





BY DAN BUETTNER PHOTOGRAPHS BY DAVID McLAIN

life? What would that be worth? First the Good News. For the past century and a half, life expectancy in this country has only gone up. Having defeated parasitic and infectious diseases such as malaria, pneumonia, and small pox, medical science has steadily chipped away at diseases of aging such as cancer, heart disease, and dementia. James Vaupel, a demographer at the Max Plank Institute, figures that life expectancy has increased by about two years a decade since 1840—and he sees no reason for it to stop. By 2050, he estimates, half of all the women born in the developed world will reach age one hundred.

hat if I said you could add

seven or eight years to your

Now the bad news. Last March a team of researchers led by Jay Olshansky at the University of Illinois found that life expectancy in the U.S. may have started to level off—or even to dip. For the first time in living history, the next generation of Americans could live shorter lives than the previous one. The culprit: childhood obesity and ailments such as diabetes and heart disease that result from it later in life.

And there's another problem. Your body was designed to wear out. Once you reach reproductive age, plus enough years to raise your offspring, any life you have remaining is due to genetic leftovers; think of it as your biological software expiring. Technology's no help: There's no diet, supplement, pill hormone therapy, or gene manipulation that's been proven to slow the aging process. "We can't expect to make humans live longer if we can't figure out how to make a car last more than ten years," says Leonard Hayflick of the University of California at San Francisco.

But you do have the power to add time to your life and—more significantly, life to your time. Some individuals, perhaps one tenth of one percent of the population, will win the genetic lottery and live to be one hundred. The rest, if they live in the developed world, can expect to reach their late 70s, for men, or early 80s, for women. No matter what your genetic inheritance, there are things you can do to make the most of your body's potential. You can slow the aging process, for example, by reducing your consumption of calories, by avoiding smoking, overexposure to the sun, or prolonged stress.

Tom Perls of Harvard estimates that if you adopt an optimal diet, lifestyle, and level of physical activity, you can add as many as eight years to your life. And most of them would likely be good years. So what's the formula?

During the past decade, researchers have studies a pocket in Sardinia, Italy, where men reach age one hundred at the highest rate in the world. Across the planet on the islands of Okinawa, Japan, another group of scientists have been examining a population that outlives everybody else. And in Loma Linda, California, researchers have identified a group of Seventh Day Adventists who are America's longevity all-stars.

People in these regions, the researchers found, live as much as a decade longer than their counterparts elsewhere, produce several times more centenarians, suffer a fraction of the diseases the kill most Americans, and enjoy more good years of life than anyone else

on the planet. In essence, they offer three sets of "best practices" for the rest of us to emulate. And one more sentence here to fill this.

POINTER TITLE Delve deeper i the complex, and at times mysterious, workings of the carbon cycle with the amazin resources compiled by the world renowned experts at your magazine of magazines. Find out how to live to be ancient here at **nationalgeographic.com/magazine/0402**.

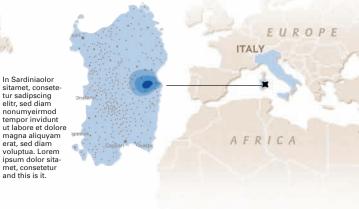
SARDINIANS Honor Family Drink Red Wine Eat Whole Grains and Fava Beans Let Women Run the House **Stay Active** ALL Keep Socially Engaged Eat A Plant-Based Diet **ADVENTISTS** OKINAWANS Be Purposeful **Avoid Time Urgency Drink Soy Milk Eat Plants** Stay Friends Eat Nuts and Legumes Try To Be Likeable

WHERE PEOPLE LIVE LONGER

Lorem ipsum dolor sitamet, consetetur sadipscing elitr, sed diam nonumyeirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. Lorem ipsum dolor sitamet, consetetur and this is it.



magna aliquyam erat, sed diam





8 NATIONAL GEOGRAPHIC · NOVEMBER 2005 SECRETS OF LONGEVITY 9

honor family

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Sardinians

- Centenarians ate a plant-based diet until at least 1950's
- Seniors who live with their families live longer, higher quality lives

n the work shed behind his house in Salinus, Sardinia, seventy-five year old Tonino Tola emerges elbow-deep from the steaming carcass of a freshly-slaughtered bull, sets down his knife, and greets me with a warm, bloody handshake. Then he moves his thick red-glistening fingers to the chin of his five-month old grandson, Filippo—who regards the scene the with cooing glee from his mother's arms—and purrs a seemingly universal, "goochi, goochi goo..." For this strapping, six-foot-two shepherd relentless hard work and family compose the fabric of everyday life—and they may help explain why Tonino and his kin live longer than any other population of males on the planet.

