Suggested dessert: hazelnuts (25 g) and grapes (100 g), or raisins (20 g)

WEEK 2

DAY 3

Breakfast

Coffee or tea (with ½ squeezed lemon)
Cinnamon raisin bagel or 2 pieces of toast (80 g)
Plum jam, no sugar added (20 g, 1 tbsp)

Lunch

Rice with zucchini and peas

Rice (40 g)
Zucchini (250 g)
Peas (100 g)
Onion (1 medium), chopped
Olive oil (12 mL, 1 tbsp)
Parsley
Salt and pepper
Parmesan cheese (1 tbsp) or pesto (1 tsp)

Boil the rice in salted water. Drain and set it aside. In a separate pan, stir the zucchini, peas, and onion in water. Drain the vegetables, stir in parsley and salt and pepper to taste. Add the rice and olive oil and let it rest for 2 to 3 minutes. Add Parmesan or pesto, as preferred, and serve.

Snack

Coconut milk, unsweetened (1 glass, 240 mL)
Nut and whole-grain dark chocolate bar; choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark chocolate and no milk

Dinner

White bean salad with onion, rosemary, and chicory

Chicory or other green leafy vegetable (180 g)
Garlic (1 clove cut in half)
Cherry tomatoes (50 grams).
Chili flakes to taste
Onion (1 medium)
White cannellini beans (150 g, wet, drained), cooked
Olive oil (25 mL, 2 tbsp)
Salt and pepper
Rosemary sprig
Dried whole-wheat focaccia, with olive oil (40 g)

Boil the chicory in salted water. Drain it well. Place the leaves in a pan with garlic, cherry tomatoes, onion chili flakes, and enough water to prevent drying. Cook for 5 minutes. In a separate bowl, season the cooked cannellini beans with olive oil, salt and pepper, and rosemary leaves. Combine the chicory and cannellini mixtures and serve warm or cold, as desired.

Suggested dessert: almonds (25 g) and cherries (80 g) or dried cherries (20 g)

WEEK 2

DAY 4

Breakfast

Coffee, espresso or American
Almond milk, unsweetened (1 glass, 240 mL)
Raisin and walnut bread (60 g)
Banana (1 medium)

Lunch

Fennel salad with tomatoes, carrots, onions, and olives

Fennel bulb (150 g)
Cherry tomatoes (150 g)
Carrots (1 medium)
Onion (1 medium)
Olives (20 g)
Olive oil (12 mL, 1 tbsp)
Parsley
Salt
Whole-wheat dried focaccia, with extra virgin olive oil (40 g) (on the side)

Side dish: chicory (200 g), boiled and seasoned with oil and lemon

Side dish: mixed green salad with cucumbers, carrots, and tomatoes

Snack

Goat's milk yogurt (125 g)
Nut and whole-grain dark chocolate bar; choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark chocolate and no milk

Dinner

Black/venus rice with zucchini and shrimp

Black/venus rice (40 g)
Zucchini (250 g) (sliced)
Cherry tomatoes (150 g)
Shrimp (60 g)
Parmesan cheese (5 g, 1 tbsp)
Saffron (4 g)
Olive oil (25 mL, 2 tbsp)
Parsley
Salt and pepper

Cook the rice following the package instructions. In a separate pan, cook the zucchini, tomatoes, and shrimp in water. Drain and mix them with the cooked rice, stirring in the Parmesan cheese, saffron, and olive oil. Season with parsley and salt and pepper to taste.

Side dish: mixed green salad with tomatoes and carrots (200 g), seasoned with balsamic vinegar

Suggested dessert: dried cranberries (20 g) and walnuts (25 g)

Take a complete multivitamin and mineral pill and one omega-3 oil soft gel.

