



# Nourishing the Mind

## Your Path to Better Health

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Insightful nutrition



# What causes neurodegeneration?

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The two main factors that lead to neurodegenerative disease are:

## Inflammation Oxidative stress

In fact, these two factors are present in almost all chronic diseases.

Chronic **inflammation** can occur when you consume a diet high in saturated fat and trans fats as well as refined and processed foods. Another cause of chronic inflammation is food intolerances brought about by consumption of foods that the body is slightly allergic too – most common intolerances are dairy, wheat, meat, peanuts, citrus foods.

The other factor leading to neurodegeneration is **oxidation**. Oxidation is to the body what rust is to metal. When tissues get oxidized, they slowly get damaged and eventually are unable to function. Excess oxidative damage can occur in the body when there is a lack of antioxidants. Antioxidants are present in green leafy vegetables and colourful vegetables and fruit.

# The Five Brain Booster Foods

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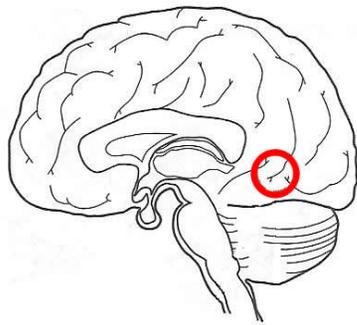
# Five essential brain booster steps

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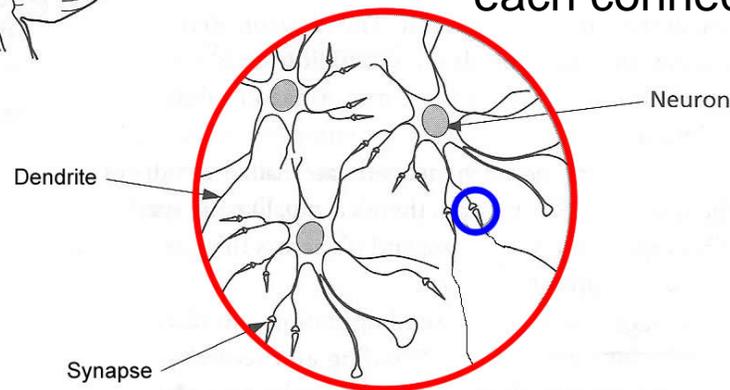
There are five essential food areas you need to consider when looking at nourishing the brain:

- **Balance your glucose** – it's the brain's favourite fuel source
- **Essential fats** – these are an essential element of every cell wall and the myelin sheath
- **Phospholipids** – these are the molecules of memory, they receive the brain's messages
- **Amino acids** – these are the brain's messengers
- **Intelligent nutrients** – these include the vitamins and minerals that fine tune your mind.

