

## **Nutrition and Brain Function**

### **Fats**

Can eating certain foods really make you smarter? According to Healthy Ontario, a division of the Ontario Ministry of Health Promotion, some foods have been linked to increased mental capacity. Omega-3 fats, found in fish such as trout and salmon, help to increase the brain's ability to relay messages and process information. A study found that people who ate at least one serving of fish per week were significantly less likely to develop Alzheimer's later in life. Incorporating fish into your weekly diet also benefits your heart and decreases your chances of developing diabetes and arthritis.

Eating too much saturated or trans-fat can impair brain functions such as concentration and memory by slowing down the communication between cells in the brain.

<b>Good Brain Foods</b>	<b>Bad Brain Foods-according to common folklore with little or no support from scientific literature</b>
Avocados, bananas, cantaloupe, oranges, broccoli, brussel sprouts, peas, potatoes, romaine lettuce, spinach	Artificial food colourings and sweeteners
Cold-pressed sunflower, safflower, corn and sesame oils are sources of omega-6	Corn syrup, frostings, junk sugars
Lean Beef, chicken, turkey, eggs, salmon, tuna	High-sugar drinks, colas
Brown rice, oatmeal	Hydrogenated fats
Milk, cheese, yogurt	White bread, French fries and potato chips
Flaxseed oil, peanut butter, soybeans	Alcohol, nicotine, overeating

For more information on fats and your brain visit the Heart and Stroke website at <http://ww2.heartandstroke.ca/Page.asp?PageID=24>

### **Antioxidants**

It is suggested that individuals include foods rich in antioxidants in their diet to prevent cognitive degenerative conditions such as Alzheimer's and Parkinson's disease.

Antioxidants work within the body to neutralize harmful particles known as 'free radicals'. Free radicals are formed when weak bonds in the body's cells split, which may result in cell damage causing health conditions like heart disease and cancer.

Eating a diet rich in antioxidants will help to decrease the chances of developing diseases of your brain such as Parkinson's and Alzheimer's. Use the table below to identify antioxidant-rich food in your diet.

<b>Antioxidant rich foods</b>	
<b>Vitamin C</b>	Bell peppers, Broccoli, Cantaloupe, Grapefruit, Kiwi, Orange, Strawberries, Tomato, Look for red, orange and green fruits and vegetables
<b>Vitamin E</b>	Almonds, Avocado, Mango, Peanut butter, Sweet potato, Vegetable oils, Blueberries, Leafy greens (spinach, kale and broccoli)
<b>Carotenoids</b>	Sweet potato, Cantaloupe, Carrots, Squash, Pumpkin, Mango, Leafy Greens (spinach, kale and broccoli), Look for orange and bright green
<b>Lycopene</b>	Tomatoes (including tomato juice and tomato sauce), Watermelon, Guava, Papaya, Apricots, Pink grapefruit, Look for red, pink and orange
<b>Lutein</b>	Leafy greens (spinach, kale, broccoli), Look for bright greens
<b>Selenium</b>	Brazil nuts, Eggs, Liver, Meat, Poultry

For more information on antioxidants and what they can do for you visit the Hospital for Sick Children at <http://www.sickkids.ca/SFSNutritionResources/section.asp?s=Nutrients&SID=14813&ss=Antioxidants&ssID=14818>

### **Mental Acuity**

As we age, our mental acuity can be threatened. The old adage, “use it or lose it”, holds true in the case of keeping your mind sharp. Older adults who practice mental tasks such as crosswords or brainteasers show improved memory, reasoning, and speed of processing. Mental exercises, just like physical exercises, need to be done regularly and with increased difficulty to foster improvement. An active brain produces new connections between cells allowing for better communication. As a result, you are better able to store and retrieve information increasing processing speeds and memory.

The Mayo Clinic suggests that staying physically active as you age helps keep your mind sharp. Physical activity promotes blood flow, facilitating cell growth. Regular physical activity including walking, for about 30 minutes most days of the week, may improve your blood pressure, reduce your cholesterol, aid in the maintenance of healthy bones and joints resulting in you feeling more alert and energetic.

Moderate drinking, no more than two drinks per day for men and one drink per day for women, has been associated with decreased risk of dementia, memory problems, heart disease and stroke. On the other hand, excessive consumption may lead to brain, liver, heart, and kidney damage as well as divorce, job loss, increased risk of trauma, decreased sexual function, and death.

