

Develop a Youthful Brain Through the Power of Ningxia

By Robin Phillips¹

It's early morning in the Ningxia province of China. Dr. Shengyuan Lei has just finished his morning three-mile trek. He will spend the next hour in meditation before beginning a busy day diagnosing and treating patients.

At first there may not seem anything particularly odd in Dr. Lei's daily routine. Except for the fact that he is 103 years old!

Amazingly, in the Ningxia province where Dr. Lei lives, his experience is not considered unusual. In this sparsely populated region 500 miles south of Inner Mongolia, it is normal for people to live well into their hundreds while remaining active in body and mind.

The Hongzhangs, a husband and wife in the Ningxia province, are both 110. Not only do they live an active life, but they have all their teeth and excellent eye sight. In the same area lives Ma Wangshi. At 121, Wangshi is an active gardener and walks up and down stairs unassisted.²

These stories could be multiplied almost endlessly. Data available from the Regional Health Bureau in Ningxia reveals that the region has over 16 times as many people over a hundred than the rest of China.³ What's more, these centenarians are not living a vegetative existence in nursing homes waiting to die, but living active lives in their community.

The prevalence of some many mentally fit people over a hundred contrasts sharply with modern Western stereotypes about the aging process. One of the most pervasive stereotypes is that growing older is associated with a sharp decline in mental fitness.

In article will show that our common negative stereotypes about aging do not need to apply to you. You will also learn the secrets to keeping your brain just as healthy, active and *youthful* as those in China's Ningxia province.⁴

Before proceeding any further, I want to emphasize that **no matter how old or young you are, the material in this article is relevant to YOU**. The focus on the activities I'm about to share is directed at the *aging process*, not merely those who are aged. And guess what? Whether you are 12, 24 or 70, you are aging. That means you need to know how to do it right.

The first secret to successful aging is found in the mind. You have to *think* correctly about aging instead of letting your thinking follow the stereotypes of our culture.

Start Thinking Correctly About the Aging Process

When many of us think about the aging process, the first words that come to our minds are negative terms like “decline”, “senility” and “decrepit.” This is because our culture tends to associate aging with cognitive and physiological decline.

By contrast, in many other cultures of the world, growing older is associated with positive qualities. For example, throughout much of Asia, growing old is seen as an accomplishment, something a person actually *looks forward to*. In much of Asia people expect to become *more* mentally fit with age, growing in qualities like wisdom, maturity, gratitude, integrated thinking and an ability to grasp the big picture.

What Does Aging Mean to You?

Take a few minutes to think about what it means to grow old. Without overanalyzing it, write down all the words that come to mind.

Is our culture’s negative approach to aging correct? That was a question I set out to answer a couple years ago when a Hawaii-based psychology company hired me to research the effect of aging on cognitive ability. This company was providing a learning platform to train would-be psychologists to pass an incredibly difficult licensure exam. Sometimes people well into their 60’s wanted to do the program. The company wanted to know whether their elderly clients were naturally disadvantaged.

As I began dipping into the aging research, I found that *what we think about the aging process plays a large part in determining how we actually age*.

Much of this research was pioneered by Becca Levy, professor of Epidemiology and Psychology at Yale University. In her voluminous corpus of publications, drawn from first-hand laboratory research, Levy repeatedly showed that negative stereotypes about aging are self-fulfilling. If we expect to grow weak, passive and disengaged as we grow older, then there is a greater chance that we will.

You Are What You Think

People often say ‘You are what you eat.’ Well, it is equally true that you are what you think. Our self-perception plays a central role in determining not simply how we think of ourselves, but the actual people we become. This is true of children. It is true of people in mid-life. And it is especially true of seniors. We grow to inhabit the futures we unconsciously expect for ourselves. How are you thinking about yourself and your future?

In one of Levy's most fascinating studies, one group of test-subjects were exposed subliminally to negative aging-stereotypes while another group were exposed to positive aging-stereotypes. Both groups were then asked to write something by hand. Finally, judges were given the handwriting samples and asked to rate them "according to how much they felt the samples were characterized by six attributes: accomplished, confident, deteriorating, senile, shaky, and wise. The age of each writer was also guessed."

