



Alzheimer's Drug Discovery Foundation

A Practical Guide to

ACHIEVING
AND
MAINTAINING
COGNITIVE
VITALITY
WITH AGING

Cognition is the process of knowing and thinking. It is a combination of skills, including knowledge acquisition, attention, intuition, memory, learning, language, perception, skilled motor behaviors, decision-making, goal-setting, planning, and judgment. Cognitive vitality results from a combination of reserve brain capacity, acquired knowledge, and a degree of protection against brain injury. People with high cognitive vitality remain intellectually sharp as they age. For frail older people, cognitive vitality may make the difference between dependent and independent living. For healthy older people, cognitive vitality has a tremendous impact on their quality of life.



Introduction

Cognitive aging is the term used to describe changes in memory, learning and other mental processes associated with aging. These changes are usually mild and do not impair a person's ability to function on a daily basis. In some people, cognitive impairment with aging affects quality of life and daily function, particularly those who suffer from dementia most commonly caused by Alzheimer's disease. The good news is that cognitive impairment with aging is preventable.

Through lifestyle interventions and effective management of chronic medical conditions, attaining and maintaining cognitive health is possible. Being mentally, physically, and socially active – at work or in retirement – are keys to successful aging. As a public charity dedicated to the early detection, prevention and treatment of Alzheimer's disease and cognitive aging, the Alzheimer's Drug Discovery Foundation (ADDF) developed this guide to provide adults of all ages with practical and scientifically-based strategies to achieve and maintain cognitive vitality.

A handwritten signature in black ink that reads "H. Fillit".

HOWARD FILLIT, MD

EXECUTIVE DIRECTOR

ALZHEIMER'S DRUG DISCOVERY FOUNDATION



THE AGING BRAIN

The human brain uses neurons (nerve cells) to transmit information and communicate with the environment and with the body. As the brain ages, the rate at which its neurons receive and process information slows. This, in turn, affects our *fluid intelligence* (ability to manipulate information) by slowing down our learning, recall, and multitasking skills.

Memory lapses and slowed retrieval of information are a normal part of the aging process and vary from person to person. Older adults are likely to have trouble recalling common items such as names, appointments, location of objects, telephone numbers, and words. Individuals experiencing normal age-related memory loss soon retrieve what they are having difficulty recalling, whereas those with cognitive impairment from disease will never remember.

Cognitive aging does have advantages. *Crystallized intelligence* (knowledge gained over time or by experience) increases with age, allowing older adults to reflect and ponder situations more effectively, to take a broader view, and to make decisions with less information. This is sometimes called “wisdom.” Vocabulary, stored experience, and special expertise also increase with age.

Contrary to popular belief, our neurons do not die off as we age. In fact, when stimulated, the older brain is capable of neurogenesis, the process of making new brain cells.



EIGHT ACTIONS THAT PROMOTE COGNITIVE VITALITY

For the brain to age successfully, its neurons must remain vital. The key to cognitive health, then, is to protect the neurons from damage and promote their vitality. The eight strategies discussed below have a biological basis in scientific research, and enable individuals of all ages to take a proactive approach to maintaining and achieving cognitive vitality with aging.

It is never too late to take concrete steps to maintain cognitive health, but the sooner you start the better. Indeed, medical and lifestyle prevention in mid-life will improve your cognitive health in late life.

“Aging is not ‘lost youth’ but a new stage of opportunity and strength.”

– BETTY FRIEDAN, WRITER

1 Manage Chronic Illnesses: See your doctor

It is critical for middle aged and older individuals to manage medical illnesses associated with diminished cognitive function, particularly hypertension, high cholesterol, obesity and diabetes. Indeed, all the risk factors that we typically think of for heart disease are also thought to be risk factors for cognitive decline (see table on page 4). Learn all you can about your condition in order to take responsibility for your care. Most importantly, see your doctor(s) on a regular basis and take your medications.

Older adults should also get their eyes and ears checked regularly. Sensory aids such as eyeglasses and hearing aids maximize our interaction with the environment and other people, which helps to maintain and improve cognitive vitality.



MEDICAL RISK FACTORS FOR COGNITIVE DECLINE

Hypertension

Heart disease

Diabetes

Elevated cholesterol

Vitamin B12 deficiency

Transitory ischemic attacks (“mini strokes”)

Head trauma

Environmental exposure to toxins,
particularly lead

Depression

Sleep Disorders

Obesity

Sensory (vision or hearing) problems



2 Physical Exercise: It's good for your brain too

Physical activity increases blood flow to the brain, and stimulates the proteins and molecules that keep our neurons healthy and strong. Exercise has also been shown to reduce stress and depression and improve mood. To maintain cognitive vitality, adults should engage in moderate-intensity aerobic exercise for at least 30 minutes, three to five days per week. Physical exercise consists of aerobic, strength training and flexibility.