Silanus is located on the sloping fringes of a mountainous region in central Sardinia where parched pastures erupt into granite peaks. There, a team of scientists led by Belgian demographer, Dr. Michel Poulain, recently quantified a sub region where people outlive any other European population and whose men reach age 100 at a rate X times greater than the U.S. proportion. In America, we have one male centenarian for every 70,000 people. In this cluster of mountain villages, of the 17,865 people born between 1880 and 1900, 47 men lived past their 100th birthday. Poulain and his colleagues have dubbed this region of extraordinary longevity the Blue Zone.

And why the extraordinary longevity here? Genes may hold part of the answer. Stanford-trained physical anthropologist, Dr. Paolo Francalacci and his team at the University of Sarssari have traced the Sardinians genetic roots to the Iberian Peninsula by tracking the "M26 marker" a genetic mutation found in the "Y" Chromosome. Eleven thousand years ago a handful of people who originated near what is today the Basque Country, made their way around the Mediterranean, through Corsica to Sardinia.



drink red wine

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Wines from the Blue Zone provides two to three times higher dose of vascular protective polyphe nols than the average wines.



Several millennia of hunting and gathering gave rise to the Bronze-age Nuragi culture that cultivated the fertile coastal plains. The culture flourished until militarily superior foreigners —Phoenicians, Romans, Arabs and Europeans —discovered Sardinia's charms and forced native Sardinians to retreat deeper and deeper into the parched highlands. There, they developed an aggressive wariness of foreigners and a reputation for banditry, kidnapping and settling vendettas at the end of a lesoria, the traditional Sardinian shepherd's knife. While invaders imposed their influences on the coasts, native Sardinians in the Blue Zone turned inward. They inbred and intermarried, creating a genetic incubator of sorts, amplifying certain traits over evolving generations. Over 80% of Blue Zone inhabitants still directly descend from the first Sardinians and over 40% of them have the M26 genes. Researchers have identified genetic anomalies unique to the Blue Zone. For example, people developed an elevated resistance to malaria but a susceptibility to fauvism and diabetes. Somewhere in this genetic code also lies a combination that favors longevity—one that expresses itself in men over age 85 and is what carries so many of them past 100. "There may or may not be a correlation between the M26 marker and the location of the longevity gene," postulates Francallaci, "We'll know within a decade."

Sardinian's lifestyle is the other half of equation. While scientist don't exactly know how nature and nurture combine in Sardinia to produce such long-lived men, they do agree that it is a disappearing phenomena—which is what brought me to Silanus. As a life-long shepherd, who produces much of his own food, and possesses an almost fanatic zeal for his family, Tonino represents a dying breed, a living example of Sardinia's culture of longevity.



