

Brain Health for the Self-Empowered Person

What does it now mean to have a healthy brain, and how might people foster one for better, more self-empowered aging?

More individuals than ever before are taking the time to learn about the human brain and the many ways they can shape it for health. This might mean reducing stress and anxiety, increasing balance and emotional well-being, enhancing memory or focus, increasing energy and creativity, and living a life that is socially, cognitively, spiritually, nutritionally, and intellectually integrated.

Some may still believe the human brain is a rigid and fixed system capable only of degeneration. Others may think that while leading a healthy lifestyle is not harmful to the brain, it provides minimal value because we have no cure for neurodegenerative diseases such as Alzheimer's. The study of neuroscience, however, has expanded to embrace a new understanding of the human brain—one indicating that individuals can take personal control in shaping their brains for health.

This issue of *Generations* addresses the idea that people now are aging on their own terms, exerting more control over their health and well-being. Brain health is a particularly important part of this goal because the brain is the epicenter for nearly all of the human body's functions. Much of what well-being and health refer to is a person's sense of being and remaining in balance emotionally, psychologically, phy-

sically, and spiritually. A brain that is in balance can function at near-peak potential and directly promote health. There now is renewed interest in this mind-body interaction and the potential power the human brain has over the body, simply through mindset (Clark et al., 2014; Newberg and Waldman, 2010). Man is the only animal that can guide his thoughts to generate feelings of happiness or misery.

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The implications for brain-centered or empowered health are enormous and beyond our complete understanding at this time. However, neural energies represent a great new frontier for using the brain to shape the body's health and functioning (Nussbaum, 2010).

In this article, I will underscore the importance of brain health and how each person has the opportunity and empowerment to shape their brain for health. This information is biased by my personal take on brain health that focuses on lifestyle, and that has been developed and applied over the past fifteen years (see www.brainhealthctr.com). The material shared in this

article will build on the 2011 issue of *Generations* (American Society on Aging [ASA], 2011) about the “Neuroscience of the Aging Brain,” which reviewed the scientific basis for lifestyle and brain health.

Defining Brain Health

Neuroscience has taught us more about the function of the human brain in the past twenty years than in our entire history, and the general public is more educated on the basics of the brain. While it is true that we still know very little about the brain and that we have no cure, or even prevention, for neurodegenerative diseases such as Alzheimer’s, we do have the ability to shape our brains with lifestyle choices that foster a healthy brain (Nussbaum, 2003).

Self-education and self-empowerment for brain health are critical because most surveys indicate that baby boomers particularly prioritize preventing loss of memory and preserving cognitive health (ASA, 2006). A first step for the field of brain health is to agree on a consistent definition of brain health. I define brain health as: “The result of a dynamic process in which a person engages in behaviors and environments to shape the brain toward a healthier existence.” This definition underscores the important relationship between the environment and the person at a neuropsychological (brain and behavior) level, and it puts the focus on the individual being empowered and able to shape his or her brain toward a healthier existence.

Core concepts of brain health

Self-empowerment begins with education, and the following information encapsulates several core concepts of brain health:

Brain health needs to be a comprehensive and holistic approach because the brain is a highly complicated system that is cognitive, emotional, motoric, spiritual, and behavioral.

Plasticity refers to a brain that is highly dynamic, constantly reorganizing, and malleable. Plasticity enables the brain to be shaped by a

multi-sensory spectrum of environmental input that includes thought.

Brain resilience is a product of plasticity in which particular parts of neurons (brain cells) react favorably to environmental input by developing increased dendritic formations and cellular connections (synaptic density). This translates into a type of intellectual or cognitive protection that represents health and also helps to potentially delay onset of disease (Wilson, 2011).

Neurogenesis is another product of plasticity in which new brain cells are generated. The human brain demonstrates neurogenesis primarily in the hippocampus, a structure critical for new learning and spatial reasoning (Eriksson et al., 1998).