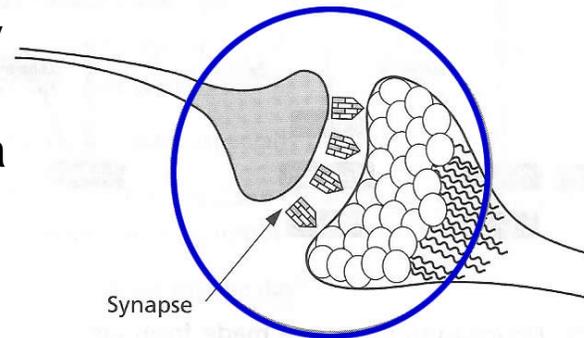
# How the brain works



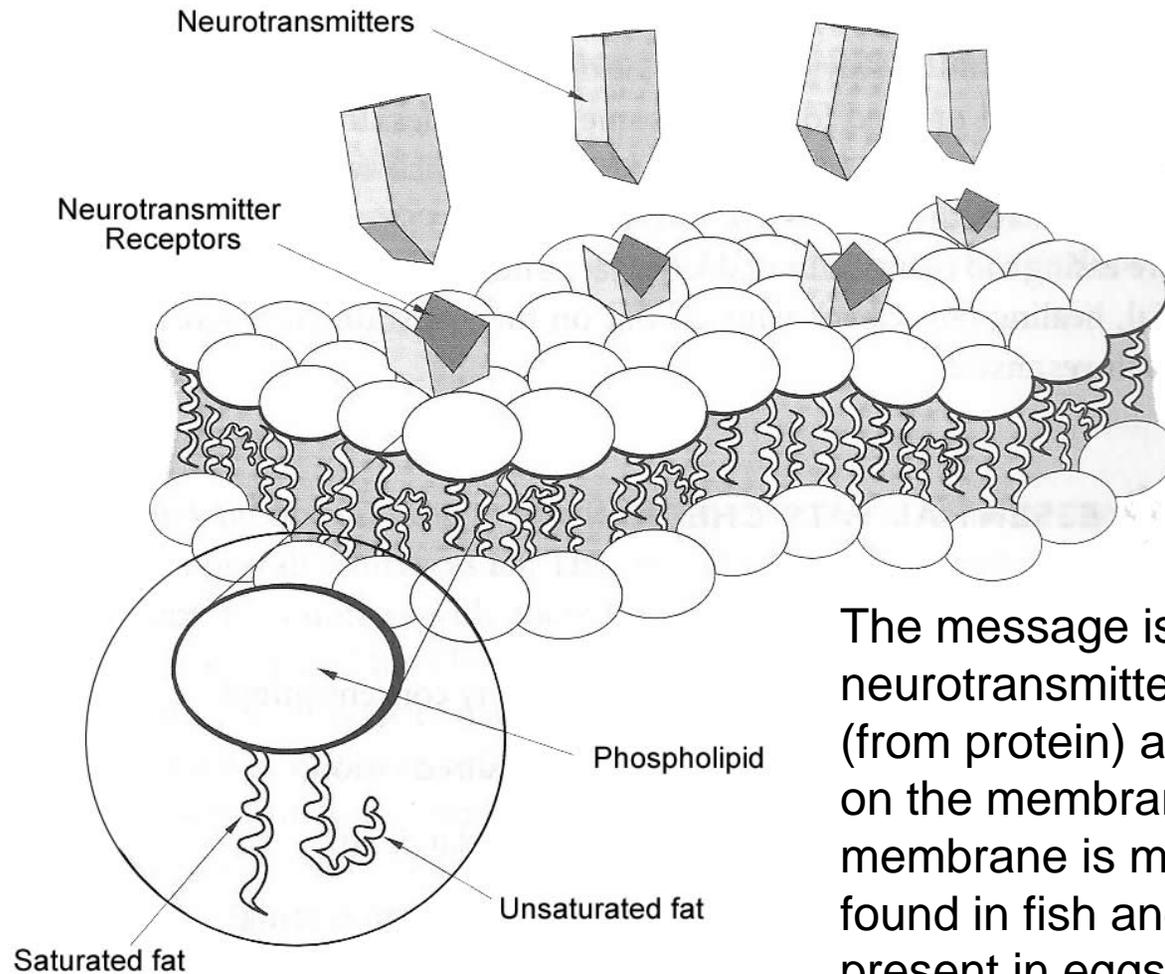
The brain is comprised of a network of **neurons**. These special nerve cells connect to other neurons – and there are about 100 billion neurons in the brain, each connected to thousands of others.



The neurons are connected to each other by long extensions called **dendrites**. Where one dendrite meets another neuron there's a gap, like the spark gap in a spark plug. This gap is called the **synapse** and it's across this gap that messages are sent from one neuron to the next.



# How the brain receives a message



The message is sent via a chemical neurotransmitter made from amino acids (from protein) and is received via receptors on the membrane of the neuron. The membrane is made up of essential fats found in fish and seeds, and phospholipids present in eggs and organ meats.

# The gut-brain connection



- It used to be thought that all of our thinking was done by neurons in the brain.
- Recent research shows that the digestive system contains 100 million neurons, and produces as many neurotransmitters (the chemical messengers) as the brain.
- Every time you eat something it sends signals to the brain because the gut and brain are in constant communication. This is why eating the right foods make you happy, and the wrong foods can make you feel anxious and depressed.
- Making neurotransmitters and receptors requires vitamins, minerals, amino acids, essential fatty acids and special enzymes.

# Balance your glucose – complex carbs



# Complex Carbs – the best brain food



- The brain and nervous system is fueled by glucose
- We are solar powered – plants collect the energy of the sun for us in the form of glucose. Plants absorb water from the soil and carbon dioxide from the air and combine these together using the sun's energy to form carbohydrate.
- In the small intestine, we digest carbohydrates down into glucose and deliver this into both our brain and body cells. This is what give us energy.
- Your brain consumes more glucose than any other organ – 40% of all the carbs we eat.

# Food as fuel



- Our bodies can also make energy from protein and fats. But carbohydrate-rich foods are the best kind of fuel because there is the least amount of waste formed.
- Carbohydrates need to be slow-releasing. Complex carbohydrates take a longer time to digest than refined carbohydrates – they contain fiber and some protein, which slows the digestive process down giving you more sustained energy release.
- We can slow down digestion by combining vegetables and fruit with protein and fibre sources – eat fruit with nuts and seeds, and carbohydrate-rich foods like sweet potatoes, pasta and rice with protein-rich foods such as lentils, beans, fish or chicken.

