

A Scientific Study on the Necessity of *Aahar* for the Brain

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ABSTRACT

Ayurveda is a branch of life science that focuses on preserving bodily wellness as a whole. The body is divided into six divisions according to *ayurveda*, which is known as *Shadanga Shareer*. Four *Shakha* (extrimities), *Madhya* Shareer (trunk), and *Shira* (Head) constitute this *Shadanga Shareer*. *Shira*, who is a component of *Trimarma* (Vital Organ), is the *Pradhan Indriya* among all.

Most memory issues, according to *Ayurveda*, are associated with the *kapha dosha*, which is known for its dense, thick, mushy, and sticky characteristics. The "film" of the brain's white matter, or *Tarpaka*, a sub-*dosha* of *Kapha*, serves as a storage medium for memories, experiences, and emotions. The brain and other nerve tissue are nourished and safeguarded by this unique tissue. The common symptoms of *Kapha* stagnation include heaviness and a dull mind.

A blood that has an oily, thick consistency from having high triglycerides (or blood fat), which may result in a slow flow of blood through the blood-brain barrier, is an indication of high *Kapha*. Fasting is recommended by *Ayurveda* to strengthen the brain and neurological system, promote digestion, and rid the body of impurities. Energy is turned inward during a fast in an effort to purify and detoxify the body.

For three to five days, one can follow a *khichari* fast, a filling dish made from split *mung dal* and white basmati rice.

Our brain requires nutrition to remain healthy and function correctly, just like our body does. The brain consumes a lot of energy. To maintain concentration throughout the day, the body consumes about 20% of its daily caloric intake. Omega-3 fatty acids support brain cell growth and repair.

There are many natural brain nutrients that we need to start including into our everyday diets right away.

Key Words *Ayurveda, Diet, Kapha, Food, Shira, Tarpaka*

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INTRODUCTION

According to *Acharya Charaka Shira a* (head) is *Uttamang* (foremost) among all organs as it is the region of the body where the vital centres and all the *Indriya* (senses) of a living-being are situated¹.

The *Shira* transmits sensory and vital impulses through all sense organs and channels in a manner similar to how the sun's rays diverge. We can associate the *Trimarma Shira* with the brain. The passage of *prana* (life force energy) throughout the body is controlled by a number of

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significant *marma* sites located in the *Shira* (head). Therefore, using good food to support the brain's health is important.

For a healthy and normal brain, *Ayurveda* recommends certain dietary suggestions. Bone marrow is the term used in *Ayurvedic Samhitas* to describe brain tissue. Foods that are thought to be good for brain tissue—like those that are soft and fatty—are thought to be comparable in structure. Since the brain is also regarded as soft and oily, it is strongly advised to consume healthy fat. Ghee might take the place of this. Foods that have been separated from a hard shell, such as walnuts and coconut, are likewise seen as advantageous.

The fatty tissues of the brain are known to be affected by a variety of brain conditions, including dementia. So it makes sense that eating foods high in healthy fats may be helpful².

AIM

To review, discuss and elaborate the various concepts and principles related to *Ahar* for the brain along with its anatomical and physiological overview.

MATERIALS AND METHODS

This article is based on various *Ayurvedic* texts such as *Dravyaguna*, *Ashtang hridaya*, *Charak samhita*. We also searched and referred various websites to collect the relevant information regarding this topic.

Discussion:

Selective nutrients that are essential and also affect cognitive function of brain:

1. Omega-3 fatty acids:

The omega-3 family of fatty acids includes a wide variety of components. EPA, DHA, and ALA are the three most essential ones.

(1) EPA (eicosapentaenoic acid):

A 20-carbon long omega-3 fatty acid is called EPA. Fish oil, seafood, and fatty fish are the main sources of it. This fatty acid serves a variety of vital purposes. Most significantly, it's utilized to produce the signalling chemicals known as eicosanoids. They can lessen inflammation.

EPA is highly beneficial in treating several mental illnesses, including depression.

(2) DHA (docosahexaenoic acid):

DHA is an omega-3 fatty acid with 22 carbons. Food sources are the same as EPA sources. DHA's primary function is to act as a structural element in cell membranes, especially in the nerve cells of the brain and eyes. The polyunsaturated fats in the brain comprise roughly 40% of it.