My **Brain Health Lifestyle** (Nussbaum, 2003; Nussbaum, 2007) involves a proactive and lifelong application of specific behaviors that are organized into five major domains: physical activity; mental stimulation; spirituality; socialization; and, nutrition.

Brain Health is not about disease prevention, but about leading a lifestyle, supported by science, that helps to promote brain resilience and facilitates emotional, cognitive, motoric, spiritual, and relational health. It is a proactive process that is lifelong and not limited by age. Further, Brain Health represents a deeply personal journey of self-discovery, and trial and error, and emphasizes a focus on lifestyle to reach peak potential, integration, and to maximize access to our life story.

Novelty and complexity are two critical factors necessary for brain health. If a person makes a point to take on new and complex tasks, there is a good chance that he or she will be engaged in an activity that stimulates resilience and brain health.

A brain exposed to an environment with proper input and care (such as activities that promote brain resilience, reduce stress, provide proper nutrition, etc.) will function closer to peak potential and can result in more positive outcomes in the classroom, boardroom, on the

athletic field, in relationships, and will most likely increase inner peace and balance.

Taking Personal Control of Brain Health: A Call to Action

Health promotion involves changing our behavior, and humans resist change. Consider how hard it may be to make such changes as sitting in a different chair at the dinner table or sleeping on a different side of the bed. These are small, but difficult, challenges. Wellness programs typically result in low compliance, even though most of us understand that leading a healthy lifestyle is good for us. Why do we resist? My belief is that a change in behavior requires two factors: First, a person needs to understand why change is necessary. Second, the change needs to be personal.

Brain health is as personal as it gets because adopting a self-empowered healthy lifestyle for the brain involves a direct shaping of one's iden-

tity and personal development. A person's brain contains his or her autobiography—a life story that is a most precious gift. Brain health means maintaining access to that life story for as long as possible so it can be shared with others. Leading a proactive brain-healthy lifestyle fosters such access.

A brain-healthy lifestyle

Research is robust on the relationship between particular behaviors and brain structure and function. My work on the Brain Health Lifestyle has been to integrate this research into a meaningful brain-healthy lifestyle, organized in five integrated domains, to educate the general public and permit individuals to apply such a lifestyle (see Nussbaum, 2010). This lifestyle is about health promotion, not disease prevention or clinical intervention, and involves an ongoing self-inspection of one's lifestyle as well as an openness to change. The following provides a

Brain Health Begins with Education

A basic education about the brain is crucial for anyone seeking to shape his or her brain for health. To that end, the following are basic facts about the brain:

- The human brain weighs about three pounds.
- Each brain has hundreds of millions of brain cells connecting with nearly 10,000 other brain cells.
- The brain is nearly 60 percent fat that insulates nerve tracts to rapidly transmit information between cells.
- The brain demands 25 percent of the blood from each heartbeat.
- The brain continues to learn, create, and produce—regardless of age.
- The cortex (grey matter) is the site of conscious information processing, while the limbic system and subcortical structures (white matter) tend to help with emotional, procedural, and subconscious processing.
- The brain is affected by sleep, nutrition, education, stress, anxiety, mood, pain, safety, poverty, fear, love, hope, and many other factors, all of which promote or impede brain health.
- Lifestyle remains a critical factor for overall health (Kvaavik et al., 2010) and for brain health (Barnes and Yaffe, 2011).
- Female and male brains process information differently.

few basic tips for consumers to feel empowered to begin a brain-healthy lifestyle.

Physical activity

Humans need to move, and research has underscored the general negative health outcomes of sedentary behavior. This is also true for the human brain (remember, the brain demands 25 percent of blood from each heart-beat), where research suggests a causal effect of movement to enhanced cognition and volumetric changes in the hippocampus (Weinstein and Erickson, 2011).