# Refined carbohydrates – why are they “bad”?

- By refining carbohydrates we remove all of the fiber, protein, & most of the minerals and vitamins in order to isolate the sugar. All forms of refined sugar and carbohydrates have a **high glycemic load**.
- Foods with a high glycemic load hit the blood stream quickly causing **blood-sugar levels** to skyrocket. In order to balance the blood and transfer the sugar into the cells, the body responds by releasing the hormone **insulin** in the blood. Insulin then moves the sugar out of the blood and into the cells. If there is too much fuel to be used immediately, excess sugar is stored in the liver and muscles as **glycogen**, and then as **fat** when they are full.
- Too much sugar also triggers the release of the hormone **adrenalin**, your body's stress hormone. Adrenalin can make it difficult to concentrate, cause irritability and anxiety.
- How to stop your body's dependence on sugar? Gradually get it used to less sweetness. **DO NOT** use sugar substitutes – they keep the cravings alive!

# Guidelines for best brain fuel



## Vegetables

Broccoli, cauliflower, onions, celery, cucumber, carrots, sweet potatoes, sprouts (watercress, pea, sunflower, broccoli)

## Fruit

Apples, berries, lemons, limes, melons



## Wholegrains

quinoa  
oats  
millet  
brown rice  
rye  
buckwheat

## Legumes

chickpeas, lentils, beans



## Nuts & Seeds

sesame  
pumpkin  
sunflower  
flax  
chia  
walnuts  
almonds

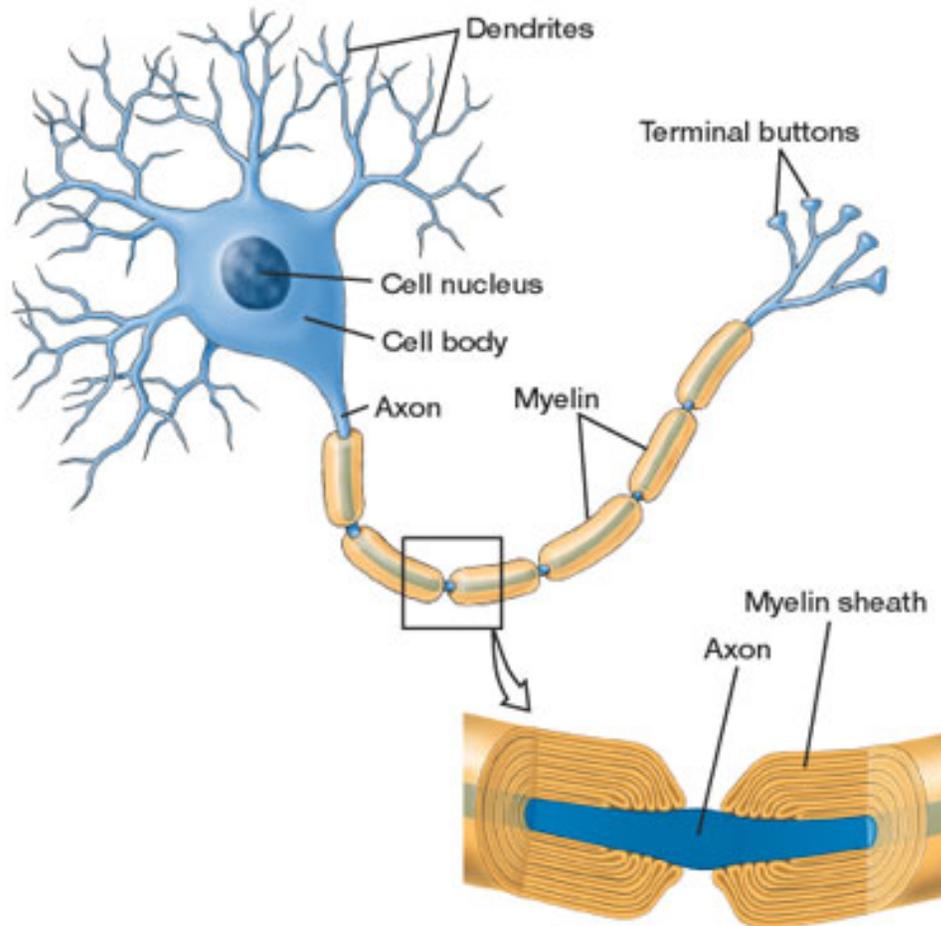
# Essential fats – vital for mental health



# Essential Fats

- If you squeezed out all of the water from your brain, **60%** of the dry weight would be made from fat! These fats are **constantly being replenished** so it's critical to give the brain a constant supply of good fats.
- The brain and nervous system are dependent on:
  - Saturated & monounsaturated fat**
  - Cholesterol**
  - Omega-3 fat**
  - Omega-6 fat**
- First 2 made in body, 2nd 2 **must come from diet.**

# Fats – vital for mental health



The **myelin sheath** is a membrane covering each neuron. It acts as an **insulator** allowing the transmission of the nerve signal to quickly travel vast distances (say from the brain to the toe).

The myelin sheath is made out of **phospholipids**, that each have a **saturated & unsaturated** fatty acid attached.

