

Supporting a Healthy Brain

TIPS AND RESOURCES



What is the brain?

The human brain is the command center for the human nervous system. It weighs about 3 pounds and comprises 60 percent of fat, making it one of the fattiest organs in the body. A brain's gray matter is made up of about 100 billion neurons that gather and transmit signals, while white matter is made of dendrites and axons that the neurons use to transmit signals to other parts of the brain that control breathing, movement, emotion, and sensation.

Humans have the largest brain-to-body ratio of any animal. If the blood vessels in the brain were stretched end to end, they would be about 100,000 miles long!

Brain development during pregnancy

Brain development begins very early during pregnancy. The brain grows at a rate of about a quarter million neurons per minute in the first trimester, with growth continuing through early adulthood. Last to develop completely is the frontal lobe, which controls important cognitive skills such as emotional expression, problem solving, memory, language, judgment, and sexual behaviors.

Doctors strongly recommend that pregnant women abstain from alcohol use, as exposure to alcohol during pregnancy can cause damage to the fetus's brain. Negative effects caused by drinking alcohol while pregnant are called fetal alcohol spectrum disorders

(FASDs). Fetal alcohol syndrome (FAS) is the most severe group of this spectrum. Fetal alcohol exposure may create eventual difficulties with remembering and learning, controlling emotions, and performing daily life skills, among others.

Drinking during pregnancy can contribute to psychiatric disorders such as attention deficit hyperactivity disorder (ADHD), depression and anxiety, and problems with hyperactivity, conduct, and impulse control.

How can I encourage healthy brain development in my young child?

It's vital to meet your child's most basic needs, such as food, shelter, clothing, attention, and affection. One cannot overstate the benefits of warm, supportive relationships with stable caregivers. Also important is adequate sleep, according to the child's age. Sleep is when most brain development occurs.

Parents should read to their children early and often. Greater reading exposure is strongly associated with activation of areas of the brain supporting word comprehension. These areas are critical for oral language development and reading.

Because brain development is so rapid in early childhood, children are especially vulnerable to persistent negative influences, including prolonged screen time on televisions, smartphones, or electronic tablets. Parents should prioritize creative, "unplugged" playtime for infants and toddlers. Some media can have educational value for children starting at around 18 months of age if it is brief and limited to high-quality programming. Parents should watch with their child to help them understand what they are seeing.

How can I support healthy brain function in adulthood?

- **Mental stimulation.** Activities that require "mental gymnastics" stimulate new connections between nerve cells. Read a book, work on a crossword puzzle, or take up a new craft or hobby, like painting.

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- **Exercise.** Physical brings oxygen-rich blood to the portion of the brain responsible for thought. Go for a walk, play some recreational soccer, do some yoga, or take an aerobics class.
- **Improve your diet.** A full and varied diet will support brain health and protect against nutritional deficiencies. Aim for a well-rounded diet of unprocessed foods such as fruits and vegetables, lean meats, whole grains, and dairy. If diet is more limited due to allergies or restricted food choices, then multivitamins and/or specific supplements may be recommended by a physician to avoid specific deficiencies.
- **Avoid tobacco and limit alcohol use.** Tobacco use is detrimental to the whole body, and excessive drinking is a major risk factor for dementia. If you choose to drink, limit your intake to two drinks a day.

Brain health in advanced age

As we age, our memory, thinking, and behavior can change. Factors such as genetics, environment, habitual behaviors, medical history, other prescribed drugs, and mental health challenges such as depression play a role, making each individual different. However, we should all be aware of the risks of cognitive decline such as memory loss, confusion, and, more seriously, forms of dementia such as Alzheimer's disease. Warning signs for cognitive decline include:

- Difficulty with short-term memory
- Misplacing common items in unusual locations
- New challenges with familiar tasks
- Lapses in good judgment or reasoning abilities
- Problems concentrating for long periods of time
- Changes in mood and/or social behavior

What is the next step?

If you are seeing the signs of cognitive decline in yourself or a loved one, it is important to see a healthcare professional. Early diagnosis can provide the opportunity to receive treatment for symptoms, give families and individuals time to prepare for the future, and even participate in clinical trials. Even if the symptoms are not serious, this gives individuals the chance to focus on preserving their cognitive health.

Vanderbilt Resources

The **Vanderbilt Kennedy Center (VKC)** works with and for people with disabilities and their family members, service providers and advocates, researchers and policy makers. It is among only a few centers nationwide to be a University Center for Excellence in Developmental Disabilities, a *Eunice Kennedy Shriver* Intellectual and Developmental Disabilities Research Center, and a Leadership Education in Neurodevelopmental and Related Disabilities Training Program. Center programs and staff can assist families, educators, and other service providers. (615) 322-8240, Toll-Free (866) 936-VUKC [8852], vkc.vumc.org.

The **Vanderbilt Behavioral and Cognitive Neurology Clinic** is designed to evaluate problems of memory, language, and thinking that can occur with aging.

Using clinical and family interview, neurologic exam, neuropsychological testing, neuroimaging, and laboratory work, the clinic provides diagnosis and management of patients with disorders of higher cognitive function. Contact (615) 936-0060.

Other Resources

Zero to Three

www.zerotothree.org

The mission of Zero to Three is to ensure that all babies and toddlers have a strong start in life.

Harvard University Center on the Developing Child developingchild.harvard.edu

The mission of the Center on the Developing Child is to drive science-based innovation that achieves breakthrough outcomes for children facing adversity.

Alzheimer's Association alz.org

The leading voluntary health organization in Alzheimer's care, support and research. Its mission is to eliminate Alzheimer's disease through the advancement of research; to provide and enhance care and support for all affected; and to reduce risk of dementia through the promotion of brain health.