These five behaviors foster brain health: walk a mile daily at a brisk pace; engage in aerobic exercise several times a week; dance more regularly; reduce time spent sitting and in sedentary behavior; and, stretch, consider yoga, and engage in healthy weight training.

Mental stimulation

The human brain wants to be stimulated and to engage in the novel and complex. The brain will react favorably to such stimulus, developing brain resilience (Wilson, 2011). People should consider participating in novel and complex activities and reduce rote and passive activities. Some examples: learn a new language, including sign language (which is great for babies); travel to new places and use new routes within familiar settings; play a musical instrument; engage in the arts and work on creative pursuits; play board games and do daily brain fitness exercises; read and write; and, try improvisation.

Spirituality

Chronic stress is known to be bad for our overall health and for the brain (Sapolsky, 1998), as it can lead to inflammation. The human brain seeks balance and inner peace so that our cognitive, emotional, spiritual, and motoric functions perform well. The new field of neurotheology is exploring the relationship between religious and non-religious forms of spirituality

and the structure and function of the human brain (Koenig, 2001; Newberg, 2011).

Some potential spiritual practices to consider: learn how to meditate and do so each day for twelve minutes; engage in daily prayer and practice complete forgiveness; practice yoga on a regular basis; engage in deep breathing for five minutes, three times daily; believe in things greater than yourself; engage in progressive muscle relaxation daily for ten minutes; work on visualization and imagery daily; focus on and repeat positive ideas, emotions, and feelings each day; and, give yourself thirty minutes a day to stop and not be task-oriented.

Nutrition

There is a field known as nutritional neuroscience, which is dedicated to food and its effects upon the brain (Turner, 2011). The brain is 60 percent fat, and proper fats can help with our energy, cognition, and motor skills. The Mediterranean Diet (www.mediterraneandiet.com), which contains a high amount of vitamins, minerals, essential fatty acids, high fiber sources of carbohydrates, phytonutrients, and low amounts of processed foods is one of the more researched diets for brain health that underscores the importance of eating the right fats and including antioxidants. A proper diet can help to reduce overall inflammation, which is so important to brain and body health.

Adopting a self-empowered healthy lifestyle for the brain involves a direct shaping of one's identity and personal development.

The best nutrition for brain health can mean: increasing consumption of fish to about eight ounces a week; consuming six handful servings of fruits and vegetables a day; increasing intake of unsalted almonds and walnuts; increasing intake of beans; reducing overall intake of red meat and consuming healthy proteins such as legumes, nuts, seeds, grains, and vegetables;

eliminating trans fats and reducing sugar intake; and, reducing caloric intake (with guidance from a doctor) as one ages into later life.

Socialization

The human animal is a gregarious animal; research consistently has shown that isolation, particularly as we get older, is bad for the brain. Depression and dementia correlate with isolation and loneliness (Ristau, 2011).

To optimize socialization, humans should do the following: define a role and purpose in life, and live accordingly; continue to develop a robust network of friends; be forgiving and heal family tensions; do not isolate oneself during retirement; engage in social functions, recreation, and conversation with others; meet new people and learn from others; and, use technology to remain connected with others.

Policy considerations for brain health

The following are my personal policy recommendations for brain health, derived from and honed over years of working on this topic:

- Brain health education and lifestyle application should begin at the earliest stages of life, with a “brain health toolkit” of information distributed to new parents.
- All babies should have the opportunity to learn sign language, as this has been shown to enhance articulatory ability and lead to a higher IQ, once oral language develops (Acredolo and Goodwyn, 2000).
- Early childhood environments are critical for brain development and policy measures concerning nutrition, breastfeeding, and oral health. As well, the effects of violence in the home and poverty, and other factors, need to be framed around their potential long-term negative consequences to the brain (Mortensen et al., 2002; Mocerri, 2000).
- Our educational system should have basic curricula on the human brain that begins in elementary school, and our current approach to learning needs to be reframed around brain health to maximize learning and creativity. This includes changing the hours of the school day to permit more sleep; enhanced nutritional options for brain performance, including an emphasis on eating breakfast; increased physical movement while learning in the classroom (stationary bikes rather than chairs, and yoga); meditation to start each day; and, the use of sensitive measures, including neuroimaging, to better understand how such brain health-promoting changes impact the structure and learning/innovation (not just test scores) of the developing brain.
- We should institute national policy measures preventing the impact of head injury(ies) resulting from competitive sports, particularly when such sports are played before age 10. We now know the negative effects upon quality of life and healthcare services use—from increased risk of dementia to traumatic brain injury—due to playing contact sports.
- There should be an integration of the brain-healthy lifestyle into all corporate wellness programs and all private insurance and government-run healthcare plans. Also, there should be small brain icons next to brain-healthy foods in grocery stores and on restaurant menus.
- Annual cognitive screens should be part of the annual wellness check, beginning at age 50, so that everyone has a way to measure their brain performance and can work with their physician on lifestyle changes to maintain brain health. The cognitive screen is now part of the annual Medicare wellness visit for people ages 65 and older.
- We should develop brain health curricula for the medical, nursing, and ancillary health professions so our healthcare professionals keep current on practical tips and tools to help patients with their brain health.
- There should be a national campaign to educate the public about brain health, with specifics that would lead to protecting the head and brain (mandatory helmets, limits on text-

ing and screen time, and tips on dental health and nutrition and their relationship to brain health, among other items).

- We should encourage the healthy use of mobile devices and new technologies to promote brain health in a fun and personalized way. While such devices are now common for a variety of body functions, there is a need for consumer-friendly and non-clinical brain health technologies. One example is the RC21X (named after baseball player Roberto Clemente who died helping others) that provides a consumer-based software tool that measures fifteen neurocognitive and neuromotor functions in a fun and engaging gaming platform (see one example at www.RC21x.com).


Conclusion

I recall sitting in the audience for the first MindAlert Lecture by Dr. Marian Diamond at the 2001 Joint Conference between the American Society on Aging and the National Council on Aging. She explained the relationship between environmental input and the structure and function of the rodent brain. More specifically, socialization, mental stimulation, and physical activity were found to have a positive effect on the hippocampus, a region critical to memory and spatial processing. The natural question for me was “Does the same relationship between environmental input and brain structure and function exist in humans?” and I set my career course to explore this important question.

I was fortunate to be invited to deliver the second MindAlert Lecture in 2002, which focused on brain health for the human brain. At the time, brain health was not a common phrase and certainly not a well-studied area in humans. My review of the literature at the time led to a publication, *Brain Health and Wellness* (Nussbaum, 2003), which shared research on environmental shaping and plasticity in animals and humans, and set the foundation for my Brain Health Lifestyle.

This ignited my ongoing work on the topic of brain health, and my belief that lifestyle is a primary conduit to brain health across the lifespan. My personal journey in brain health has witnessed a huge expansion of a new field of study and application for research and individuals. For the past fifteen years, I have worked to bring my ideas around brain health to all who are interested in shaping their brains. My approach has spread internationally and into the educational, corporate, health, technology, athletic, spiritual, senior, media, and consumer settings. Recently, I also opened my first Brain Health Center (www.brainhealthctr.com) that applies my holistic Brain Health Lifestyle for all interested consumers. The primary message is that the human brain can be shaped for health across the lifespan and age does not matter.

Brain health education and lifestyle application should begin at the earliest stages of life with a “brain health toolkit” of information to new parents.

Finally, my philosophical approach to brain health is about health promotion and not disease prevention. While my Brain Health Lifestyle is based in research, it is not meant as a clinical intervention or as a means of disease prevention. We have learned much about the human brain, but we still know very little overall; our claims must be kept realistic and ethical to maintain the public trust. We can feel confident, however, that our brains deserve increased attention, care, and a lifelong shaping for health—beginning right now, today. 

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