WEEK 2

DAY 5

Breakfast

Tea (1 black and 1 green tea bag) with 1 freshly squeezed lemon
Whole-wheat Rice Krispies bar (60 g)
Banana (1 medium)
Dark chocolate (30 g)

Lunch

Mediterranean spelt salad with artichokes and mushrooms

Spelt (40 g)
Artichokes, preserved in oil (80 g)
Carrot (1 medium), chopped
Cherry tomatoes (150 g)
Olives (20 g)
Olive oil (12 g, 1 tbsp)
Salt and pepper
Mushrooms (150 g)
Garlic (1 clove)
Parsley

Boil the spelt in salted water until cooked. Drain and place it in a bowl. Add the artichokes, carrot, tomatoes, and olives. Season with oil, salt and pepper, and additional herbs, if desired. In a separate pan, boil the mushrooms with garlic and water. When the mushrooms are tender, add the parsley and salt to taste. Stir in the oil. Enjoy the mushrooms separately or add them to the rest of the ingredients.

Side dish: mixed green salad, seasoned with balsamic vinegar

Snack

Almond milk, unsweetened (1 glass, 240 mL)

Nut and whole-grain dark chocolate bar; choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark chocolate and no milk

Dinner

Ligurian minestrone (*minestrone alla Genovese*)

Cannellini beans (150 g wet weight, drained)

Potato (1 medium)

Eggplant (1 medium)

Zucchini (1 medium)

Cabbage (1 medium)

Peas (1 handful)

Green beans (150 g)

Garlic (1 clove)

Salt and pepper

Pasta (40 g)

Olive oil (25 mL, 2 tbsp)

Pesto (1 tsp)

Boil the soaked beans in a pot of water. Chop all the vegetables in small pieces and add them to the pot, along with the garlic and salt and pepper. Cook the soup for about 45 minutes, then add the pasta. When the pasta is cooked, stir in the olive oil and pesto and remove the pot from the heat.

Side dish: mixed green salad with whole-wheat bread (40 g)

Suggested dessert: fresh fruit (e.g., 150 g of grapes)

WEEK 2

DAY 6

Breakfast

Coffee or tea
Hazelnut milk, unsweetened (1 glass, 240 mL)
Fruit and nut cereal (60 g)

Lunch

Tomato soup with basil, pesto, and croutons

Tomatoes (500 g)
Carrot (1 medium)
Celery (1 medium)
Potato (1 medium)
Red onion (1/2 medium)
Olive oil (12 g, 1 tbsp)
Basil (5 leaves)
Salt and pepper to taste
Pesto (5 g, 1 tsp)
Croutons (40 g)

Boil the tomatoes, carrot, celery, potato, and onion in a pan with salted water. When vegetables are tender, puree them with a hand blender. Add the oil, basil, and salt and pepper. Serve garnished with pesto and croutons.

Side dish: mixed green salad with carrots and tomato; or boiled green leafy vegetables (200 g) with brown bread (40 g)

Snack

Hazelnut milk, unsweetened (1 glass, 240 mL)
Nut whole-grain dark chocolate bar; choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark

chocolate and no milk

Dinner

Cream of garbanzo beans (*vellutata di ceci*) + steamed broccoli

Garbanzo beans (150 g wet weight, drained)

Rosemary (1 sprig)

Garlic (1 clove, cut in ½)

Olive oil (25 mL, 2 tbsp)

Salt and pepper to taste

Broccoli, boiled and seasoned with oil and lemon (150 g)

Garbanzo bean bread (page 228) or whole-wheat focaccia, with olive oil (60 g)

Boil the soaked garbanzo beans in salted water with the garlic and rosemary. When cooked, drain and puree with a hand blender. Add the oil and salt and pepper and let the soup rest.

Steam the broccoli until tender, then season with oil, salt, and lemon. Serve the soup and steamed broccoli with your choice of garbanzo bean bread or whole-wheat focaccia.