DHA is essential for both breastfeeding and pregnancy. It is extremely necessary for the nervous system's growth.

DHA can be found in high concentrations in breast milk, depending on the mother's diet.

(3) ALA (alpha-linolenic acid):

ALA is an omega-3 fatty acid with 18 carbons. It is the most prevalent dietary source of omega-3 fatty acids and is present in a number of high-fat plant foods, particularly flax, chia, and walnut seeds, canola, soybean, and soybean oil. ALA

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serves primarily as an energy source and has few other biological uses. However, it is regarded as a necessary fatty acid. This is because, as we have already shown, our body can transform it into EPA and DHA, omega-3 fatty acids with numerous vital biological roles.

Functions of the **Omega-3 fatty acids** for the brain are as below:

Depression and anxiety:

The signs of depression and anxiety can be lessened by taking omega-3 supplements, such as fish oil.

ADHD:

Omega-3 fatty acid supplements can greatly reduce a number of symptoms in kids with ADHD.

Baby development:

DHA consumption during pregnancy and lactation helps the baby's brain and visual development.

Dementia:

A higher omega-3 consumption has been linked in certain studies to a lower risk of dementia and Alzheimer's disease.

Alpha-linoleic acid, another omega-3, is used by the body to create EPA and DHA, as is well known (ALA).

Animals who consume diets devoid of omega-3 fatty acids have lower levels of DHA in their brains and are more likely to have learning and memory problems. The reduced brain size in older persons has been linked to lower blood levels of DHA, which is a symptom of accelerated brain ageing.

Therefore, in order to prevent some of the negative effects on brain function and development, one must consume enough omega-3 fatty acids³.

2. Curcumin:

The primary biologically active phytochemical in turmeric is *curcumin*. Numerous research conducted over the past 50 years have shown that *curcumin* has a preventive effect on almost all health ailments. In addition to its preventive effects against diseases of peripheral organs, the compound is known to have neuroprotective qualities as well⁴.

Curcumin has a low molecular weight and a polar shape that efficiently allow it to cross the blood-brain barrier. *Curcumin* has been shown in animal experiments to accelerate adult hippocampal neurogenesis by boosting the number of newly formed cells in the dentate gyrus area of hippocampus⁵.

Low doses of *curcumin* have been reported in one recent study to be protective in the treatment of Alzheimer's disease by successfully disaggregating beta amyloid and preventing the development of fibrils and oligomers. *Curcumin's* potential as an antidepressant is the subject of exponentially growing research. Through controlling the release of serotonin and dopamine, *curcumin* has antidepressant properties. The concentration of neurotrophic factors (BNDF) like brain derived neurotrophic factor is increased by *curcumin*⁶.

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Curcumin increases insulin's ability to reduce blood sugar levels and prevents the development of diabetic neuropathy⁷.

Nootropic herbs (*Medhya Rasayana*) in Ayurveda:

Evidence based approach towards the Ayurvedic *Medhya* herbs:

Four medicinal plants—*Mandukaparni* (*Centella asiatica* Linn.), *Yastimadhu* (*Glycyrrhiza glabra* Linn.), *Guduchi* (*Tinospora cordifolia*), and *Shankhapushpi* (*Convolvulus pleuricaulis* Choisy)—that have a variety of uses for various systems constitute the *Medhya Rasayana* group, which may be used independently or together. However, other places in the old *Ayurvedic* textbooks describe a few more medications used for the same purpose in practise.

Aindri (*Bacopa monniera*), *Jyothishmati* (*Celastrus panniculata*), *Kushmanda* (*Benincasa hispida*), *Vacha* (*Acorus calamus*), and *Jatamamsi* (*Nardostachys jatamamsi*) are the varieties.

➤ ***Mandukaparni* (*Centella asiatica* Linn.):**

Fresh entire plant juice acts as a *Medhya* (cognitive enhancer) remedy. Saponin, which includes medacoside, asiaticoside, medacassoside, asiatic acid, and triterpenic acid, are the main components. They are not only neuroprotective but also have behavioural effects. Direct or indirect manipulation of the ATPase activity can have an anti-seizure effect.

AChE is inhibited by *Centella asiatica*, which prevents the memory loss brought on by scopolamine. *Centella asiatica* is an ingredient in

BR-16A (Mentat), a product known for its anti-stress properties.