The unsaturated fatty acid is usually an **omega-3** or **omega-6** fat.

# Omega-3 polyunsaturated fat

- Most people have a diet deficient in omega-3 and omega-6 fats – as well, often the amount is imbalanced, usually we eat more omega-6 fats. The optimal balance of omega-3 to omega-6 fats is 1:1.
- Unsaturated fat is prone to damage by cooking, heating and food processing. It is quickly oxidized by heat and air (meaning it goes rancid).
- Essential fats are turned by the body into a family of hormone-like compounds called prostaglandins that seem to control just about everything from your hormonal balance, to how your brain reacts and responds, and how flexible the lenses of your eyes are.
- **Best source of omega-3** is coldwater fish, especially fish that eat fish – herring, mackerel, Atlantic salmon, sardines, anchovies, marine algae, eggs of chickens fed flax seeds.
- Vegetarian options – flaxseeds, hemp seeds, pumpkin seeds, walnuts, flax and walnut oil.

# Omega-6 polyunsaturated fat

- **Omega 6 fats** are made and stored in the seeds and nuts of hot-climate plants such as the sunflower and sesame.
- The most potent dietary source of omega-6 is called GLA (gamma-linolenic acid), which is highly concentrated in **borage flower** and **evening primrose oil**.
- GLA can be made in the body from unrefined, organic sesame seeds and sunflower seed oils, however these oils can be damaged though heat and the oil manufacturing procedures.
- **Balance:** the appropriate balance of omega-3 to omega-6 oils is 1:1. But the average balance is about 1:20 in favour of the omega-6 oils.
- **Trans-fats:** a diet high in fried food and hydrogenated vegetable oil (Crisco, margarine) is full of trans-fats. Trans-fats take up the same position as the omega-6 oils in the nerve cell membranes. Twice as many trans fats appear in the brains of people deficient in omega-3 fats. But these fats don't act the same as the EFAs – they are rigid, hard fats rather than resilient and crooked.

# Benefits of Essential fats

There are countless benefits to eating Omega 3 and 6 fats:

- **Stabilization of blood sugar** – fat stabilizes insulin from spiking - provided that you choose ‘good’ fats and not bad fats.
- Why does this work? Lean protein and good fats slow down the conversion of carbohydrates into glucose in your blood stream, making them time-released, therefore keeping your blood sugar stable and controlling the release of insulin.
- EFAs also help to control **inflammation** as well as keep your blood platelets from sticking.
- EFAs are critical for healing **depression**. When combined with vitamins B6, zinc, niacin and vitamin C, studies found that symptoms of many psychiatric disorders can be reversed.