12 NATIONAL GEOGRAPHIC · NOVEMBER 2005 SECRETS OF LONGEVITY 13

keep moving

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

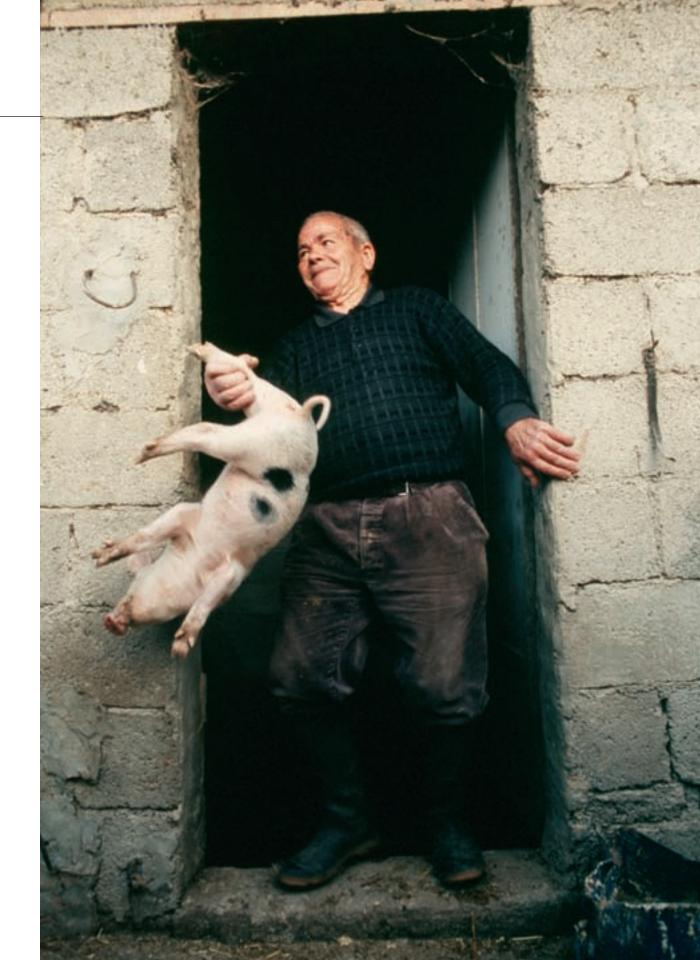


Women shoulder most of the burden of child rearing, family finances, and house hold management.

At 11:00 am sweaty and exuberant, Tonino has already walked four miles pasturing sheep, milked cows, cut a half cord or wood, and slaughtered a bull. Now, taking the day's first break, he gathers his grown children, grandson and visitors around the kitchen table. Giavenella, Tonino's—a robust woman with quick, intelligent eyes unties a handkerchief containing Nota Musica—paper thin flatbread — fills our water glasses with red wine and slices a ball of homemade pecorino cheese with the thumping severity of a women in charge. Like most wives in the Blue Zone whose husbands spent up to five months at a time tending sheep, Giovenella shouldered the burden of child rearing, family finances and household management. In most parts of the world, female centenarians outnumber men 5:1. In the Blues Zone's nucleus, the proportion is 1:1; a statistic which may be explained by pant-wearing women's greater share of the family's stress load —and men's longer lives. Less stress equals less risk of cardiovascular disease. "I do the work," admits Tonino hooking Giavenella around the waist, "My ragazza does the worrying,"

Tonino's family's diet has always depended heavily on homegrown seasonal vegetables —zucchini, tomatoes, potatoes vegetables, eggplant, and most significantly, fava beans. For most of his life, meat

was at best a weekly affair, boiled on Sunday with pasta and roasted during village festivals. Until the 1950's Tonino sold his sheep to buy whole grain staples from which Giavenella made their pastas and bread. Unlike the typical Mediterranean diet, fish Tonino's family rarely eats fish. Instead, grass-fed sheep's milk and its product like pecorino cheese contribute protein and artery-friendly Omega-3 fatty acids. Tonino maintained a small vineyard of "contanaou" wine grapes—a variety that provides two to three times