Smoking is a contributing factor to memory loss. Smokers are twice as likely to get Alzheimer's than non-smokers. Quitting smoking, even after many years, can decrease your risk for developing these problems.

About the only thing that smoking contributes positively to is the share price of tobacco companies. For pretty much everything else it's either associated with the cause or it makes it worse.

Keeping your mind sharp is not only a concern for older individuals. People in their 20s and 30s also experience memory problems. Sometimes it's due to information overload associated with life experiences such as beginning a career or starting a family. During these times, individuals often become overwhelmed with information and have a difficulty focusing and thus retaining new information. This problem usually resolves itself after these major life events have calmed down and the senses are no longer overwhelmed with information.

For more information on how to keep your mind sharp, visit the Mayo Clinic at <http://www.mayoclinic.com/health/memory-loss/HA00001>

For more information on mental exercises visit the Franklin Institute at <http://www.fi.edu/brain/exercise.htm>

## Brain Disorders

### **Seizure Disorders**

A seizure occurs when nerve cells, or neurons, in the brain send abnormal signals to each other. Seizures are one of the most common nervous system disorders affecting people of all ages, races and ethnic backgrounds. They vary from a momentary disruption of the senses, to short periods of unconsciousness or staring spells, to convulsions. Affected people may be prone to one type of seizure or may experience several different types. Although they may appear different, the commonality is a sudden change in how the cells of the brain send electrical signals to each other.

Primary treatment of seizures is with medication. However in most cases while the medication may control the seizures, it does not cure the underlying cause. Surgery, diet (primarily in children), or electrical stimulation, may be options when medications fail. Sometimes people, especially children, outgrow the seizures.

For more information on Seizures, visit the Epilepsy Foundation at <http://www.epilepsyfoundation.org/about/>

### **Alzheimer's Disease**

Alzheimer's disease is a progressive brain disorder that gradually destroys a person's memory and ability to learn, reason, make judgments, communicate and carry out daily activities. As Alzheimer's progresses, individuals may also experience changes

in personality and behavior, such as anxiety, suspiciousness or agitation, and delusions or hallucinations.

Alzheimer's disease progresses at different rates in different people. The short-term memory and thinking areas of the brain are affected first, progressing to include other regions of the brain.

There is no cure for Alzheimer's disease. Treatment for symptoms is available and in some cases is effective. Current research has shown that effective care and support can improve the patient's, as well as the caregiver's, quality of life over the course of the disease.

10 warning signs of Alzheimer's taken from:

[http://www.alz.org/alzheimers\\_disease\\_symptoms\\_of\\_alzheimers.asp](http://www.alz.org/alzheimers_disease_symptoms_of_alzheimers.asp)

### **10 warning signs of Alzheimer's:**

**1. Memory loss.** Forgetting recently learned information is one of the most common early signs of dementia. A person begins to forget more often and is unable to recall the information later.

**What's normal?** Forgetting names or appointments occasionally.

**2. Difficulty performing familiar tasks.** People with dementia often find it hard to plan or complete everyday tasks. Individuals may lose track of the steps involved in preparing a meal, placing a telephone call or playing a game.

**What's normal?** Occasionally forgetting why you came into a room or what you planned to say.

**3. Problems with language.** People with Alzheimer's disease often forget simple words or substitute unusual words, making their speech or writing hard to understand. They may be unable to find the toothbrush, for example, and instead ask for "that thing for my mouth."

**What's normal?** Sometimes having trouble finding the right word.

**4. Disorientation to time and place.** People with Alzheimer's disease can become lost in their own neighborhood, forget where they are and how they got there, and not know how to get back home.

**What's normal?** Forgetting the day of the week or where you were going.

**5. Poor or decreased judgment.** Those with Alzheimer's may dress inappropriately, wearing several layers on a warm day or little clothing in the cold. They may show poor judgment, like giving away large sums of money to telemarketers.

**What's normal?** Making a questionable or debatable decision from time to time.

**6. Problems with abstract thinking.** Someone with Alzheimer's disease may have unusual difficulty performing complex mental tasks, like forgetting what numbers are for and how they should be used.