# Guidelines for brain fats



## **Fish**

herring  
mackerel  
salmon  
sardines

Two to three  
servings per week

Daily  
supplement  
EPA/DHA/GLA

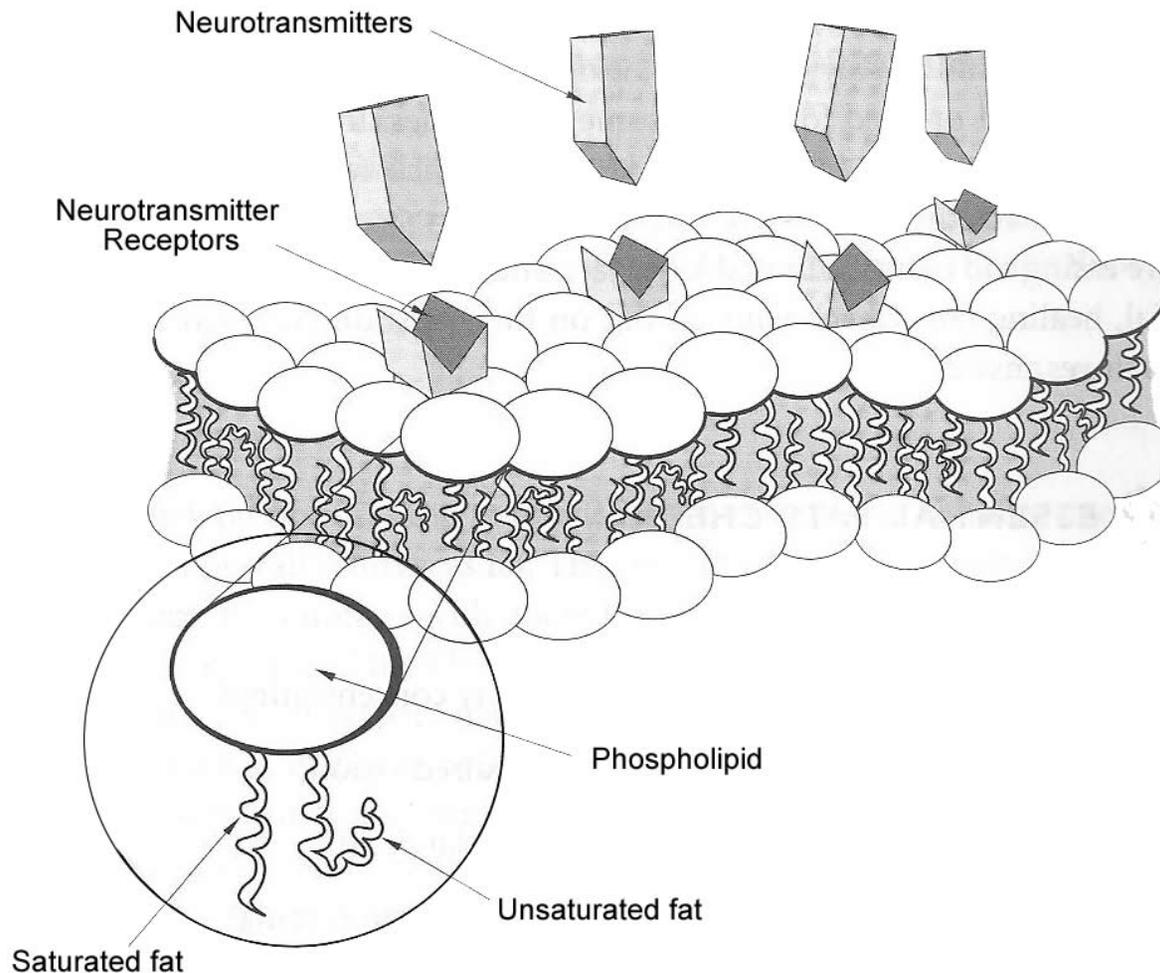


## **Nuts & Seeds**

flax  
hemp  
pumpkin  
sunflower  
sesame

Fresh grind them  
and sprinkle on  
soups, salads,  
fruit - use oils  
to make salad  
dressings

# Phospholipids – molecules of memory



Phospholipids form double-layered membranes, the skin that surrounds every living cell of all living organisms.

They form a barrier that keeps the outside world outside and the inside world inside each cell.

Along with proteins (here designated as neurotransmitter receptors) they determine which substances can come into the cells (or the neuron in the brain) and which will be pushed out.

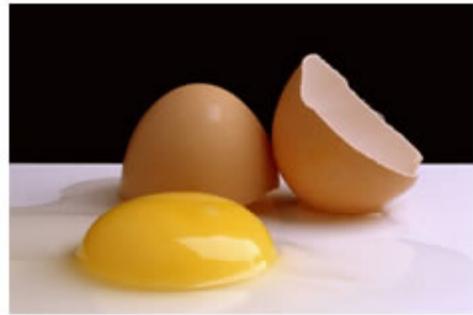
# Phospholipids – intelligent fats

- Phospholipids are the molecules of **insulation** that make up the myelin sheath that covers all nerves and promotes a smooth signal to and from the brain.
- Phospholipids also used to make the memory neurotransmitter **acetylcholine**.
- Phospholipids supply key nutrients that are involved in **methylation** – the process by which the brain and body keep thousands of neurotransmitters in balance.
- They **enhance** your mood, mind and mental performance, and they **protect** against age-related memory decline and Alzheimers
- There are 3 main phospholipids – phosphatidylcholine (PC), phosphatidylserine (PS) and phosphatidyl dimethylethanolamine (DMAE)

# Why eggs are good for you!

- Your body is able to make phospholipids – but you can help it make them more efficiently by getting some extra from your diet.
- The best sources of phospholipids are **choline** – abundant in egg yolks and organ meats – and DMAE which can be found in sardines and other fish.
- What kinds of eggs? An egg is as healthy as the chicken who laid it. So get your eggs from an organic farm where the chickens are fed flaxseeds or fishmeal.
- Lecithin is another phospholipid supplement that can supply **choline** to the brain. It is also a reliable source of small amounts of omega 3 essential fatty acids. Further, it is an edible detergent which breaks up fats into suspensions of smaller droplets. Found naturally in all unrefined seed oils.

# Guidelines for phospholipids



**Phospholipids**  
eggs - free-range,  
organic with high  
omega-3

lecithin granules -  
add 1 Tbsp to  
cereal or 1 tsp  
high-PC lecithin

Supplement - brain  
food formula with  
PC, PS & DMAE



**Vitamins &  
Minerals**

Vitamin B2, B3, B6  
B12 and folic acid  
Manganese  
Magnesium

**Antioxidants**  
Vitamins A, C, E  
Selenium  
Zinc

# Amino acids – the brain's messengers



# Amino acids – the brain's messengers

- Proteins are involved in the growth, regulation and maintenance in the body including blood clotting, fluid balance, cell repair (muscles), vision, production of hormones and enzymes – to name just a few of their roles.
- The body is continuously at work, breaking dietary proteins down into individual amino acids and then reassembling these amino acids into new structures. Amino acids are the basic chemical building blocks of life, and are combined into long molecular chains which are used to direct and regulate the body.
- In essence, amino acids are the chemical messengers of the body - they are the words the brain uses to send messages from one cell to another. The form these messengers take is neurotransmitters.