find purpose

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

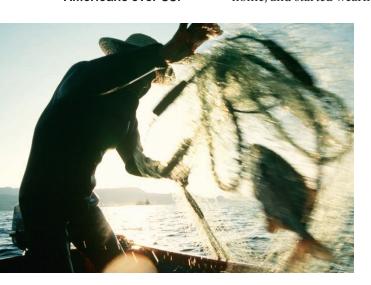
Okinawans

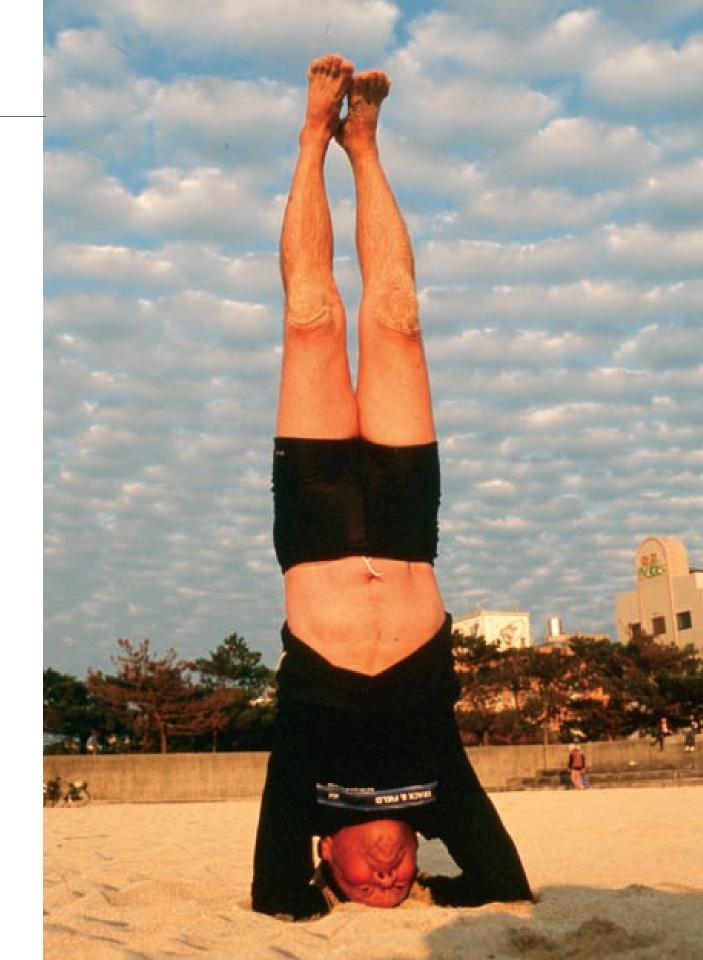
- Turmeric, used to flavor fish soup has been shown to slow aging process in mice.
- Seniors have less than I/5 the rate of eart disease and cer tain cancers, diseases that kill 75% of Americans over 65.

he first thing you notice about Ushi Okushima is her laugh. It begins with a belly quake, rumbles silently up to her shoulders, and then erupts with a hee-haw that fills a room with pure joy. I first met Ushi five years ago, and now it is that same laugh that has drawn me back to her small wooden house in the seaside village of Ogimi. This rainy afternoon, she sits snuggly wrapped in a blue Kimono. A heroic shock of hair is combed back from her bronzed forehead revealing alert, green eyes. Her smooth hands lay serenely folded in her lap. At her feet, family and friend, Setzu Taira, sits crosslegged on tatami mats, sipping tea. Since I last visited Ushi, she's grown up, taken her first paying job, tried to run away from home, and started wearing perfume. Predictable behavior for a

growing girl, perhaps. But Ushi is 104 years old. And when I ask about the perfume, Ushi admits to a new boyfriend—39 years her junior —then claps a hand over her mouth before unleashing one of her blessed heehaws into the room.

We're in Okinawa, Japan, an 800-mile long subtropical archipelago of one large and 160 tiny islands in a vast sea. As early as 609 A.D., when a Chinese expedition in search of "a land of happy immortals" landed on the shores of the then Rukyus kingdom, Okinawa has held a Shangri-la reputation among Asians. Though the disappointed Chinese found only "pliable and agreeable"

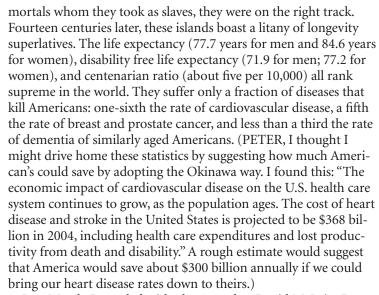




stay friends

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

- Traditional diet has one fifth the caloric density of a hamburger
- People with two close friends have been shown to live longer



Last March, I traveled with photographer David McLain, Dr. Greg Plotnikoff, a world-renowned expert of Japanese alternative medicine, and Dr. Craig Willcox, whose New York Times Best Seller, "The Okinawa Program" chronicles the findings of a 25-year Okinawan Centenarian Study. Our goal was to find the one centenarian who best embodied Okinawa's longevity culture and formally describe their formula. With approximately 800 centenarians among 1.4 million people, this would require a protean, needle-in-the-haystack search. We'd start by phoning from a list of Okinawa's 100 oldest people and discover that most centenarians don't have phones; they often don't have hearing. We'd canvas the five most likely islands (Takatomi, Ie, Iromote, Tonaki, and





18 NATIONAL GEOGRAPHIC • NOVEMBER 2005

eat plants

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.