Suggested dessert: dried apricots (20 g) and almonds (25 g)

WEEK 2

DAY 7

Breakfast

Coffee or tea
Almond milk, unsweetened (1 glass, 240 mL)
Cranberry bread (80 g)
Honey (10 g, 2 tsp)

Lunch

Barley salad with broccoli, feta, and tomatoes

Barley (40 g)
Broccoli (150 g)
Cherry tomatoes (100 g)
Carrots (1 medium)
Onion (optional)
Feta cheese (20 g)
Olive oil (12 mL, 1 tbsp)
Parsley
Salt and pepper

Boil the barley in salted water. In a separate pan, steam the broccoli. When both are cooked, drain well and set aside to cool. Mix the barley and broccoli in a bowl and add the raw chopped cherry tomatoes, carrots, and onion. Stir in the feta cheese. Season with the oil, parsley, and salt and pepper to taste. Serve warm or cold.

Side dish: leafy green vegetables, seasoned with oil and lemon and brown bread (40 g)

Snack

Coconut milk, unsweetened (1 glass, 240 mL)

Nut and whole-grain dark chocolate bar; choose a brand containing 150 calories, low in sugar (less than 8 g), made with 70% minimum dark chocolate and no milk

Dinner

Pizza with vegetables, anchovies, and sardines (no cheese)

Pizza crust, ready-made (100 g)

Sardines and anchovies (90 g)

Cherry tomatoes (80 g)

Artichokes, canned (50 g)

Mushrooms (100 g), sliced

Spinach (100 g)

Pepper (100 g)

Olives, black (20 g)

Olive oil (25 g, 2 tbsp)

Salt and pepper to taste

Top your ready-made pizza crust with the fish, all the vegetables, and the olives. Season with oil, salt and pepper, and any herbs and spices you prefer. Bake according to the instructions on the crust package. You can also try different combinations of vegetables and fish, but remember that anchovies and sardines are rich in omega-3 fatty acids.

Suggested dessert: unsalted pistachios (25 g) and dried cranberries (20 g)

Take a complete multivitamin and mineral pill and one omega-3 oil soft gel.

Appendix B: Food Sources of Vitamins and Minerals

Food Sources of Vitamin B12

Food	Serving Size	Vitamin B12 Micrograms	Percent Daily Value (DV)
Tuna fish, bluefin, raw or cooked	75 g (2½ oz)	8.2–9.3	137–155
Clams, cooked	75 g (2½ oz)	74.2	1,237
Mussels, cooked	75 g (2½ oz)	25	417
Oysters, cooked	75 g (2½ oz)	18.2	303
Mackerel (king, Atlantic), cooked	75 g (2½ oz)	14	233
Roe, raw	75 g (2½ oz)	9	150
Crab, Alaska king, cooked	75 g (2½ oz)	8.6	143
Herring, cooked or kippered	250 mL (1 cup)	7.2	120
Sardines, canned in oil or tomato sauce	75 g (2½ oz)	6.8	113
Caviar (black, red)	75 g (2½ oz)	6	100
Breakfast cereal, fortified with 100% of the DV for vitamin B12	1 serving	6	100
Trout, cooked	75 g (2½ oz)	5	83
Salmon, red/sockeye, cooked	75 g (2½ oz)	4	67
Salmon, pink/humpback, with bones, canned	75 g (2½ oz)	3.7	62
Fish, tuna fish, light, canned in oil, drained solids	1.0 cup	3.21	54
Salmon, red/sockeye, cooked	75 g (2½ oz)	2.3	38

Salmon, Atlantic, wild, cooked	75 g (2½ oz)	2.3	38
Tuna fish, light, canned in water	75 g (2½ oz)	2.2	37
Soy burger	75 g (2½ oz)	1.8	30
Almond, oat, or rice milk beverage, fortified	250 mL (1 cup)	1	17
Red Star T6635+ Yeast (Vegetarian Support Formula)	2 grams	1	17
Breakfast cereals, fortified with 25% of the DV for vitamin B12	1 serving	1	17
Egg, cooked, hard-boiled	1 large	0.6	10

Sources:

<https://ndb.nal.usda.gov/>

<http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/LabelingNutrition/ucm0649>

