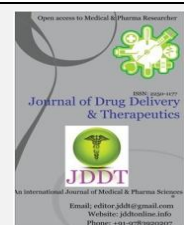


Available online on 15.10.2018 at <http://jddtonline.info>

Journal of Drug Delivery and Therapeutics

Open Access to Pharmaceutical and Medical Research

© 2011-18, publisher and licensee JDDT, This is an Open Access article which permits unrestricted non-commercial use, provided the original work is properly cited

Open  Access

Review Article

NOOTROPICS AGENTS: PHARMACEUTICAL ASPECT, COMMON EXAMPLES AND THEIR APPLICATIONS

Leena Sakhare Vitthalrao*

Department of Pharmaceutical Sciences, Bhagwant University, Ajmer Rajasthan India

ABSTRACT

Nootropics compounds are one of the important categories of medicinal agents act as cognitive enhancers and neuroprotective. These agents mainly used to improve memory related functioning of brain. Nootropic compounds exhibited various neural activities and boost functioning of central nervous system including improvement of intellectual, memory and learning capacity. These agents also offer significant relief in various neurodegenerative disorders such as parkinson disease and alzheimer disease. Drugs, nutraceuticals, supplements and functional foods may be used as nootropics agents to enhance concentration and memory. Various synthetic & semi synthetic agents, material from natural origin such as; herbs, animal products and minerals may also act as potent nootropic agents. This article presented a pharmaceutical consideration of nootropic agents in a view to explore this area for future perspective.

Keywords: Nootropics, Memory, Cognitive, Brain, Neuroprotective



Article Info:

Received 27 Aug, 2018; Review Completed 27 Sep 2018; Accepted 29 Sep 2018; Available online 15 Oct 2018

Cite this article as:

Vitthalrao LS, Nootropics Agents: **Pharmaceutical Aspect**, Common Examples and Their Applications, Journal of Drug Delivery and Therapeutics. 2018; 8(5-s):59-61 DOI: <http://dx.doi.org/10.22270/jddt.v8i5-s.1940>

INTRODUCTION

The brains as important part of body control intellectual activities and considered responsible for memory which is defined as ability to record event, information and things and retaining them for certain periods of time. There are various conditions such as age, stress, disease and excessive emotional response may lead to loss of memory, loss of learning ability and altered mood & behavior¹⁻⁴. These conditions may be treated by using nootropic agents which help to improves learning abilities and memory. These agents also help to organized mood and behavior thus offer cognitive enhancers effect. There are various nutraceuticals, supplements and functional foods available in market which act as cognitive enhancers and used as nootropic agents. Herbal plants like *Prunus amygdalus*, *Hibiscus sabdariffa*, *Clitoria ternatea*, *Baccopa monniera* and *Centella asiatica*, etc. also offers prompt nootropic effect therefore may be used as chief ingredients of various nootropic formulations; nutraceuticals and

supplements. These agents additionally may also offer other pharmacological activities such as antioxidant and neuroprotective effects³⁻⁶.

PHARMACEUTICAL CONSIDERATION OF NOOTROPIC AGENTS

Modern drugs such as; piracetam, pramiracetam, aniracetam and cholinesterase inhibitors like onepezil may be used as nootropic agents since they possess ability to improve memory, mood and behavior. However these agents may sometimes offers side-effects which restricted their uses thus natural products or food supplements recommended as safer nootropic agents.

The phyto-constituents present in various parts of the plants viz., leaves, flower, flower buds, stem bark, stem, seeds and roots offering antioxidant and neuro-protective effect used as nootropic agents⁴⁻⁷.

These agents offer therapeutic relief in other degenerative disorders such as; alzheimer's disease,

schizophrenia, attention deficit hyperactivity disorder, parkinson and neurological impairment⁸⁻⁹.

Table 1: Examples of Some Nootropic Agents

S. No.	Food	Supplements	Prescription medications
1	Caffeine	Piracetam	Adderall
2	Coffee	Adrafinil	Ritalin
3	Red Reishi	Phenibut	Concerta
4	Mushrooms	Noopept	

PRINCIPLE MECHANISMS OF ACTION OF NOOTROPIC AGENTS

- ❖ Decreases malondialdehyde levels in brain, increases levels of antioxidant molecules such as; glutathione and superoxide dismutase.
- ❖ Interaction with dopamine-D2, serotonergic and GABAB receptors.
- ❖ Reduction of MAO-A and plasma corticosterone levels.
- ❖ Reduces the concentration of noradrenaline and decrease turnover of central monoamines.
- ❖ Inhibition of acetylcholinesterase activity in brain.
- ❖ Increases content of lipids and phospholipids in brain.
- ❖ Protects neurons against glutamate-induced toxicity.
- ❖ Modulation of NMDA receptor activity.
- ❖ Free-radical-scavenging activity; reduces H₂O₂-induced cytotoxicity and DNA damage.