What was so amazing about this study is that, without being told which people had been primed with which stereotype, the judges were able to accurately distinguish who had been exposed to the negative stereotypes vs. who had been exposed to positive stereotypes. How were the judges able to distinguish, on the basis of the handwriting samples alone, which group someone had been in? The answer is simple: those who had been primed with positive stereotypes were noticeably sharper, wiser and neater in what they wrote.

The same principles also apply to physiological ability. In another study, groups of seniors were asked to perform a physical activity after being exposed to either positive or negative age-stereotypes. The group that had been primed with negative aging-stereotypes showed greater cardiovascular stress and less physical fitness.⁵

If stereotypes about aging can make such a difference in the artificial environment of the laboratory, what happens when we grow up in an entire society dominated by negative age-stereotypes? The answer to this question is clear if you simply look around you. All around us we see apparent proof that growing old is associated with mental decline and cognitive disengagement. As a consequence, we begin to think (perhaps unconsciously⁶) that this type of decline is inevitable. But believing our culture's negative narrative about aging comes at a cost since "the way in which individuals view their own aging affects their functional health."⁷

What happens when someone resists the messages of our culture and chooses to adopt a positive perspective on aging? According to the research, if you have a positive self-perception of aging in your younger years, this is actually predictive of how likely you will be to avoid adverse outcomes (i.e., hospital and nursing home admissions) when you are older.⁸ Moreover, positive self-perception of aging is also predictive of continuing levels of brain fitness, as we saw earlier from the handwriting samples. In other words, you are how you think. If you think of age as necessarily and unavoidably connected with cognitive retardation, then there's a good chance this will be your experience. But if you think of age as unveiling new opportunities, a time to refine your skills, acquire new strengths and grow in wisdom, then you increase the likelihood of actually experiencing these benefits.⁹

I'm not talking about mind over matter here, as if the quality of the aging process is all in your head. Far from it! One of the reasons we are so easily influenced by negative stereotypes of aging is that our perceptions affect how we actually behave. A person with fatalistic negative aging-stereotypes is less likely to engage in activities that help preserve or increase mental and physical fitness.¹⁰

So having correct thinking is only one part of the picture: you also have to implement the right behavior. Building on this, I will be sharing specific things you can do to maintain, and even increase, mental fitness as you age. In the course of these activities, you'll learn the secret of how the Ningxia people are able maintain such amazing levels of brain fitness well into their hundreds.

Start Drinking Ningxia Red

Talk to a Young Living distributor about getting a bottle of Ningxia Red. Pour one or two ounces of this liquid into a small glass. Sip it slowly as you read the next section.

Brain Fitness in a Berry

During the prime of the Tang Dynasty (618 – 907 AD), a caravan of merchants traveling along the Silk Road stopped for the night at a roadside inn.

Upon entering the inn, the merchants beheld a young maiden whipping an elderly gentleman. Shocked to behold such a spectacle, they exclaimed, “Why do you assault this elderly man?”

The lady replied, “I am disciplining my great-grandson. Mind your own business!”

Shocked by this reply, the travelers made inquiries. Why was it that this girl's great-grandson looked so much older than she? And what had he done to deserve this punishment?

The merchants learned that the maiden was over three hundred years old. They also learned that she was punishing the old man for refusing to take a special fruit, known for its anti-aging properties.

“May I be so bold as to ask what type of fruit you take?”, the head merchant ventured to ask.

The maiden replied that it was known as the Chinese Wolfberry – a special fruit that delayed the onset of old age.¹¹

This fanciful legend encapsulates Chinese thinking about the Wolfberry (also known as the goji berry), a small red berry prized for its potential to slow down the onslaught of old age. References to this fruit can be found as far back as 200 BC in the book *Shen Nong Ben Cao Jing*, an ancient book detailing medical secrets.¹² The Wolfberry is still held in high esteem

throughout various parts of China, especially in the Ningxia region where it has long been considered effective for anti-aging properties, including its ability to restore failing eyesight.

In modern times the wolfberry continues to play a central part in the Ningxia communities. At the end of Summer, the inhabitants of this arid region gather to celebrate a two-week festival in honor of the berry. During the festival, everyone from the very young to the very old (including people well into their hundreds) will dress up in traditional costume to celebrate this amazing fruit.

Unlocking the Secrets of Ningxia

The wolfberry has recently started to be studied for its high concentration of antioxidants, vitamins and key amino acids.