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3174857>

<http://www.ncbi.nlm.nih.gov/pubmed/24724766>

<https://www.dietitians.ca/Your-Health/Nutrition-A-Z/Vitamins/Food-Sources-of-Vitamin-B12.aspx>

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3174857/>

<http://www.ncbi.nlm.nih.gov/pubmed/24724766>

Food Sources of Folate

Food	Serving Size	Micrograms per Serving	Percent Daily Value
Spinach, boiled	½ cup	131	33
Black-eyed peas (cowpeas), boiled	½ cup	105	26
Breakfast cereal, fortified with 25% of the DV for folate	1 cup	100	25
Rice, white, medium-grain, cooked	½ cup	90	23
Asparagus, boiled	4 spears	89	22
Spaghetti, enriched, cooked	½ cup	83	21
Brussels sprouts, frozen, boiled	½ cup	78	20
Lettuce, romaine, shredded	1 cup	64	16
Avocado, raw, sliced	½ cup	59	15
Spinach, raw	1 cup	58	15
Broccoli, chopped, frozen, cooked	½ cup	52	13
Mustard greens, chopped, frozen, boiled	½ cup	52	13
Green peas, frozen, boiled	½ cup	47	12
Kidney beans, canned	½ cup	46	12
Bread, white	1 slice	43	11
Peanuts, dry roasted	1 oz	41	10
Wheat germ	2 tbsp	40	10
Tomato juice, canned	¾ cup	36	9
Crab, Dungeness	3 oz	36	9
Orange juice	¾ cup	35	9
Turnip greens, frozen, boiled	½ cup	32	8
Orange, fresh	1 small	29	7
Papaya, raw, cubed	½ cup	27	7

Banana	1 medium	24	6
Yeast, baker's	¼ tsp	23	6
Egg, hard-boiled	1 large	22	6
Cantaloupe, raw	1 wedge	14	4
Halibut, cooked	3 oz	12	3

Food Sources of Calcium

Food	Serving Size	Milligrams per Serving	Percent Daily Value
Breakfast cereal, fortified with calcium	1 cup	100–1,000	10–100
Beverages, coconut milk, sweetened, fortified with calcium and vitamins A, B12, and D2	1 cup	451	45
Beverages, chocolate almond milk, unsweetened, shelf-stable, fortified with vitamins D2 and E	1 cup	451	45
Beverages, vanilla almond milk, sweetened	8 fl oz	451	45
Almonds, whole	1 cup	385	39
Chickpeas (garbanzo beans, bengal gram), mature seeds, canned, drained	1 cup	370	37
Soy milk (all flavors), enhanced	1 cup	340	34
Sardines, canned in oil, with bones	3 oz	325	33
Soy milk, fortified with calcium	8 oz	299	30
Collards, cooked, boiled, drained, without salt	1 cup	268	27
Orange juice, fortified with calcium	6 oz	261	26
Salmon, pink, canned, solids with bone	3 oz	181	18
Seeds, chia seeds, dried	1 oz	179	18
Salmon, red/sockeye, canned	3 oz	168	17
Beet greens, cooked, boiled, drained, without salt	1 cup (1-inch pieces)	164	16
Crustaceans, lobster, northern, cooked with moist heat	1 cup	139	14
Hazelnuts or filberts	1 cup	131	13
Peanuts, Virginia, raw	1 cup	130	13
Pistachios, raw	1 cup	129	13
Trout, rainbow, wild, cooked, dry heat	1 fillet	123	12
Black turtle beans, mature seeds, cooked, boiled, without salt	1 cup	102	10
	1 cup	100	10