Mandukaparni is a traditional remedy for mental exhaustion, anxiety, sadness, forgetfulness, and sleeplessness. According to current medical studies, the plant is capable of neuroregeneration, or the production of new nerve cells.

By blocking excessive AChE activity, *Mandukaparni* raises the levels of neurotransmitters in the brain, particularly acetylcholine. It also improves blood circulation within the brain, which supplies enough oxygen to the brain cells.

➤ ***Yashtimadhu* (*Glycyrrhiza glabra* Linn.):**

For medicinal purposes, finely ground dried root is taken internally with milk and this act as *Medhya*⁸.

Glycyrrhizine, flavonones, isoflavones, glycyrrhetic acid, and six phenolic compounds constitute the active components. Glycyrrhizine and flavonones may be responsible for the multidimensional actions of *Yashtimadhu*⁹.

Glycyrrhiza glabra's roots and rhizomes are effective brain tonics that improve circulation to the central nervous system and stabilise blood sugar levels.

Liquorice significantly improves cognitive function in dementia patients. On scopolamine-induced dementia, it greatly enhanced learning and memory. Its root is renowned for its anti-stress, anti-leprotic, and anti-malarial properties.

➤ ***Guduchi*:**

The plant *Tinospora cordifolia* is well known for being a rich source of trace elements (Zinc and

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Copper), which function as antioxidants and guard cells from the negative effects of oxygen radicals produced during immunological activation¹⁰.

➤ **Aindri (Bacopa monniera):**

Macerated entire plant juice is the most useful therapeutic form. It is claimed that the properties are similar to those of *Mandukaparni*. A well-known nootropic herb recognised for its calming, sedative, cognitive, hepatoprotective, memory-improving, and antioxidant effects is *Bacopa monniera*¹¹. Its ability to scavenge reactive oxygen species may explain its neuroprotective action. A plant rich in saponins is *Bacopa monniera*¹². The primary active nootropic ingredient in the plant's alcoholic extract is bacosides.

➤ **Kushmanda (Benincasa hispida):**

Benincasa hispida contains alkaloids, flavonoids, saponins, and steroids, according to phytochemical research¹³.

Through both direct and indirect antioxidant activity, it has a tissue-protective preventative impact on Alzheimer's disease caused by colchicine.

In the management of *Chittodvega* (anxiety disorders), *Kushmandadi Ghrta* achieved notable successes¹⁴.

➤ **Vacha (Acorus calamus):**

Kanda is an important component with *Medhya* quality. The active chemical constituents include asarone, elemicine, cis-isoelemicine, cis and trans isoeugenol, and their methyl ethers, camphene, P-cymene, bgurjunene, a-selinene, b-cadinene,

camphor, terpinen-4-ol, aterpineol, and a-calacorene, as well as¹⁵.

➤ **Jatamamsi (Nardostachys jatamamsi):**

Rhizome is *Medhya* and helps psychiatric issues. A terpenoid ester called nardostachysin is present in rhizomes. Hysteria, epilepsy, and convulsions can all be treated using *N. jatamamsi* roots and rhizomes¹⁶. Additionally, neurological diseases, sleeplessness, and cardiovascular system disorders¹⁷ are treated using the drug's decoction¹⁷.

➤ **Ashwagandha:**

It is an adaptogen plant that can aid in controlling cortisol production and stress management. *Ashwagandha* has also become well-known as a great herb for people who want to sharpen their minds and get better sleep¹⁸.

Sitoinosides VII–X, withaferin A, withanosides IV, withanols, withanolide A, withanolide B, anaferine, beta-sitosterol, and withanolide D have been identified as *Ashwagandha*'s neuroprotective phytoconstituents, and they have important pharmacological effects on brain disorders, particularly anxiety, Alzheimer's, Parkinson's, and schizophrenia¹⁹.

CONCLUSION

The conclusion of the article summarises the findings of recent studies on Ayurvedic herbs that point to their extensive potential as neuroprotective and neurogenerative qualities in a variety of brain disorders. This potential is supported by preclinical studies, clinical trials, and published patents.

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However, there are numerous molecular pathways that these herbs use to impart their neuroprotective effects that need for further research in order to promote them as lifestyle changes.

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