Seniors have less than I/5 the rate of heart disease and certain cancers, diseases that kill 75% of Americans over 65.

the main island, Okinawa), stopping in villages and asking people where the oldest person lives. Some helpful finger invariably pointed us in the right direction, but inevitably we'd experience another centenarian statistic: six of seven live in rest homes or are otherwise disabled. So, we struck off to find Ushi.

A U.S. military base and the cement sprawl of contiguous cities that radiate from the southern capital, Naha, dominate the southern half of Okinawa's main island. But in north, vestiges of traditional life endure. There, among glistening jungle riots and life, many small towns still proceed with a 19th century somnolence. You can still see centenarians bent over their gardens and 90-year-olds still spear fish their lunch. And most afternoons in the first roadside market after entering Ogimi, you can find Ushi and Setazo bagging oranges.

Like most rural Okinawans, Ushi grew up barefooted and poor, with a hoe in hand for cultivation or a sickle for harvesting. Her family worked long days to coax a meager living out of the Ogimi's rocky, typhoon-prone terrain. They grew some sugar cane for cash, but mostly the staple sweet potatoes, which formed the core of every meal. Life revolved around the family and two annual growing seasons. About once a month, the village celebrated a festival when they butchered a

pig and everyone got a morsel of pork.

In 194_,World War II blasted the island. Americans warships rained down some 600,000 shells and fired another 1.7 million rounds from the ground. Ushi and Setzo, whose husbands were conscripted into the Japanese army, fled to the mountains with their children. "We experienced terrible hunger," Setzo recalls. "I dug up roots and tried them first to make sure they wouldn't po and one more line goes here to fill this out so it's not short.



have faith

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

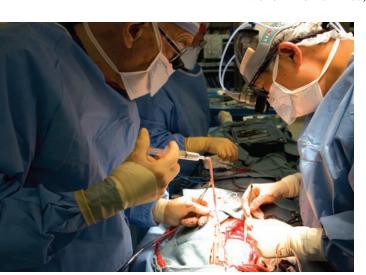
Adventists

- Religion re-enforces and heavily promotes health
- Regular church goers appear to live as much as two years longer than non-church goers

t's Friday morning and Marge Jetton is barreling down the San Bernadino Freeway in her root beer-brown Cadillac Seville. She peers out of the windshield behind green sunshades, her head barely clearing the steering wheel. Marge, who turned 101 last September, is late for one of the four volunteer commitments she has today and is driving fast. Already this morning, Marge has walked a mile, pumped iron and eaten her oatmeal. "I don't why God made me live so long," she says, lifting a hand from the wheel to point back at herself. "But look what He did." God may or may not have had something to do with Marge's triple digit vitality but her religion certainly did. Marge is a Seventh Day Adventist.

We're in Loma Linda, California, halfway between Palm

Springs and Los Angeles.. Here, radiating from the Loma Linda University Medical Center, surrounded by orange groves and usually blanketed in mustard-colored smog live North America's highest concentration of Seventh Day Adventists. Since 1976, the National Institutes of Health has funded the Adventists Health Study which has followed 34,000 California Adventists to relate their lifestyle to the risk of heart disease, cancer and life expectancy. Earlier Adventists studies established that consuming tomatoes, fruit, beans and soymilk lowered your risk of certain cancers, and nuts, whole wheat bread and five glasses of water per day





keep sabbath

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

Those who adhere strictly to Adventist health recommenda tion live 10.8 years longer than their Californian counterparts. reduce the risk of heart disease. This latest study offered a stunning summation:: Adventists who most strictly follow the church laws and recommendations church live as much 10.8 years longer than their American cohorts—making them America's most convincing culture of longevity.