Kale, raw, chopped			
Turnip greens, fresh, boiled	½ cup	99	10
Kale, fresh, cooked	1 cup	94	9
Squash, winter, acorn, cooked, baked, without salt	1 cup	90	9
White beans, cooked	½ cup	81	8
Chinese cabbage, bok choy, raw, shredded	1 cup	74	7
Bread, white	1 slice	73	7
Anchovies, European, canned in oil, drained solids, boneless	1 oz	66	7
Salmon, red/sockeye, fillets with skin, smoked (Alaska Native)	1 fillet	63	6
Sweet potato, baked, with salt	1 cup	62	6
Figs, dried	¼ cup	61	6
Tortilla, corn, ready-to-bake/fry	6-in diameter	46	5
Pinto beans, cooked	½ cup	39	4
Tortilla, flour, ready-to-bake/fry	6-in diameter	32	3
Bread, whole wheat	1 slice	30	3
Red beans, cooked	½ cup	25	3
Broccoli, raw	½ cup	21	2

The DV for calcium is 1,000 milligrams for adults and children ages four years and older.

Source: <https://ods.od.nih.gov/factsheets/Calcium-HealthProfessional>

Food Sources of Iron

Food	Serving Size	Milligrams per Serving	Percent Daily Value
Seaweed, spirulina, dried	1 cup	31.92	177
Breakfast cereal, fortified with 100% of the DV for iron	1 serving	18	100
Cocoa, dry powder, unsweetened	1 cup	12	67
Oysters, eastern, cooked with moist heat	3 oz	8	44
White beans, canned	1 cup	8	44
Chocolate, dark, 45%–69% cacao solids	3 oz	7	39
Mollusks, mussels, blue, cooked, moist heat	3 oz	5.71	32
Peanut butter, chunky, vitamin and mineral fortified	2 tbsp	5.6	31
Almonds, whole	1 cup	5.31	30
Mixed nuts, dry roasted, with peanuts, without salt added	1 cup	4.89	27
Lentils, boiled and drained	½ cup	3	17
Spinach, boiled and drained	½ cup	3	17
Kidney beans, canned	½ cup	2	11
Sardines, Atlantic, canned in oil, drained solids with bone	3 oz	2	11
Chickpeas (garbanzo beans, bengal gram), boiled and drained	½ cup	2	11
Tomatoes, stewed, canned	½ cup	2	11
Potato, baked, flesh and skin	1 medium	2	11
Cashew nuts, oil roasted	1 oz (18 nuts)	2	11
Green peas, boiled	½ cup	1	6
Rice, white, long grain, enriched, parboiled, drained	½ cup	1	6
Bread, whole wheat	1 slice	1	6
Bread, white	1 slice	1	6
Raisins, seedless	¼ cup	1	6

Spaghetti, whole wheat, cooked	1 cup	1	6
Tuna, bluefin, fresh, cooked with dry heat	3 oz	1	6
Pistachios, dry roasted	1 oz (49 nuts)	1	6
Broccoli, boiled and drained	½ cup	1	6
Egg, hard-boiled	1 large	1	6
Rice, brown, long, or medium grain, cooked	1 cup	1	6

Source: <https://ods.od.nih.gov/factsheets/Iron-HealthProfessional>

Food Sources of Vitamin A

Food	Serving Size	Micrograms of Retinol Activity Equivalents (RAE) per Serving	International Units (IU) per Serving	Percent Daily Value
Sweet potato, baked in skin	1 whole	1,403	28,058	561
Spinach, frozen, boiled	½ cup	573	11,458	229
Carrots, raw	½ cup	459	9,189	184
Pumpkin pie, commercially prepared	1 piece	488	3,743	75
Cantaloupe, raw	½ cup	135	2,706	54
Peppers, sweet, red, raw	½ cup	117	2,332	47
Mangos, raw	1 whole	112	2,240	45
Black-eyed peas (cowpeas), boiled	1 cup	66	1,305	26
Apricots, dried, sulfured	10 halves	63	1,261	25
Broccoli, boiled	½ cup	60	1,208	24
Tomato juice, canned	¾ cup	42	821	16
Herring, Atlantic, pickled	3 oz	219	731	15
Breakfast cereal, fortified with 10% of the DV for vitamin A	¾–1 cup	127–149	500	10
Baked beans, canned, plain or vegetarian	1 cup	13	274	5
Egg, hard-boiled	1 large	75	260	5
Summer squash, all varieties, boiled	½ cup	10	191	4
Salmon, red/sockeye, cooked	3 oz	59	176	4
Yogurt, plain, low fat	1 cup	32	116	2
Pistachio nuts, dry roasted	1 oz	4	73	1
Tuna, light, canned in oil, drained solids	3 oz	20	65	1

