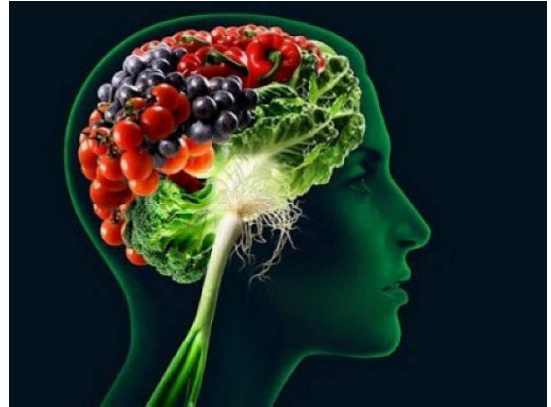




## HOW YOUR FOOD CHANGES YOUR BRAIN

The foods you choose to eat on a daily basis have a significant effect on your brain - influencing mood (anxiety & depression), behaviour (motivation) and executive function (memory, learning, decision making).

It is true that eating a healthy well balanced diet is essential for good health, vitality and mental acuity. A healthy diet reduces the risk of chronic diseases such as heart disease, type II diabetes, obesity and some cancers as well as reducing risk of anxiety, depression, dementia, and Alzheimer's disease, whilst simultaneously promoting brain plasticity and enhancing cognitive function.



Whereas a Western diet\* negatively impacts cognitive function and is associated with an increased risk of dementia, anxiety, and depression. With one study finding that greater adherence to a Western diet is associated with significantly smaller hippocampal volume, while higher adherence to a healthy diet is associated with significantly larger hippocampal volume. The hippocampus is an area of the brain essential to executive function as well as mood regulation – with lower volumes implicated in depression.

## HOW DOES IT WORK?

Scientists are still uncovering the potential mechanisms surrounding the relationship between food and the brain, but emerging evidence suggests that inflammation, oxidative stress, and the gut microbiota play key roles. What we eat has a major impact on these physiological pathways and fuelling ourselves poorly can result in cell damage or death, stimulate the stress response increasing cortisol levels, and inhibit neuroplasticity\* (brain's ability to adapt and change), all of which are detrimental to cognitive function and mental health.

- **Inflammation** – a Western diet stimulates the immune system increasing circulating cytokines which activate the Hypothalamus-Pituitary-Adrenal (HPA) axis thereby increasing cortisol levels. Cortisol has an anti-inflammatory effect, however, if cortisol levels are constantly elevated due to chronic stress or chronic inflammation from food then the body becomes de-sensitised to cortisol's anti-inflammatory effects, resulting in excessive inflammation. Inflammation results in cell and tissue damage within the body and the brain. Inflammation has been associated with depression, dementia and Alzheimer's disease.
- **Oxidative stress** – a Western diet is often low in vegetables and fruits which contain powerful anti-oxidants. Anti-oxidants neutralise harmful free radicals, reducing oxidative damage to cells. Oxidative damage and low anti-oxidant levels are associated with Alzheimer's disease.
- **Gut Microbiota Imbalance** – We all have naturally occurring bacteria living within our intestine, known as the gut microbiota. Emerging research indicates that the gut microbiota communicates with the brain and can have significant effects on immune system function, the stress response, brain function and behaviour – even influencing our cravings for fatty and sugary foods! The overgrowth of certain strains of gut bacteria has been associated with depression and anxiety, and has been shown to stimulate the stress response and increase inflammation. Whereas strains of beneficial bacteria stimulate the relaxation response, reducing cortisol and inflammation. Beneficial gut bacteria also regulates serotonin levels which influences mood, behaviour (motivation), memory and sleep. The food we eat has a significant effect on our gut microbiota, with a Western diet causing detrimental imbalances associated with depression, anxiety and impaired cognitive function.

\*Western diet = high in refined sugar, high in saturated & trans fats, high in processed foods, low in fibre and anti-oxidants (plant-based foods).