The following exercises are fun and effective ways to stay active:

| AEROBIC TRAINING | |
|------------------|--------------------------|
| Brisk Walking | Climbing Stairs or Hills |
| Aerobics | Racquet Sports |
| Hiking | Bicycling |
| Swimming | Skiing |
| Aqua Aerobics | Yard Work |
| Jogging | Dancing |
| | Martial Arts |

| FLEXIBILITY/BALANCE BENEFITS | STRENGTH TRAINING |
|------------------------------|-------------------|
| Tai Chi | Lifting Weights |
| Yoga | Martial Arts |
| Pilates | Yoga |
| Dancing | Pilates |

3 Nutrition: Eating brain food

Studies show that low fat and low calorie diets have the highest correlation with cognitive health. This may be due to their effects on preventing vascular disease in the brain, or by other mechanisms.

Researchers are also investigating the role of antioxidants in preserving cognitive vitality. Antioxidants, such as vitamins C and E and beta carotene (pigment found in vegetables), act as scavengers and may protect the brain against free radicals that can damage brain cells. Free radicals are unstable molecules created by cells when burning oxygen for energy.



Dietary omega-3 fatty acids may also promote cognitive health. A component of omega-3, DHA, may enhance memory and learning by protecting and boosting our neuron's ability to communicate with each other.

Studies show that B vitamins, such as niacin and folic acid, help control inflammation and may play a role in the development of new brain cells. B vitamins are found in lean meat, fish, legumes, dairy products, whole grains, nuts and seeds, eggs, seafood, spinach, carrots, asparagus, and broccoli.

Some research suggests that drinking alcohol moderately (two drinks per day for men, one for women) may lower the risk of cognitive decline with aging. Recent animal studies also show that a chemical found in the skin of red grapes, resveratrol, possess potent properties that reduce the risk of developing Alzheimer's disease. Since you would need to drink over 100 glasses of red wine per day to see equivalent benefits, scientists hope to develop a drug based on resveratrol.

If your lifestyle includes moderate consumption of alcohol, remember, excessive alcohol intake (more than 2 drinks per day) causes cognitive impairment, and this risk increases with aging.

NUTRITION NOTE

When choosing fruits think 'bright is best' such as tantalizing apples, bananas, oranges, and grapes. With vegetables 'deep greens are delight', such as spinach and broccoli.



Examples of foods containing antioxidants and omega-3 fatty acids:

FISH CONTAINING THE MOST OMEGA-3

Anchovy, bluefish, herring, mackerel, sablefish, salmon, sardines, lake trout, tuna, and whitefish.



ANTIOXIDANT-RICH FRUITS

Berries, plums, avocados, oranges, red grapes, cherries, red apples, and cranberries.



ANTIOXIDANT-RICH VEGETABLES

Kale, spinach, brussels sprouts, alfalfa sprouts, beets, red bell peppers, and onions. Black and green teas are also rich in anti-oxidants.



OTHER OMEGA-3 RICH FOODS

Flax seeds and flax seed oil, canola oil, walnuts, Brazilian nuts, seaweed, green leafy vegetables, tofu, and other forms of soybean. DHA is also available as a supplement.



To promote cognitive health, a balanced, low fat, low calorie diet that includes five servings of antioxidant-rich fruits and vegetables is recommended (see boxes above). Taking a multi-vitamin every day is also highly recommended to insure an adequate balance of vitamins and minerals.



4 Reduce Stress: Learn ways to cope

Stress affects us all differently, depending on past experiences, and coping techniques. The “stress reaction” is the body’s natural response to internal and external pressures. Physically, the body reacts to stress by secreting stress hormones, tensing muscles, elevating the heart rate, and increasing blood pressure. Prolonged stress causes fatigue, disturbed sleep, poor concentration, and memory lapses. Chronically high-levels of stress hormones suppress the immune system and kill brain cells. Older adults with a high level of psychological distress have twice the risk of cognitive impairment.