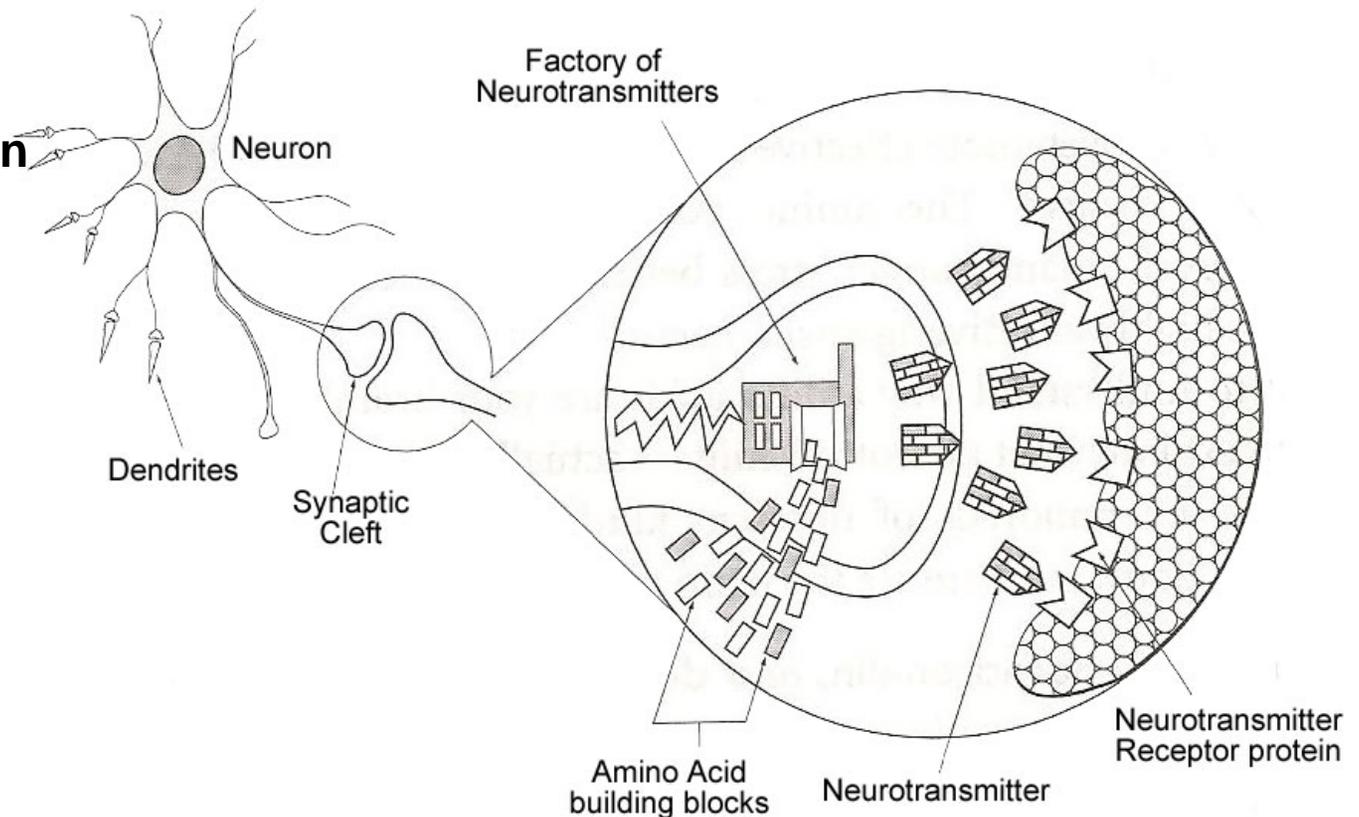
# Quality of protein



- There are **eight essential amino acids** which can then be broken down and recombined to make all of the amino acids required in the body: *Tryptophan, Leucine, Isoleucine, Lysine, Valine, Threonine, Methionine, Phenylalanine*
- The quality of protein is determined by its **balance of amino acids**. Though there are 23 amino acids from which the body can build everything, from a neurotransmitter to a muscle cell, you actually need to eat only the 8 essential amino acids, because the body can make the rest from these. The better the balance of amino acids the more you can make use of the protein.

# How neurotransmitters work

There are 5 key neurotransmitters: **adrenalin**, **noradrenalin** and **dopamine** (these make you feel good, stimulate you, and help you deal with stress); **GABA** (relaxing and calming); **Serotonin** (keeps you happy, improves your mood); **Acetylcholine** (keeps brain sharp and improves memory); and **Tryptamines** – such as melatonin (keep you connected).