Food Sources of Vitamin C

Food	Serving Size	Milligrams per Serving	Percent Daily Value
Red pepper, sweet, raw	½ cup	95	158
Orange juice	¾ cup	93	155
Orange	1 medium	70	117
Grapefruit juice	¾ cup	70	117
Kiwifruit	1 medium	64	107
Green pepper, sweet, raw	½ cup	60	100
Broccoli, cooked	½ cup	51	85
Strawberries, fresh, sliced	½ cup	49	82
Brussels sprouts, cooked	½ cup	48	80
Grapefruit juice	½ medium	39	65
Broccoli, raw	½ cup	39	65
Tomato juice	¾ cup	33	55
Cantaloupe	½ cup	29	48
Cabbage, cooked	½ cup	28	47
Cauliflower, raw	½ cup	26	43
Potato, baked	1 medium	17	28
Tomato, raw	1 medium	17	28
Spinach, cooked	½ cup	9	15
Green peas, frozen, cooked	½ cup	8	13

Food Sources of Vitamin D

Food	Serving Size	International Units (IU) per Serving	Percent Daily Value
Cod liver oil	1 tbsp	1,360	340
Maitake mushrooms, raw	1 cup	786	196.5
Swordfish, cooked	3 oz	566	141.5
Trout, rainbow, farmed, cooked, dry heat	1 fillet	539	134.75
Salmon, red/sockeye, cooked	3 oz	447	111.75
Herring, Atlantic, cooked, dry heat	1 fillet	306	76.5
Tuna, canned in water, drained	3 oz	154	38.5
Tilapia, raw	1 fillet	144	36
Orange juice, fortified with vitamin D	1 cup	137	34.25
Soy milk (all flavors), enhanced	1 cup	114	28.5
Chanterelle mushrooms, raw	1 cup	114	28.5
Beverages, almond milk, chocolate	8 fl oz	101	25.25
Beverages, coconut milk, sweetened, fortified with calcium and vitamins A, B12, and D2	1 cup	101	25.25
Beverages, rice milk, unsweetened	8 fl oz	101	25.25
Sardines, canned in oil, drained	2 sardines	46	11.5
Salmon, Atlantic, farmed, cooked, dry heat	3 oz	44	11
Egg (vitamin D is found in the yolk)	1 large	41	10.25
Shiitake mushrooms, cooked without salt	1 cup	41	10.25
Breakfast cereal, fortified with 10% of the DV for vitamin D	$\frac{3}{4}$ –1 cup	40	10
Anchovy, European, canned in oil, drained solids, boneless	1 oz	20	5
White mushrooms, cooked, boiled, drained, without salt	1 cup	12	3

Selected Food Sources of Vitamin E (Alpha-Tocopherol)

Food	Serving Size	Milligrams per Serving	Percent Daily Value
Wheat germ oil	1 tbsp	20.3	102
Sunflower seeds, dry roasted	1 oz	7.4	37
Almonds, dry roasted	1 oz	6.8	34
Sunflower oil	1 tbsp	5.6	28
Safflower oil	1 tbsp	4.6	23
Hazelnuts, dry roasted	1 oz	4.3	22
Peanut butter	2 tbsp	2.9	15
Peanuts, dry roasted	1 oz	2.2	11
Corn oil	1 tbsp	1.9	10
Spinach, boiled	½ cup	1.9	10
Broccoli, chopped, boiled	½ cup	1.2	6
Soybean oil	1 tbsp	1.1	6
Kiwifruit	1 medium	1.1	6
Mango, sliced	½ cup	0.7	4
Tomato, raw	1 medium	0.7	4
Spinach, raw	1 cup	0.6	3