The plants that produce this small red berry are part of the *Lycium* genus and exist in 10 different species in China. However, the plants that have been proved to possess the most therapeutic benefits are those of the *Lycium barbarum* variety, found only in the Yellow River flood plain of the Ningxia region. Water from the surrounding mountains brings nutrient-rich deposits into this plateau, creating a “perfect storm” of factors for the growth of a superfood found nowhere else in the world.

In researching for his book *Ningxia Wolfberry: the Ultimate Superfood*, Dr. Gary Young visited the Ningxia region to discover what made these particular wolfberries unlike fruit anywhere else on earth. Here’s what Dr. Young reported:

“*Lycium barbarum* L is grown only in a small area of northern China near the Yellow River: the Ningxia Hui Autonomous region and the Xinjiang Uygur Autonomous Region.... The Yellow River flood plain where the Ningxia wolfberry crop is concentrated derives its water from the Himalayan mountains. As the water flows through the mountain snowpack and lower Himalayan foothills, it becomes charged with an unprecedented assortment of minerals and organic nutrients. By the time it reaches the Ningxia province of Northern China it is a mineral-rich, superfertile siltwater, the likes of which is found nowhere else on earth.”¹³

Until comparatively recently, China was cut off from the Western world and few Westerners even knew about the wolfberry. One of the benefits of China opening up is that Western scientists have been able to analyze the Ningxia wolfberry. Scientists have discovered that “Ningxia wolfberries are the richest known whole food source of natural vitamin B1 (thiamin), containing 67 times that of brown rice. They contain 100 times the niacin (vitamin B3) of oat bran. Wolfberries have 3 times the amount of vitamin C (ascorbic acid) of oranges, 5 times the calcium of raw cauliflower and 2 times the beta carotene of

raw spinach. In short, Wolfberries are a true superfood.”¹⁴ Scientists have also discovered that the Ningxia wolfberry is high in the constituents Lutein and Zeaxanthin, which the American Optometric Association recommends for maintaining healthy eyesight.¹⁵

As amazing as all of this data is, the primary attraction of the Ningxia wolfberry is the unusually high concentration of antioxidants found in the fruit. Antioxidants are important for their ability to stop our cells being attacked by free radicals. Free radicals, which are produced by the body during times of mental or physical stress, cause oxidative damage.

What is oxidative damage? Dr Ananya Mandal, MD explained for *News Medical* that “Oxidative stress is essentially an imbalance between the production of free radicals and the ability of the body to counteract or detoxify their harmful effects through neutralization by antioxidants.”¹⁶ Moreover, oxidative damage “[destroys] cellular proteins, causing our cells to weaken and become susceptible to the array of symptoms we associate with aging.”¹⁷

Oxidative damage occurs normally during the aging process,¹⁸ and there is evidence that the efficiency of the anti-oxidant system decreases after 45 years of age.¹⁹ These and other observations have given credence to what is known as “the free-radical theory of aging”, which hypothesizes that the symptoms associated with the aging process result from the build-up of oxidative stress in the body caused by free-radicals. Though this theory remains controversial, a voluminous body of empirical studies seem to support the free-radical theory of aging.²⁰ Even the Department of Agriculture announced in 2010 that “various chronic and degenerative diseases...may be attributed, in part, to oxidative stress” adding that “Oxidative stress has also been implicated in the process of aging.”²¹

If it is true that oxidative damage contributes to the negative symptoms associated with the aging process, then a simple solution for delaying these symptoms is to ingest foods with the highest concentration of anti-oxidants.²² Remember, oxidative damage increases when the body doesn’t have enough antioxidants to neutralize the effects of free-radicals.

But how do we know which foods have the highest concentration of antioxidants? Scientists have developed a method for testing the level of antioxidants within a food. This method, known as Oxygen radical absorbance capacity (ORAC),²³ basically “pits a nasty bunch of free radicals against the synergistic effect of the antioxidants found in a given food. ORAC measures how powerful the natural combination of antioxidants in a given food are by seeing just how well they do in ‘absorbing’ (or incapacitating) a particular free radical.”²⁴

In 2010 the USDA wrote that “Diets rich in fruits and vegetables are considered to be an excellent source of antioxidants”²⁵ and published tables showing the ORAC value of 326 food items. The Department subsequently withdrew their support for the ORAC method of testing after ORAC values began being misused for marketing purposes.²⁶ However, the scientific basis for ORAC testing continues to be affirmed throughout the medical literature.²⁷