\*Neuroplasticity, especially in the Hippocampus, is essential for higher executive functions & cognitive performance, and preventing cognitive decline.



## SO, WHAT IS A HEALTHY DIET?

For the general population the following healthy eating guidelines adapted from Harvard School of Public Health are recommended.

- **Vegetables:** Eat an abundant variety, the more the better. Limited consumption of potatoes is recommended, however, as they have a high glycaemic load which rapidly increases blood sugar.
- **Fruits:** Choose a rainbow of fruits every day aiming for as many different colours as possible.
- **Whole Grains:** Choose whole grains, such as quinoa, barley, buckwheat, amaranth, oats, wild rice and brown rice. Refined grains, such as white bread and white rice, act like sugar in the body. Eating too many refined grains causes blood sugar imbalances which increase inflammation in the body, raising the risk for disease.
- **Healthy Proteins:** Choose fish, poultry, beans, or nuts, which contain healthful nutrients. Limit red meat and avoid processed meats, since eating even small quantities of these on a regular basis raises the risk of heart disease, type 2 diabetes, colon cancer, and weight gain.
- **Healthy Oils:** Use olive and other plant oils in cooking, on salads, and at the table, since these healthy fats reduce harmful cholesterol and are good for the heart. Limit butter and avoid trans-fat.
- **Water:** Drink water, tea, or coffee (with little or no sugar). Limit milk and dairy (1-2 servings per day), and avoid sugary drinks.
- **Focus on natural real foods.** Studies consistently show that the use of dietary supplements in humans does not result in health benefits equivalent to the health benefits gained from dietary sources of nutrition. It is always best to get your nutrients from a well-balanced healthy diet rather than relying on supplements. Supplements are designed to 'supplement' a healthy diet, not fix a poor diet. In certain situations, where nutrient deficiencies are present, supplements may be needed but this should always be in combination with a healthy diet.

## NUTRITION STRATEGIES TO BOOST BRAIN HEALTH

In addition to a healthy diet including more of the following foods can help to promote cognitive function:

- Pro-biotics are specific strains of live bacteria found in supplements and in fermented foods. Examples of fermented foods include yoghurt, pickled vegetables, miso, sauerkraut, kimchi, and kombucha. Consuming these foods can help to increase beneficial strains of gut bacteria.
- Pre-biotics are foods that feed the beneficial strains of gut bacteria and are generally found in high fibre indigestible carbohydrates such as vegetables, fruits and wholegrains. Specific pre-biotic foods include onions, garlic, leeks, asparagus, Jerusalem artichoke, bananas, chicory root, seaweed (Wakame, nori), flaxseeds, oats, apples and cocoa.
- Include sources of the omega-3 fatty acid DHA found in fish, particularly salmon. DHA is essential to maintain healthy brain structure and function, and promotes neuroplasticity by increasing BDNF\* levels. The omega 3 fatty acids contained in fish oils are thought to reduce inflammation in the brain and promote neurogenesis (growth of new brain cells).
- Include plant-based foods rich in polyphenols which are generally abundant in vegetables and fruits. Polyphenols are powerful anti-oxidants which reduce inflammation and cell death, and support neuroplasticity and cognitive function. Examples of polyphenols include curcumin found in turmeric and resveratrol found in grapes and berries.

\*BDNF – Brain Derived Neurotrophic Factor plays a crucial role in the development and plasticity of the brain. BDNF promotes the survival and aids in the regeneration of neurons, enhances synaptic growth, promotes learning and protects against cognitive decline. Low levels of BDNF have been implicated in mood and anxiety disorders, with decreased BDNF levels found in post-mortem studies of suicide depression patients. Adherence to a Western diet has been shown to reduce BDNF levels, inhibiting neuroplasticity. Neuroplasticity, especially in the Hippocampus, is essential for higher executive functions & cognitive performance, and preventing cognitive decline.



## WANT TO KNOW MORE?

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