The psychological reaction to stressful situations is more relevant than the stress itself because how we cope determines how stress affects our bodies—both physically and mentally. Therefore, finding ways to cope successfully with stress is critical to our physical and cognitive health. Coping takes effort, but can be learned. Effective methods for handling stress involve the following:

- Take responsibility for developing a way to cope
- Avoid rash decisions or actions
- Find a lesson in the situation
- Express your feelings privately
- Seek advice from friends, family, or counselors
- Stay confident and optimistic
- Use humor
- Regularly practice relaxation techniques such as meditation or physical exercise



HOW TO MEDITATE

The best time to meditate is in the morning, before breakfast. Choose a place where you will not be disturbed by anyone, not even a pet. Sit for 10 to 20 minutes on the couch or floor and use this simple breathing meditation. Breathe naturally, preferably through the nostrils, without attempting to control your breath. Try to become aware of the sensation of the breath as it enters and leaves the nostrils. Concentrate on it to the exclusion of everything else. Thoughts will eventually creep up. When you become aware of them, simply re-focus your attention on breathing.

5 Sleep: Snooze for better memory

Getting a good night's sleep is essential to cognitive health and function even with aging. The average individual needs seven to eight hours of sleep per night. Here are a few tips to improve the quality of your sleep:

- Maintain a regular bed and wake time schedule, even during the weekends
- Establish a bedtime routine, such as taking a hot bath, reading, or listening to soothing music
- Use the bedroom only for sleep and sex
- Eat at least two to three hours before bedtime
- Avoid exercising at least three hours before bedtime
- Avoid sleeping pills

“Anyone who stops learning is old, whether at twenty or eighty. Anyone who keeps learning stays young. The greatest thing in life is to keep your mind young.”

– HENRY FORD



6 Emotional Health: Depression is treatable

Depression is very common in older adults, yet often not diagnosed. Fortunately, today depression is very treatable with medications and psychotherapy. Depression may cause cognitive impairment, such as memory loss and difficulty paying attention. Seek help if you suffer from depression, anxiety, grief, or loneliness.

7 Remain Engaged: Participate in social activities

A rich and stimulating work and social environment helps maintain cognitive function. This should be an important consideration for a person thinking about retirement. In fact, we strongly recommend planning your retirement—and we don't mean that financially. Be open to alternative ideas and ways of retiring such as volunteering, working part-time, or discovering a new career path. Retirement, after all, doesn't mean you no longer need the companionship, validation, or social connections with your peers. It simply means you're moving on to a new phase in life. So even if you are 90 years of age, ask yourself, "What am I going to do with the rest of my life?"

"The Man who works and is never bored is never old. Work and interest in worthwhile things are the best remedy for age. Each day I am reborn. Each day I must begin again."

— PABLO CASALS, MUSICIAN

Adults of all ages should limit the number of hours they spend alone and socially isolated. Watching television is a mentally passive activity that has been linked with poorer performance on measures of cognitive function. Instead, engage in mentally stimulating activities associated with improving cognitive health.



Participate in group activities that provide opportunities for social interaction. Work, volunteering, and social networks, such as family and friends, are important to cognitive health, especially in old age. Playing mentally challenging, socially interactive games like bridge, and sports, such as tennis or golf, promote cognitive vitality.

Generativity is central to the mental health of older adults. Generativity is a concern for the next generation and a desire to make a difference. Generative activities include teaching, mentoring, social activism, and grandparenting. Find an activity that fulfills the desire to feel needed and connected to society and family.

“I read a story once of a group of Jews who were escaping the Nazis. They were walking over a mountain, and they carried with them the sick and the old and the children. A lot of old people fell by the wayside and said, ‘I’m a burden; go on without me.’ They were told, ‘The Mothers need respite, so instead of just sitting there and dying, would you take the babies and walk as far as you can?’ Once the old people got the babies close to their bosom and started walking, they all went over the mountain. They had a reason to live.”

– RUBY DEE, ACTRESS

8 Lifelong Learning: Stimulate the brain

Studies demonstrate that lower education levels or low language ability in early life are associated with cognitive impairment in later years. The brain has billions of neurons, giving it a sizable reserve capacity to compensate for neurons that are damaged or destroyed. Education has been found to protect against cognitive decline, probably by providing a larger reserve in brain function.



It's never too late to acquire that extra reserve through education. Enroll in adult education courses, sign up for career development opportunities, and engage in other educational and intellectual stimulating activities. Learning to play a musical instrument, reading books, or learning a new language will all promote cognitive health.

“Mind training” activities such as cross word puzzles, memory exercises, computer games and computer based programs are another possible way to promote cognitive health. However, they have not been proven to have generalized benefits on daily function.

WOMEN, MENOPAUSE AND MEMORY

Menopause is when the ovaries stop producing the hormones estrogen and progesterone, leading to the end of women's periods. Menopause generally occurs between the ages of 45 and 55. Aside from the typical hot flashes, women going through menopause may also experience sleep disturbances and depressive symptoms such as increased irritability and anxiety. Menopausal women also complain of cognitive symptoms such as difficulty paying attention and word finding. Some women report that they became more forgetful during and after menopause. However, research studies clearly show that the menopause is not associated with any cognitive decline that impairs a woman's ability to function.