After Dr. Gary Young's trip to China to research the Ningxia wolfberry, one of Young's researchers, Marc Schreuder, sought for a laboratory that could perform ORAC testing on the Ningxia wolfberry. Schreuder found that the only laboratory that could perform the ORAC protocol was Brunswick Laboratories in Wareham, Massachusetts.²⁸ In November 2000, Marc submitted a sample of dried Ningxia wolfberries to Dr. Wang at the Brunswick laboratory for ORAC antioxidant analysis. In Gary Young's book *Ningxia Wolfberry*, he explained what they discovered when the laboratory analyses were complete:

“The results were astonishing. According to the ORAC results, dried Ningxia wolfberries had five times the antioxidant power of prunes, 10 times the antioxidant power of oranges, 12 times the antioxidant power of raisins, and 55 times the antioxidant power of cauliflower. In fact, according to the published ORAC data, the dried Ningxia wolfberry had the highest known ORAN score for any whole food.”²⁹

The evidence throughout various scientific journals support and expands these findings,³⁰ in addition to highlighting the anti-aging properties of the Ningxia wolfberry (*Lycium barbarum*).³¹ One of my favorite studies was published by *The Journal of Alternative and Complementary Medicine* in 2008. They reported on the result of a randomized, double-blind, placebo-controlled clinical trial exploring the general effects when healthy adults drank wolfberry juice for 14 days. The results showed that drinking the wolfberry juice for 14 days “increases subjective feelings of general well-being, and improves neurologic/psychologic performance and gastrointestinal functions.”³² In case you don't know, “neurologic/psychologic performance” is how scientists refer to brain fitness.

I hope that by now you're thoroughly excited about this little berry. But wait, it gets even better. You may have already guessed, but the juice you've been sipping ever since activity 2 is made from the Ningxia wolfberry!!

After Gary Young's trip to Ningxia, he worked with scientists in China and America to make this superfruit available to the world. Gary contracted with local farmers in the Ningxia province and began on-site production of a special beverage using the puree of crushed Ningxia berries. By crushing the berries when they're still fresh and immediately packaging them in the beverage, people throughout the world can enjoy the amazing health benefits of the Ningxia wolfberry. The drink, NingXia Red, also incorporates various essential oils known for the antioxidant properties.

As you begin drinking the Ningxia Red juice, expect that after a few weeks you will experience the same improvement in “neurologic/psychologic performance” as those who participated in the randomized, double-blind, placebo-controlled clinical study mentioned earlier.

Stop Surviving and Start Living!

In his book *The Brain That Changes Itself*, Norman Doidge explained that cognitive decline often occurs in the older years because a person stops putting themselves in situations where he or she will be stretched. By mid-life, most people are on autopilot, consolidating strengths they've already developed instead of working to acquire new skills. Although there's nothing wrong with this, it can lead to the brain growing weak and lazy. This pattern can be reversed through activities that challenge and stretch the brain, including:

- memorizing large chunks of literature;
- learning a foreign language;
- doing online brain-fitness exercises every day from sites like Posit Science (<http://www.brainhq.com/>) or Lumosity (<https://www.lumosity.com/>)
- finding a field of study that is new to you and then attempting to master it;
- doing logic puzzles every day (my favorite are those sold by ThinkFun: <http://www.thinkfun.com/>)
- regular meditation

Most people instinctively understand why memorization exercises or logic puzzles help to keep the aging brain fit and youthful. But why the last item on the above list, meditation?

Believe it or not, by meditating you exercise the brain just as much as learning a foreign language or acquiring a new skill. You see, when you engage in focused meditative breathing, you are going against the grain of how your brain is accustomed to function. Insofar as this stretches the brain, research shows that it can actually turn back the clock on the brain's aging process. I'm not making this up: researchers have been finding that "a growing body of research shows that...meditation may be able to offset normal age-related cognitive decline or even enhance cognitive function in older adults."³³

But how does meditative breathing go against the grain of how the brain normally functions? To answer this question, we need first to understand something important about how the brain works.

Most of the time the human brain is a distraction-machine. It's been critical to human survival for our brains to be able to engage in what Nicholas Carr called "past-paced, reflexive shifts in focus".³⁴ Without this attention-shifting proclivity, our hunter-gatherer ancestors might have missed crucial food-sources and other opportunities. Moreover, the impulse to constantly shift our focus from one thing to another reduces the odds of being surprised by a predator. Thus, the survival of man and woman depended on remaining in a state of continual vigilance, alert to actual and potential threats.