**What's normal?** Finding it challenging to balance a checkbook.

**7. Misplacing things.** A person with Alzheimer's disease may put things in unusual places: an iron in the freezer or a wristwatch in the sugar bowl.

**What's normal?** Misplacing keys or a wallet temporarily.

**8. Changes in mood or behavior.** Someone with Alzheimer's disease may show rapid mood swings – from calm to tears to anger – for no apparent reason.

**What's normal?** Occasionally feeling sad or moody.

**9. Changes in personality.** The personalities of people with dementia can change dramatically. They may become extremely confused, suspicious, fearful or dependent on a family member.

**What's normal?** People's personalities do change somewhat with age.

**10. Loss of initiative.** A person with Alzheimer's disease may become very passive, sitting in front of the TV for hours, sleeping more than usual or not wanting to do usual activities.

**What's normal?** Sometimes feeling weary of work or social obligations.

For more information on the Stages of Alzheimer's disease go to:

[http://www.alz.org/alzheimers\\_disease\\_stages\\_of\\_alzheimers.asp](http://www.alz.org/alzheimers_disease_stages_of_alzheimers.asp)

## **Learning Disabilities**

A learning disability is a neurological condition that hinders a person's ability to store, process, or produce information. Learning disabilities can affect a person's ability to read, write, speak, spell, compute math, and/or reason. Attention, memory, coordination, social skills and emotional maturity can also be affected leading to significant academic and social difficulties.

Teachers are often the first to recognize the signs of learning disabilities – symptoms can change with growth stages, and are not always as obvious as you might

think. If parents, teachers, and other professionals discover a child's learning disability early and provide the right kind of help, it can give the child a chance to develop skills needed to lead a successful and productive life.

The following is a list of signs taken from the Learning Disabilities Association of Canada which indicate a child may have a learning disability. The presence of one or two of these signs may not be significant, but a cluster of these behaviours requires further assessment.

### **In Infancy**

- Trouble with nursing, sucking or digesting
- Resistance to cuddling and body contact
- Lack of, or excessive response to sounds or other stimulus
- Trouble following movements with eyes
- Unusual sleep patterns
- Delays in sitting, standing, walking
- Absence of creeping and crawling
- Little or no vocalization
- Irritability

### **Preschool**

- Speaks later than most children and has immature speech patterns
- Slow vocabulary growth, often unable to find the right words, pronunciation problems
- Difficulty rhyming words
- Trouble learning numbers, alphabet, days of the week, colors, shapes
- Extremely restless and easily distracted
- Trouble interacting with peers
- Difficulty following directions or routines
- Difficulty with dressing
- Fine motor skills slow to develop
- Exaggerated response to excitement or frustration
- Tendency to trip, or bump into things
- Cannot skip, has trouble bouncing and catching a ball

### **Grades K-4**

- Slow to learn the connection between letters and sounds
- Confuses basic words (run, eat, want)
- Makes consistent reading and spelling errors including letter reversals (b/d), inversion (m/w), transposition (felt/left), and substitutions (house/home)
- Transposes number sequences and confuses arithmetic signs (+, -, x, /, =)
- Slow to remember facts
- Slow to learn new skills, relies heavily on memorization

- Impulsive, difficulty planning
- Unstable pencil grip, poor printing, writing
- Trouble learning about the concept of or telling time
- Poor coordination, unaware of physical surroundings, prone to accidents
- Difficulty cutting with scissors, coloring and printing inside lines
- Cannot tie laces, button clothes, or get dressed
- Reads but does not comprehend
- Difficulty playing with more than one child at a time, may prefer to play alone
- Difficulty remembering the names of things: the seasons, the months, streets, etc.
- Does not understand the difference between 'up and down'; 'top and bottom'; 'in and out'; 'front of and behind; etc.