Hormone Replacement Therapy: The role of estrogen

Some research has shown that estrogen protects neurons from damage and may promote the production of new neurons in the brain. As a result, researchers studied whether menopausal hormone replacement therapy (HRT) would prevent or delay the onset of



age-associated memory loss or cognitive impairment and dementia. However, at present, there is no conclusive clinical evidence to support this theory. Furthermore, some studies have found that HRT increases the risk of heart disease, stroke, breast cancer, and even dementia. For these reasons, long-term HRT is not recommended for women to prevent dementia or treat Alzheimer's disease.

DEMENTIA AND ALZHEIMER'S DISEASE

Dementia is a medical condition characterized by cognitive impairment that involves multiple domains of cognitive function, including memory, language, and abstract thinking; and is severe enough to impair a person's ability to perform their usual everyday tasks. Though early dementia is sometimes difficult to distinguish from normal cognitive aging, dementia is not a normal part of aging. However, it does affect about 5 percent of people over age 65, and up to 25 percent of people over 75. Dementia is common and devastating for older people and their loved ones.

SYMPTOMS OF ALZHEIMER'S

- Memory loss (worsens over time)
- Difficulty performing familiar tasks
- Problems with language
- Disorientation to time, place, and person
- Poor or decreased judgment
- Problems with abstract thinking
- Changes in mood, behavior, and personality
- Loss of interest or lack of initiative





Alzheimer's disease is the most common cause of dementia in older people. It is characterized by progressive cognitive decline caused by the degeneration of neurons and the formation of amyloid plaques and neurofibrillary tangles, both of which are abnormal in the brain. Alzheimer's disease can be diagnosed, treated, and effectively managed by a doctor.

While Alzheimer's disease is the most common cause of dementia, there are other causes of dementia that are preventable and treatable. These include multiple strokes, B12 deficiency, thyroid abnormalities, depression, and the side effects of many medications.

Since some causes of dementia are potentially reversible or preventable, and Alzheimer's disease can be effectively treated and managed, getting an early diagnostic evaluation for anyone with significant memory problems in old age is very important to cognitive health.

FACTS ABOUT ALZHEIMER'S DISEASE

- Every 71 seconds, someone in the U.S. develops Alzheimer's disease; by mid-century, someone will develop Alzheimer's disease every 33 seconds.
- Over 16 million people in the U.S. are suffering with Alzheimer's disease, mild cognitive impairment or age-related cognitive decline.
- Alzheimer's disease, related dementias, and mild cognitive impairment affect 25% of individuals over age 75 and 40% over age 80.
- Alzheimer's disease alone costs U.S. society over \$100 billion annually, making it the third most costly disease after heart disease and cancer.



COGNITIVE VITALITY IS ACHIEVABLE WITH AGE

Cognitive vitality is crucial to optimal aging. Through years of scientific research, we now know preventive strategies and interventions that can promote cognitive vitality. We also know that it is never too late or too early to implement a cognitive health program. By using this guide, adults can take concrete steps to achieve and maintain their cognitive vitality and improve the quality of their lives as they age.

EIGHT ACTIONS TO PROMOTE COGNITIVE VITALITY

Manage Chronic Illnesses

Physical Exercise

Nutrition

Reduce Stress

Sleep

Emotional Health

Remain Engaged

Lifelong Learning



“There is a fountain of youth: it is your mind, your talents, the creativity you bring to your life and the lives of people you love. When you learn to tap this source, you will truly have defeated age.”

– SOPHIA LOREN, ACTRESS



About the Alzheimer's Drug Discovery Foundation (ADDF)

ADDF is the only public charity whose sole mission is to accelerate the discovery and development of drugs to prevent, treat and cure Alzheimer's disease and cognitive aging. We use a venture philanthropy investment model to bridge the global funding gap between basic research and later-stage development, recycling any return on investment to support new research.

The only way we can end the nightmare of Alzheimer's disease is to collectively support scientists in their research efforts to develop new drugs. We encourage you to partner with us to conquer the disease. To make a donation, please visit our website at www.AlzDiscovery.org.

For more information about ADDF, please contact Howard Fillit, MD, Executive Director at 212-935-2402 or hfillit@AlzDiscovery.org.

Additional copies of the guide are available by contacting ADDF at 212-935-2402 or info@AlzDiscovery.org. Copies are also available on our website.

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