Why? Born of the same mid-19th century Christian health reforms that introduced organized vegetarianism, the graham cracker and corn flakes (John B. Kellogg was an Adventist before quit the church to start the cereal company) the church has al-

ways preached a practiced a message of health, It expressly forbids smoking, alcohol consumption and eating biblically unclean foods-such as pork—as well as discourages the consumption of any meat, rich foods, caffeinated drinks, "stimulating" condiments and spices. "Grains, fruits, nuts and vegetables constitute the diet chosen for us by our Creator," wrote Ellen White, an early figure who most shaped the Adventist church. "...Cancers, tumors and all inflammatory disease are largely caused by meat-eating." Adventists also observe Saturday Sabbath—as opposed to Sunday— when the cut out the rest of the world to pray, relieve stress, socialize with other Adventists and enjoy a "sanctuary in time.". Today, most Adventists follow the prescribed lifestyle—a testimonial, perhaps to the potential power of mixing health and religion.

I met Marge at 8:25 am at the Beauty Pantry on the outskirts of Loma Linda, where she has kept her 8:00 am appointment with stylist Barbara Miller every Friday for the past 26 years. When I arrive, Marge is flipping through Readers' Digest, as stylist Barbara Miller in uncurling a silver lock of hair. "You're late!" she shouts revealing a set of perfect teeth (all hers). Behind Marge, a line of other stylists languidly coif other heads of hair, all in varying shades a gray. "We're a bunch a dinosaurs around here" Barbara whispers to me, as she unfurls curlers. "You may be," Marge shoots back, chuckling. "Not me".

At 9:00 a.m. her hair now a cottony tuft, Marge leads me to the car. She doesn't walk, really, but scoots with a snappy, can-do shuffle. "Get in," she orders. "You can help." We drive to the Loma Linda Adult Services Center, a day care center for seniors—most of whom several decades younger than Marge. She pops open her trunk and heaves out four bundles of old magazines she has collected throughout the week. "The old folks here like to read them and cut out the pictures for crafts." Marge explains. Old folks?

Next stop: deliver recycled bottles to a woman



24 NATIONAL GEOGRAPHIC · NOVEMBER 2005 SECRETS OF LONGEVITY 25

living proof

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet.

- Diet, taken emphasizes consumption of nuts, legumes and whole grains
- Social circle of other Adventists tend to reinforce healthy behaviors
- Avoid tobacco, liquor and spiced foods.

on welfare. On the way, Marge tells me she was born poor, to a mule skinner father and home-maker mother in Uva, California. She remembers the 1906 San Francisco earthquake, when the aftershock reached her family farm and sloshed water out of the animal trough. She worked as a nurse, married a medical student, raised two children as a doctor's wife and soon after their 75th anniversary, heard a thump on the bathroom floor and her husband was gone. "Of course I feel lonely once in a while but for me, that's always been a sign to get up and help somebody."

Marge's "What can I do for you?" mantra has not diminished past 100: she still volunteers for seven organizations. The impulse may flow for the Adventist enthusiasm for the Bibilcal fable of the good Samaritan but like the Okinawan, "Ikiguy" it also gives Marge a sense of purpose which seems to imbue the lives of successful centenarians. Also like other longevity pockets around the world, Adventists experience a sense of isolation—cultural rather than geographical in this case. "I've always felt a sense of "otherness" xx, yy the Adventist Academy school principal, told me. "In school I couldn't participate in sports because games we're on Saturday and other kids thought I was weird because I didn't eat hamburgers." So, Adventists tend to hang out with other Adventists. "It is difficult to have non-Adventist friends," Marge added. "Where do you meet them? You don't do the same things. I don't go to movies, I don't go to dances." The benefit of isolation in this case may be that they tend to associate with peo-

ple who reinforce healthy behaviors.

At noon, back at the "Linda Vista" where Marge lives with a community of retired Adventists, she treats me to lunch. We sit by ourselves but a stream of her neighbors stream by to say hello. Over tofu casserole and mixed green salad, as ask Marge to share her longvity wisdom. "I never eat between meals, haven't eaten meat in 50 years and I avoid dessert " she says, tapping her perfect teeth. "They're all mine. Other than that, I realized a long time ago that I need to go to world; the world is not going to come to me."