### **Grades 5-8**

- Reverses letter sequences (soiled/solid, left/felt)
- Slow to learn prefixes, suffixes, root words and other spelling strategies
- Avoids reading aloud
- Trouble with word problems
- Difficulty with handwriting
- Awkward, fist-like, or tight pencil grip
- Avoids writing compositions
- Slow or poor recall of facts
- Difficulty making friends
- Trouble understanding body language and facial expressions
- Difficulty expressing ideas and relating events in sequence

### **High School Students**

- Continues to spell incorrectly, frequently spells the same word differently in a single piece of writing, laborious handwriting
- Avoids reading and writing tasks
- Difficulty with putting thoughts on paper
- Trouble summarizing
- Trouble with open-ended questions on tests
- Weak memory skills
- Difficulty adjusting to new settings
- Works slowly
- Poor grasp of abstract concepts
- Either pays too little attention to details or focuses on them too much
- Misreads information/lacks logic, poor reasoning ability
- Vulnerable to peer pressure, often the 'scapegoat' in situations
- Difficulty organizing and/or concentrating on homework
- Rarely relates past events or experiences in sequence or detail

### **Adults**

- Excellent verbal ability, but cannot express thoughts on paper
- Mechanical aptitude, but difficulty with reading, writing or spelling
- Lacks social skills and has difficulty maintaining relationships or making friends
- Learns well when shown, but cannot follow written and/or verbal instructions
- Feels constantly anxious, tense, depressed and has a very poor self-concept
- Has difficulty organizing belongings, time, activities, or responsibilities

**For information on Autism, visit the Autism Society of Canada at**

[http://www.autismsocietycanada.ca/understanding\\_autism/resources/index\\_e.html](http://www.autismsocietycanada.ca/understanding_autism/resources/index_e.html)

**For more information on Dyslexia visit the Dyslexia Resource Centre at**

<http://dyslexiahamilton.ca/>

**For more information on Learning Disabilities visit:**

The Learning Disabilities Association of Canada

[http://www.ldac-taac.ca/InDepth/background\\_signs-e.asp](http://www.ldac-taac.ca/InDepth/background_signs-e.asp)

National Dissemination Center for Children with Disabilities

<http://www.nichcy.org/>

National Center on Birth Defects and Developmental Disabilities

<http://www.cdc.gov/ncbddd/>

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## **Stroke**

A stroke is a loss of brain function due to the disruption of blood flow to the brain. The cause is either a blood clot or a hemorrhage, giving rise to the descriptions – thrombotic and hemorrhagic. The effects of a stroke depend on the area of the brain that was affected and how much damage occurred. There are many risk factors that increase one’s chances of a stroke including diabetes, high LDL cholesterol, high blood pressure, heart disease, obesity, excessive alcohol consumption, smoking, stress and a lack of physical activity.

Signs of stroke include weakness, trouble speaking, vision problems, headache and dizziness. Like a heart attack, a stroke is a medical emergency. early treatment may result in less damage or be life saving. Always err on the side of caution and call 911 immediately.

Visit the Heart and Stroke Foundation of Canada to learn more:

<http://ww2.heartandstroke.ca/Page.asp?PageID=1017&CategoryID=2&Src=stroke>

## **Stress**

When the body experiences a stressful situation, it releases hormones to improve memory, immune function, enhance muscular activity and restore your body's natural balance or equilibrium. The brain's natural reaction to stress is to stimulate the body to either fight the stressor or flee the stressful event, known as the fight or flight natural response. If you experience a situation in which you are not fighting or fleeing, such as sitting in traffic, your body stores the chemicals that your brain activated in response to your stress. Chronic stress can lead up to a build-up of these unused chemicals causing memory impairment, immune suppression and energy being stored as fat. Excess stress can also cause your body to over produce other hormones, which can lead to high blood pressure, abdominal obesity and atherosclerosis (hardening of the arteries).

For more information visit the Society for Neuroscience at <http://www.sfn.org/skins/main/pdf/brainfacts/brainfacts.pdf>

## **Green Tea**

Green tea contains antioxidants, which may work within the body to neutralize harmful particles known as 'free radicals'. Free radicals are formed when weak bonds in the body's cells split, which may result in cell damage.

Green tea contains polyphenols, which are the antioxidants that give it a bitter taste. Polyphenols have been shown to increase the amount of dopamine a chemical in the brain, which helps to maintain a positive mood. Polyphenols have also been shown to help the brain and body maintain a constant supply of glucose, the body's fuel allowing for more efficient production of energy.

Green tea has 10 times the antioxidants found in fruits and vegetables and more antioxidants per equal volume of black tea. It is important to note that too much of anything, including green tea, may be harmful to your body. Talk to your health care professional to ensure you are not getting too much of one specific vitamin or mineral.