# Protein power



- Neurotransmitters are released from one neuron and sent across the synaptic gap to deliver their message to the next neuron. Each neurotransmitter only fits into one receptor site. When the message is delivered, an electrical signal passes from one neuron to another.
- Once a neurotransmitter has delivered its message, it is released from the receptor site and returns to the synapse where it is either reabsorbed, recycled or broken down and destroyed.
- Protein is vital since almost all neurotransmitters are made from it. You can influence how you feel by giving yourself the ideal quantity and quality of protein every day.

# How much protein is enough?

- Depends on your goals. Elite athletes can require up to 1 gram of protein per lb of body weight daily!
- Most people require 2 to 3 - 20gram servings of protein per day.
- Examples of 20 gram servings:
  - 1 cup quinoa
  - 1 small piece of salmon (100g serving)
  - 1 cup of seeds
  - 2 eggs
  - 125 grams of lentils and rice/beans and rice

# Guidelines for amino acids



## Animal Protein

fish  
chicken  
turkey  
eggs  
lean meat



## Vegetable Protein

quinoa  
chickpeas  
lentils  
beans  
peas  
corn  
wheat germ  
oat bran  
broccoli, cauliflower



## Nuts & Seeds

sesame  
pumpkin  
sunflower  
flax  
chia  
walnuts  
almonds  
pecans

# Vitamins & minerals – support players



# Vitamins & minerals – key roles



- Vitamins and minerals are key players in many processes. Without them, glucose cannot be turned into energy, amino acids into neurotransmitters, essential fats into more complex fats and choline and serine into phospholipids. They help build and repair the brain and nervous system and keep everything running smoothly.
- The sooner you start optimally nourishing your brain, the better. Every one of the 50 known nutrients plays an essential role in promoting brain health

# The B vitamins – mental health boosters

- The B-complex group of vitamins is vital for mental health. Deficiency of even one of the 8 B vitamins will rapidly affect how you think and feel.
- Where to find them?
  - **B1** – Romaine lettuce, asparagus, crimini mushrooms, spinach, sunflower seeds, tuna, green peas, tomatoes, eggplant, Brussels sprouts
  - **B2** – Crimini mushrooms, Calf's liver, spinach, romaine lettuce, asparagus, swiss chard, broccoli, collard greens, venison, yogurt, eggs
  - **B3 (niacin)** – Crimini mushrooms, tuna, chicken, salmon, Calf's liver, asparagus, lamb, turkey, tomatoes, shrimp, sardines, peas, collard greens
  - **B5** – Crimini mushrooms, cauliflower, broccoli, Calf's liver, sunflower seeds
  - **B6** – Spinach, bell peppers, garlic, tuna, cauliflower, bananas, broccoli, celery, asparagus, cabbage, crimini mushrooms, kale, collard greens, Brussels sprouts
  - **B12** – Calf's liver, sardines, venison, shrimp, scallops, salmon, eggs
  - **Folate** – Romaine lettuce, spinach, asparagus, Calf's liver, collard greens, broccoli, cauliflower, beets, lentils, Brussels sprouts, beans

# Other brain boosters

- **Vitamin C** – Bell peppers, parsley, broccoli, strawberries, cauliflower, lemon juice, romaine lettuce, Brussels sprouts, papaya, kale
- **Minerals**
  - **Calcium & Magnesium** – spinach, collard greens, basil, cinnamon, yogurt, swiss chard, cheese, kale, summer squash, pumpkin seeds, broccoli, nuts, seeds
  - **Manganese** – cinnamon, romaine lettuce, pineapple, spinach, turmeric, collard greens, raspberries, swiss chard, kale, nuts, seeds
  - **Zinc** – Calf's liver, crimini mushrooms, spinach, grass-fed beef, summer squash, nuts, seeds, fish

# Guidelines for vitamins & minerals



## Vegetables & Fruit

5-7 servings

dark green, leafy  
vegetables  
cruciferous  
vegetables  
berries  
bananas  
apples



**Supplement**  
multivitamin and  
mineral  
at least 25 mg  
of B vitamins  
10mcg of B12  
100mcg of folic acid  
200mg of Mg  
3mg of Mn  
10mg of Zn

consider Greens  
powder



**Nuts & Seeds**  
sesame  
pumpkin  
sunflower  
flax  
chia  
walnuts  
almonds  
pecans

# Water – keeps everything in motion

- The human body is anywhere from 55% to 78% water depending on body size. A rule of thumb, 2/3 of body consists of water, and it is the main component of human body.
  - ▣ Muscle consists of 75% water
  - ▣ Brain consists of 90% of water
  - ▣ Bone consists of 22% of water
  - ▣ Blood consists of 83% water