Even for those of us not living in primitive conditions, the brain's tendency to constantly shift attention is deeply rooted in our primal survival mechanisms. Many of us find that a relentless (and usually unconscious) fear for our own survival drives our brain to remain constantly vigilant against perceived threats to our social, physical, psychological, emotional and reproductive needs. As a result, we find it hard to focus on any one thing for very long without our brain throwing up threats to your survival for you to respond to. These threats could include things like:

- obsessing over threats to our social needs, including wondering what other people might be thinking about us;
- imagining how we will respond to various future scenarios;
- mentally rehearsing everything we need to do;
- worrying whether our emotional needs are being met;
- focusing on what we will do next instead of paying attention to what we are doing right now;
- thinking about sex, food or resources (especially financial resources);

Without even consciously choosing to listen to these types of thoughts, they typically flow through our brains automatically, disrupting inner-stillness and scattering our focus. Because these types of thoughts are rooted in primal fears for our survival, they have enormous power. If you don't believe me, try a little experiment. Go into an empty room and determine to sit in stillness for 5 minutes. Watch how quickly your attention defaults to some of the survival-based anxieties mentioned above.

Survival-based fear and anxiety are not malfunctions of the brain: these emotional reactions are integral to our harm-avoidant systems. As a reaction to real or perceived threats, the emotions of fear and anxiety provide valuable incentives for us to avoid danger. The problem occurs when these emotions become habitual and keep operating even during times of safety.

When a person's harm-avoidant systems are underworking, the person is in danger of becoming passive in the face of risks, accidentally placing herself in a perilous situation or becoming under-motivated to engage in long-term planning. This is often the case with children, who need to be trained to recognize danger in the world. As a child's harm-avoidant system begins being trained, the child learns not to cross the road without an adult, not to touch stray dogs and how to simulate the future consequences of present actions. The problem is that as we grow older and experience frequent threats to our security and well-being, the brain's harm-avoidant system can begin overworking leading to the mind becoming consumed with unhealthy levels of fear and anxiety. When this happens, a person has less mental resources available for the ingredients that go into brain fitness, including creativity, memory, focus, gratitude, emotional intelligence, logical reasoning, empathy, and so on. In short, living from a place of survival can make a person stupid. In fact, research has shown that anxiety symptoms are correlates and predictors of cognitive impairment in older adults.³⁵

Maybe you're reading this and thinking "*O my God, that's me! What can I do about this?*" Simple: meditate. When you meditate, you purposely say no to fear and anxiety by choosing to conform your body (your breathing, your posture, your heartrate and your brain) to the truth that you are safe. When you meditate, you purposely say no to survival-based mental distractions through committing to focus on just one thing, whether your breathing or a simple prayer.

For those just starting to develop the habit of meditative breathing, it often feels unnatural and even frightening. That's normal. The brain's survival instincts find stillness threatening. Our survival instincts feel safe when we live from a place of "past-paced, reflexive shifts in focus." When you choose to let your thoughts be at rest and embrace stillness, you're saying to your brain that you have arrived at a place of safety where you no longer need to be controlled by your survival instincts. In short, you're stretching your brain to become youthful again when you enjoyed the freedom of not having any cares.

It's time to get out your diffuser and put all of this into practice with some deep breathing.

Smell, Breathe, Relax

Start diffusing some essential oils and meditate for 5 minutes. Breathe in and out deeply, trying not to think about anything other than the breathing itself and the smell of the aroma.

If you want, you can add a little variety by slowing your breath down to 5 breaths a minute. Get a clock that you can hear ticking every second, so your ear can keep track of time without having to stare at a device. Then breathe in for 4 seconds, hold it for another 4 seconds, and breathe out for 4 seconds. If you keep doing this for sixty seconds, then you will have gone an entire minute on only five breaths.

As you do this, distracting thoughts will float into the brain. That is normal. Instead of fighting against these thoughts, or judging yourself for having them, simply view these thoughts as something outside yourself and gently draw your attention back to your breathing. By doing this, you will increase the brain's capacity for conscious moment to moment awareness through paying attention. You will also be turning back the clock on the brain as you consciously embrace the type of safety you experienced as an infant, before you were burdened down with the cares of life.