Food Sources of Omega-3

Food	Serving Size	Alpha-linolenic Acid (ALA) (g)	Eicosapentaenoic (EPA) / Docosahexaenoic (DHA) (g)
Halibut, cooked	75 g (2½ oz)	0.04–0.06	0.35–0.88
Herring, cooked	75 g (2½ oz)	0.05–0.11	1.6
Lobster, cooked	75 g (2½ oz)	0.01	0.42
Mackerel, cooked	75 g (2½ oz)	0.03–0.08	0.90–1.39
Mackerel, salted	75 g (2½ oz)	0.12	3.43
Mussels, cooked	75 g (2½ oz)	0.03	0.59
Octopus, cooked	75 g (2½ oz)	0	0.13
Oysters, Eastern/Blue Point, cooked	75 g (2½ oz)	0.04–0.05	0.33–0.41
Oysters, Pacific, cooked	75 g (2½ oz)	0.05	1.04
Pollock, cooked	75 g (2½ oz)	0	0.4
Salmon, Atlantic, farmed, raw or cooked	75 g (2½ oz)	0.08–0.11	1.48–1.61
Salmon, Atlantic, wild, raw or cooked	75 g (2½ oz)	0.22–0.28	1.08–1.38
Salmon, Chinook, raw or cooked	75 g (2½ oz)	0.06–0.08	1.31–1.47
Salmon, coho, raw or cooked	75 g (2½ oz)	0.03–0.05	0.33–0.98
Salmon, pink/humpback, raw, cooked or canned	75 g (2½ oz)	0.03–0.06	0.96–1.26
Salmon, red/sockeye, raw, cooked or canned	75 g (2½ oz)	0.05–0.07	0.87–1.06
Sardines, canned	75 g (2½ oz)	0.17–0.37	0.74–1.05
Scallops, cooked	75 g (2½ oz)	0	0.27

Shrimp, cooked	75 g (2½ oz)	0.01	0.24
Snapper, cooked	75 g (2½ oz)	0	0.25
Sole or plaice, cooked	75 g (2½ oz)	0.01	0.37
Tilapia, cooked	75 g (2½ oz)	0.03	0.1
Trout, cooked	75 g (2½ oz)	0.06–0.14	0.65–0.87
Tuna, light, canned with water	75 g (2½ oz)	0	0.21
Tuna, white, canned with water	75 g (2½ oz)	0.05	0.65
Whitefish, cooked	75 g (2½ oz)	0.17	1.2
Beans (navy, pinto), cooked	175 mL (¾ cup)	0.17–0.24	0
Peas, black-eyed, cooked	175 mL (¾ cup)	0.11	0
Soybeans, mature, cooked	175 mL (¾ cup)	0.76	0
Meatless fish sticks, chicken, or meatballs, cooked	75 g (2½ oz)	0.39–0.78	0
Almonds, oil roasted, blanched	60 mL (¼ cup)	0.15	0
Chia seeds	15 mL (1 tbsp)	1.9	0
Flaxseed, ground*	15 mL (1 tbsp)	2.46	0
Hickory nuts	60 mL (¼ cup)	0.32	0
Pumpkin seeds, without shell	60 mL (¼ cup)	0.06	0
Pecans	60 mL (¼ cup)	0.25–0.29	0
Soy nuts	60 mL (¼ cup)	0.42	0
Walnuts, black	60 mL (¼ cup)	0.64	0
Walnuts, English, Persian	60 mL (¼ cup)	2.3	0

Canola oil	5 mL (1 tsp)	0.42	0
DHA-enriched omega-3 margarine made with fish oil	5 mL (1 tsp)	0.28	0.03
Flaxseed oil	5 mL (1 tsp)	2.58	0
Omega-3 margarine made with canola oil*	5 mL (1 tsp)	0.34	0
Soybean oil	5 mL (1 tsp)	0.31	0
Walnut oil	5 mL (1 tsp)	0.48	0
Herring oil supplement	5 mL (1 tsp)	0.04	0.48
Salmon oil supplement	5 mL (1 tsp)	0.05	1.44
Sardine oil supplement	5 mL (1 tsp)	0.06	0.96
Almond milk beverage	250 mL (1 cup)	0.1	0
Oat beverage	250 mL (1 cup)	0.3	0

* Amounts vary depending on the product.