For more information please visit The American Society for Nutritional Sciences at <http://jn.nutrition.org/cgi/content/full/132/4/785>

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<http://www.psychologytoday.com/articles/pto-20030610-000003.html>

## **Classical Music**

Research has shown that classical music may result in a decreased heart rate, a lowering of blood pressure, overall relaxation of muscles, and a lower breathing rate.

Classical music also enhances your memory and learning abilities. When the left and right side of the brain are activated simultaneously, which happens when listening to classical music while learning, retention and assimilation of information are enhanced. Studies have shown that classical music, whether playing, listening, or singing, increases the brain's ability to process information. Learning activates the left side of the brain and classical music the right, leading to a dynamic combination for enhancing brain function.

The main factor of music that makes it beneficial to learning and memory is its order. The order of this music includes a mathematical pattern, which is recognized by the body and intrigues the brain. Music such as rock has irregular beats that cause the balance between the two sides of the brain to be disrupted. Studies have shown that this disruption can cause lower work performance, learning and behavior problems in children and poor moods in adults.

Schellenberg, G.E., Nakata, T., Hunter, P.G., & Tamoto, S. (2007). Exposure to music and cognitive performance: Tests of children and adults. *Psychology of Music*. 35(1), 5-19.

## **Physical Fitness**

A healthy active lifestyle has been shown to improve your brain function. Walking is especially good for your brain as it increases blood circulation to the brain. This helps bring necessary oxygen to your brain cells and helps you to think more clearly. Studies show that elderly individuals who walk for exercise have significantly better memory skills than those in the same age group who are sedentary.

Inactive individuals are twice as likely to develop Alzheimer's and have significantly more cognitive decline as they age than those that are active at least three times per week.

Research has also shown a link between exercise and a decrease in depression. Aerobic exercise, such as walking, running, or swimming, was shown to decrease major depression as effectively as medication and also improved the cognitive abilities of middle-aged and elderly men and women.

Similar studies have also shown that aerobic exercise can help maintain functions such as planning, organization and attention, which tend to decrease as we age. Strength training exercise combined with aerobic exercise has been shown to be more effective in improving and maintaining cognitive functions than aerobic exercise alone. Exercising for at least 30 minutes a day, most days of the week, has been linked to many cognitive benefits and physical improvements.

For more information please visit the Franklin Institute at <http://www.fi.edu/brain/exercise.htm>

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## **Mental Exercise**

As we age, our mental acuity can be threatened. The old adage, “use it or lose it”, has some validity in the case of keeping your mind sharp. It has been shown that older adults who practice mental tasks such as crosswords or brainteaser puzzles show improved memory, reasoning, and speed of processing. Mental exercises, just like physical exercises, need to be done regularly and with increased difficulty to foster improvement. An active brain produces new connections between cells allowing for better communication with one another. As a result, you are better able to store and retrieve information.

Keeping your mind sharp is not only a concern for older individuals. Younger adults also experience memory problems due to information overload associated with life experiences such as beginning a career or starting a family. During these times, individuals often become overwhelmed with information and have a difficulty focusing and thus retaining new information. This problem usually resolves itself after these major life events have calmed down and information is no longer overwhelming to the senses. If you are experiencing any of these symptoms, seek the advice of a health care professional for accurate diagnosis and treatment.

## **Endorphins and the Brain**

Endorphins are chemicals found in the body that act as natural painkillers. Laughing is an example of an activity that causes the release of endorphins. When you laugh, your body is able to put aside your negative emotions or stress and allow you to concentrate on the amusing event. This shift in mood is the physical sign of endorphin activity. Laughing is also a great source of pain relief. Studies have shown that people who experience chronic pain can reduce their pain levels significantly for hours after the amusing event by laughing for roughly 10 minutes. Laughter is only one example of a stimulus that causes the release of endorphins into the body. Such things as the scent of fresh flowers, chocolate, exercise, eating, sound and acute stress also release endorphins, producing the euphoric or mood changing effect.

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**For fun Brain Facts from visit The University of Washington at**  
<http://faculty.washington.edu/chudler/ffacts.html>

**Everything you need to know about the brain:**

<http://apu.sfn.org/index.cfm?pagename=brainfacts>

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