¹ This article originally appeared at <http://www.salvomag.com/unpragmatic-thoughts/?p=3217>

² These accounts were recorded in J.A. Tosti, "The Secret to Living a Healthful, Productive Life Beyond 100 Years Old," *Bio/Tech News*, 2007, 2.

³ Xinhua News Agency, "Ethnic living habits prove conducive longevity", cited in Gary Young, Ronald Lawrence, and Marc Schreuder, *Ningxia Wolfberry: The Ultimate Superfood: How the Ningxia Wolfberry and Four Other Foods Help Combat Heart Disease, Cancer, Chronic Fatigue, Depression, Diabetes and More* (Orem, UT: Essential Science Publishing, 2006), iv.

⁴ I am using the word "youthful" in its qualitative sense to refer to vitality and fitness irrespective of age.

⁵ Becca R. Levy et al., "Reducing Cardiovascular Stress With Positive Self-Stereotypes of Aging," *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 55, no. 4 (July 1, 2000): P205–13, doi:10.1093/geronb/55.4.P205.

⁶ Aging self-stereotypes have been shown to operate without conscious awareness, influencing cognitive and physical outcomes. Aging-stereotypes "are embodied when their assimilation from the surrounding culture leads to self-definitions that, in turn, influence functioning and health." Such self-definitions have been shown to "(a) become internalized across the life span, (b) can operate unconsciously, (c) gain salience from self-relevance, and (d) utilize multiple pathways." Becca Levy, "Stereotype Embodiment: A Psychosocial Approach to Aging," *Current Directions in Psychological Science* 18, no. 6 (2009): 332–36.

⁷ Becca R. Levy, Martin D. Slade, and Stanislav V. Kasl, "Longitudinal Benefit of Positive Self-Perceptions of Aging on Functional Health," *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 57, no. 5 (September 1, 2002): P409–17, doi:10.1093/geronb/57.5.P409.

⁸ "One study found, as predicted, that individuals with more positive self-perceptions of aging in 1975 reported better functional health from 1977 to 1995 (controlling for baseline measures of age, functional health, gender, loneliness, race, self-rated health, and socioeconomic status; Levy, Slade, & Kasl, 2002). The effect increased over six waves. These findings are given larger meaning by functioning problems (that occur in one out of five individuals over the age of 70) predicting a number of adverse outcomes, including hospital and nursing home admissions (Branch & Lu, 1989; Stump, Johnson, & Wolinsky, 1995)." Becca R. Levy, "Mind Matters: Cognitive and Physical Effects of Aging Self-Stereotypes," *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 58, no. 4 (July 1, 2003): P203–11, doi:10.1093/geronb/58.4.P203; See also Levy, Slade, and Kasl, "Longitudinal Benefit of Positive Self-Perceptions of Aging on Functional Health."

⁹ The and other positive benefits to aging were discussed in Gene D Cohen, *The Mature Mind: The Positive Power of the Aging Brain* (New York: Basic Books, 2005).

¹⁰ For example, it's been shown that older adults will often withdraw from society in preparation of death. A common pattern in America is that retirement correlates with social disengagement. Social disengagement, in turn, accelerates a spiral of cognitive decline. Elaine Cumming and William E Henry, *Growing Old; the Process of Disengagement* (New York: Basic Books, 1961).

¹¹ Yoko, "Walks in the Apricot Forest: Chinese Wolfberry," *Pure Insight*, May 5, 2003, <http://www.pureinsight.org/node/1590>.

¹² Peter Bucheli et al., "Biomolecular and Clinical Aspects of Chinese Wolfberry," in *Herbal Medicine: Biomolecular and Clinical Aspects*, ed. Iris F. F. Benzie and Sissi Wachtel-Galor, 2nd ed. (Boca Raton (FL): CRC Press/Taylor & Francis, 2011), <http://www.ncbi.nlm.nih.gov/books/NBK92756/>.

¹³ Young, Lawrence, and Schreuder, *Ningxia Wolfberry*, 25.

¹⁴ Tosti, "The Secret to Living a Healthful, Productive Life Beyond 100 Years Old," 5.

¹⁵ "Lutein & Zeaxanthin," *American Optometric Association*, accessed November 29, 2016, <http://www.aoa.org/patients-and-public/caring-for-your-vision/diet-and-nutrition/lutein?sso=y>.