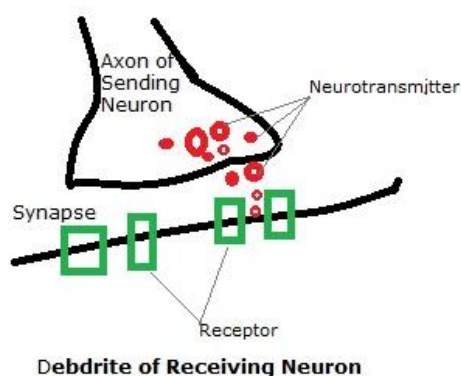


Figure 1: Dendrite of Receiving Neuron

NOOTROPIC AGENTS

• *L-Theanine*

L-Theanine is an amino acid, found in tea and help to improve concentration and protect brain against neurodegeneration.

• *Caffeine*

Caffeine act as a central nervous system stimulant, improve alertness and concentration. It also enhances alertness and improves reaction time.

• *Omega-3's*

Omega-3 fatty acid is very essential for a healthy brain. It reduces impairment between brain cells, enhances thinking ability, improve memory and focusing ability. Various foods containing Omega-3's like; walnuts, chia seeds and sea food, etc. offers beneficial effect in different degenerative disorders.

Synthetic Nootropic Agents

• *Piracetam*

Piracetam is synthetic nootropic molecule which improves memory during aging, control mental decline and used for geriatric care.

• *Phenotropil*

Phenotropil is another synthetic drug which is widely available as supplement. It helps brain to recover from various injuries like stroke, epilepsy and trauma. It also enhanced memory in animal model.

• *Modafinil (Provigil)*

Modafinil is a prescription drug used to treat narcolepsy, it's also offers stimulating effects, improves memory, enhances executive functioning and improves reaction time.

Natural Nootropic Agents

• *Panax Ginseng*

Panax ginseng root used to boost brain functioning. *Panax ginseng* reduces brain fatigue, improves mental performance, protect brain from oxidative stress and enhance memory.

Ginkgo Biloba

Ginkgo biloba tree offers positive effects on brain, improve memory, reduces stress-related high blood pressure, decreases levels of cortisol and prevent brain from oxidative stress.

Bacopa Monnieri

Bacopa monnieri is an herb used as Ayurvedic medicine to enhance brain function. It reduces reaction time,

improve memory and protect brain from oxidative stress. *Bacopa monnieri* contains bacosides which is considered responsible for nootropic effects of herbs. Bacosides improve signaling in hippocampus thus boost memory related functioning of brain.

CONCLUSION

Nootropics are drugs act as memory enhancers, elevates mood and concentration levels. They have gained popularity in today's highly competitive society and are most often used to boost memory, focus, creativity, intelligence and motivation.

Nootropics also decreases platelet aggregation, increase cerebral blood flow and oxygen consumption. Herbs, nutraceuticals and food supplements may be used as nootropics agents for controlling neurodegenerative disorders.

REFERENCES

1. Bhanumathy M, Harish MS, Shivaprasad HN, Sushma G Nootropic activity of *Celastrus paniculatus* seed. Pharm. Biol. 2010; 48(3):324-327.
2. Cook L, Weidley E Behavioural effects of some psychopharmacological agents. Ann. NY. Acad. Sci. 1957; 66:740-752.
3. Giurage C. The "nootropic" approach to the integrative activity of the brain. Cond. Reflex. 1973; 8(2):108-115.
4. Jakka Al A study on nootropic activity of *Celastrus paniculata* wild whole plant methanolic extract in rats. Asian. J. Pharm. Clin. Res. 2016; 9(1):336-341.
5. Schever K, Rostock A, Bartsch P, Muller WK. Piracetam improved cognitive performance by restoring neurochemical deficits of the aged rat brain. Pharmacopsychiatry 1999; 32 Suppl 1:10-6.
6. Michael S. (2006) The Ethical Brain: The Science of Our Moral Dilemmas (P.S.). N.Y: Harper Perennial. p. 184.
7. Paula J (2008). The medical basis of psychiatry. Totowa, NJ: Humana Press. ISBN 1-58829-917-1.
8. Gattu M, Boss KL, Terry A V, Buccafusco JJ. (1997) Reversal of scopolamine-induced deficits in navigational memory performance by the seed oil of *Celastrus paniculatus*. Pharmacol Biochem Behav, 57(4): 793-799.
9. Malik J, Karan M, Dogra R. (2017) Ameliorating effect of *Celastrus paniculatus* standardized extract and its fractions on 3-nitropropionic acid induced neuronal damage in rats: possible antioxidant mechanism. Pharm Biol, 55(1): 980-990.

JDDDT