Source: <http://www.whfoods.com/genpage.php?dbid=84&tname=nutrient>

<http://www.dietitians.ca/Your-Health/Nutrition-A-Z/Fat/Food-Sources-of-Omega-3-Fats.aspx>

Food Sources of Magnesium

Food	Serving Size	Milligrams per Serving	Percent Daily Value
Almonds, dry roasted	1 oz	80	20
Spinach, boiled	½ cup	78	20
Cashews, dry roasted	1 oz	74	19
Peanuts, oil roasted	¼ cup	63	16
Cereal, shredded wheat	2 large biscuits	61	15
Soymilk, plain or vanilla	1 cup	61	15
Black beans, cooked	½ cup	60	15
Edamame, shelled, cooked	½ cup	50	13
Peanut butter, smooth	2 tbsp	49	12
Bread, whole wheat	2 slices	46	12
Avocado, cubed	1 cup	44	11
Potato, baked with skin	3.5 oz	43	11
Rice, brown, cooked	½ cup	42	11
Breakfast cereal, fortified with 10% of the DV for magnesium	1/3 cup	40	10
Oatmeal, instant	1 packet	36	9
Kidney beans, canned	½ cup	35	9
Banana	1 medium	32	8
Salmon, Atlantic, farmed, cooked	3 oz	26	7
Halibut, cooked	3 oz	24	6
Raisins	½ cup	23	6
Broccoli, chopped and cooked	½ cup	12	3
Rice, white, cooked	½ cup	10	3
Apple	1 medium	9	2
Carrot, raw	1 medium	7	2

Source: <https://ods.od.nih.gov/factsheets/Magnesium-HealthProfessional/>

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CHAPTER 11

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About the Author

Valter Longo is the director of the Longevity Institute at the University of Southern California in Los Angeles, and of the Program on Longevity and Cancer at IFOM (Molecular Oncology FIRC Institute) in Milan. His studies focus on the fundamental mechanisms of aging in simple organisms and mice, and on translating the results to benefit humans. Dr. Longo received the 2010 Nathan Shock Lecture Award from the National Institute on Aging (NIA/NIH), the 2013 Vincent Cristofalo “Rising Star” Award in Aging Research from the American Federation for Aging Research (AFAR), and the 2016 Glenn Award for Research in Biological Mechanisms of Aging from the Glenn Foundation for Medical Research. Coincidentally, Longo is from a town in Italy that is home to some of the longest-lived people in the world.



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* This section was written in collaboration with nutritionist Noemi Renzetti and dietitians Mahshid Shelechi and Susan Kim.

* Portions are calculated for a woman of average weight, of average height, and with a BMI of 21.5. Men of normal weight and height may increase portions by 20 percent. Portions should be based on your ability to reach and maintain a normal weight and BMI, and on your desire to either lose or gain weight. I recommend daily weight and abdominal-circumference measurements (see [chapter 4](#)) until the ideal weight is reached and stabilized.

* US Dietary Guidelines recommend limiting sodium to less than 2.3 grams a day.

* Throughout these recipes, when possible use fresh and seasonal vegetables, and dried legumes (beans, lentils, peas) that have been soaked overnight.

* Sugar is naturally present in fruits and dried fruits. In the following daily meal plans, limit added sugar (to sweeten coffee or tea) and sugar naturally present in fruit juices, honey, and syrups to less than 8 to 10 grams a day (2 teaspoons).