¹⁶ Dr Ananya Mandal, MD, "What Is Oxidative Stress?," *News Medical*, March 2, 2010, <http://www.news-medical.net/health/What-is-Oxidative-Stress.aspx>.

¹⁷ Tosti, "The Secret to Living a Healthful, Productive Life Beyond 100 Years Old," 4.

¹⁸ "...aging per se increases oxidative stress..." Víctor Manuel Mendoza-Núñez et al., "Aging-Related Oxidative Stress in Healthy Humans," *The Tohoku Journal of Experimental Medicine* 213, no. 3 (2007): 276, doi:10.1620/tjem.213.261.

¹⁹ Dean P. Jones et al., "Redox Analysis of Human Plasma Allows Separation of pro-Oxidant Events of Aging from Decline in Antioxidant Defenses," *Free Radical Biology & Medicine* 33, no. 9 (November 1, 2002): 1290–1300.

²⁰ "An exhaustive literature exists that support the notion that aging is associated with the accumulation of oxidative damage to multiple different cellular macromolecules..." Yael H. Edrey and Adam B. Salmon, "Revisiting an Age-Old Question Regarding Oxidative Stress," *Free Radical Biology & Medicine* 0 (June 2014): 368–78, doi:10.1016/j.freeradbiomed.2014.03.038; "Many studies have demonstrated that oxidative stress and mitochondrial dysfunction are two important factors contributing to the aging process." Hang Cui, Yahui Kong, and Hong Zhang, "Oxidative Stress, Mitochondrial Dysfunction, and Aging," *Journal of Signal Transduction* 2012 (October 2, 2011): e646354, doi:10.1155/2012/646354; "...studies strongly suggest that free radical reactions play a significant role in the deterioration of the cardiovascular and central nervous systems with age. The free radical theory of aging provides reasonable explanations for age-associated phenomena". D. Harman, "The Aging Process," *Proceedings of the National Academy of Sciences of the United States of America* 78, no. 11 (November 1981): 7124–28.

²¹ David B Haytowitz and Seema Bhagwat, "USDA Database for the Oxygen Radical Absorbance Capacity (ORAC) of Selected Foods, Release 2" (U.S. Department of Agriculture; Agricultural Research Service; Beltsville Human Nutrition Research Center; Nutrient Data Laboratory, May 2010), 1, http://www.orac-info-portal.de/download/ORAC_R2.pdf.

²² B N Ames, M K Shigenaga, and T M Hagen, "Oxidants, Antioxidants, and the Degenerative Diseases of Aging.," *Proceedings of the National Academy of Sciences of the United States of America* 90, no. 17 (September 1, 1993): 7915–22.

²³ For a scientific explanation of this method and its effectiveness, see Guohua Cao, Helaine M. Alessio, and Richard G. Cutler, "Oxygen-Radical Absorbance Capacity Assay for Antioxidants," *Free Radical Biology and Medicine* 14, no. 3 (March 1, 1993): 303–11, doi:10.1016/0891-5849(93)90027-R.

²⁴ Dr Jonny Bowden, "ORAC No More!," *Huffington Post*, July 16, 2012, http://www.huffingtonpost.com/dr-jonny-bowden/orac-_b_1594115.html.

²⁵ Haytowitz and Bhagwat, "USDA Database for the Oxygen Radical Absorbance Capacity (ORAC) of Selected Foods, Release 2," 1.

²⁶ The USDA's updated statement can be found at "Oxygen Radical Absorbance Capacity (ORAC) of Selected Foods, Release 2 (2010) : USDA ARS," *United States Department of Agriculture: Agricultur Research Service*, accessed November 29, 2016, <https://www.ars.usda.gov/northeast-area/beltsville-md/beltsville-human-nutrition-research-center/nutrient-data-laboratory/docs/oxygen-radical-absorbance-capacity-orac-of-selected-foods-release-2-2010/>.

²⁷ for a summary of this literature in response to the USDA's decision no longer to endorse ORAC testing see Ronald L Prior, "Antioxidant Food Databases? Valuable or Not?" (Brunswick Laboratories), accessed November 29, 2016, http://www.brunswicklabs.com/hs-fs/hub/153979/file-17993920-pdf/docs/a_response_to_the_usda_orac_statement.pdf.

²⁸ Young, Lawrence, and Schreuder, *Ningxia Wolfberry*, 48.

²⁹ Ibid.

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