# You're not tired, you're thirsty!

- ❑ Transports nutrients and oxygen into cells
- ❑ Moisturizes the air in lungs
- ❑ Helps with metabolism – helps you burn fat
- ❑ Protects our vital organs
- ❑ Helps our organs to absorb nutrients better
- ❑ Helps regulate body temperature
- ❑ Detoxifies
- ❑ Protects and moisturizes our joints
- ❑ Every cell in your body needs water from head to toe.
- ❑ That is why it is so important to drink enough fluid.
- ❑ Brain consists of 90% water. If you are not drinking sufficient water, your brain cannot function well and you may get headaches or feel tired and slow-witted.
- ❑ Next time you feel tired or have a headache, ask yourself if it may be a sign of dehydration.

# Laughter is the best medicine



- You can help your brain learn and remember by creating new connections. Keeping your brain active keeps it flexible. Here are some ideas:
  - ▣ **Laughter** – humor works on the whole brain. Less than a half-second after you hear or see something funny, an electrical wave moves through the higher brain functions of the cerebral cortex; the left hemisphere analyzes the words and structure; the right hemisphere interprets the meaning. Meanwhile, the visual sensory area of the occipital lobe creates images; the limbic (emotional) system makes you happier; and the motor sections make you smile or laugh out loud. In short, laughter improves alertness, creativity and memory

# Get up and move



- **Exercise** – movement helps you think. The brain's cognitive and movement functions work side by side, sharing the same automatic process. Exercise also stimulates the production of brain chemicals such as Brain-Derived Neurotrophic Factor (BDNF) which encourages the growth of new nerve connections. Plus it releases the feel-good neurotransmitter, serotonin!
- **Easy steps** – park 2 blocks from the store or office and walk the distance; take the stairs rather than the elevator; schedule a walk with a friend; join a gym.

# Importance of light and dark



- **Balance light and dark** – changes in light can affect the brain. In the wintertime, the lack of sufficient light can cause seasonal affective disorder (SAD). When we move the clocks back and forth, there are more accidents on the road. The brain uses light to enhance alertness. Even ambient light positively influences hormone release and heart rate.
- **Sleep in the dark** – we also need darkness to synchronize our body clocks. Keep the light of television and electronics out of your bedroom and completely block out the street lights.

# Learning keeps the brain young



- **Learning** strengthens the whole brain – start by simply trying new things, visit a new place, learn a song, rearrange the furniture – they all stimulate the neurons. Or do normal things in odd ways such as brushing your teeth with your non-dominant hand, taking a new route home or sleeping on the wrong side of the bed. Learn something new like a new language, take up quilting or bridge, or take a community class in engine repair or gourmet cooking.

# Creative thinking stimulates whole brain

- **Create** – for years scientists believed the right side of the brain was responsible for creativity. Recent functional brain scans show that the whole brain engages in creative thinking. When you find yourself bored, allow your brain to turn to inspiration, day dream, what would you do with a million dollars? Build time for creative experience – try a new craft, put a sketch pad on your desk, or make dates to spend a half hour each day writing, painting, knitting or crocheting. You'll inspire yourself while building new brain connections!

# Nourishing the brain summary

- **Complex carbohydrates** – 5-7 servings of vegetables and fruits per day, eat with protein and fibre
- **Essential fatty acids** – mercury-free, PCB-free coldwater fish 2-3 times per week (such as Atlantic salmon, cod, herring, sardines, mackerel), nuts and seeds, flax oil – good quality fish oil supplement
- **Phospholipids** – choline from eggs, organ meat and lecithin, consider a brain booster supplement to include phosphatidylcholine (PC), phosphatidylserine (PS) and choline. DMAE not available for sale in Canada.
- **Amino acids** – 2-3 servings of good quality, vegetable and lean animal protein per day
- **Vitamins and Minerals** – 5-7 servings of vegetables and fruits per day (heard this before?), multivitamin and mineral supplement
- **Water** – urine should be pale, straw-coloured – about 1 to 1.5 litres/day
- **Keep brain active** – learn, create, laugh, move

# Resources

- Patrick Holford, *New Optimum Nutrition for the Mind*. Basic Health Publications, Inc: 2009
- World's Healthiest Foods website – whfoods.org
- Alan C. Logan, ND, FRSH, *The Brain Diet: The Connection between Nutrition, Mental Health, and Intelligence*. Cumberland House, Nashville, Tennessee: 2006
- Sondra Kornblatt, *Eating for Brilliance*. Well Being Journal: March/April 2012
- Sondra Kornblatt, *Five Ways to Increase your Brain Power*. <http://www.huffingtonpost.com/sondra-kornblatt>
- Blog post by Josh Gitalis, *Preventing Neurodegenerative Disease*. <http://www.joshgitalis.com>