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# NUTRACEUTICAL TRENDS FOR BRAIN HEALTH

## Upgraded Review

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### ABSTRACT

"Nutraceuticals" are food-based products greatly used because of its presumed health-promoting or disease-curing effects. In recent years, many efforts are aimed at assessing nutraceutical efficacy and safety, but these factors are difficult to deal with because of the complex chemical compositions and multiple modes of action. Nutraceuticals also can be considered a valuable source of new "lead compounds", creating the chance to discover new classes of therapeutic agents. This review provides information on these themes, showing the new challenges that comprehensive medicinal chemistry research is aimed to answer in the field of nutraceuticals. Other contributions address key emergent issues like bioavailability, formulation, blood-brain permeability, neuronal health, and inflammation that impact upon how nutraceuticals ultimately leverage the brain to function better.

**KEYWORDS:** Nutraceutical, Neurodegeneration, Functional food.

### INTRODUCTION TO NUTRACEUTICALS

Major scientific and engineering advances in recent decades have led to a rise in the development of expensive, high-technology medical and surgical procedures and drug therapies. At the identical time, however, there has been a rise in the number of people turning to alternative medical therapies, which emphasize the importance of a 'good diet' in maintaining and restoring health.

The term "nutraceutical" was coined from "nutrition" and "pharmaceutical" in 1989, by Stephen DeFelice, MD, founder and chairman of the inspiration for Innovation in Medicine. A nutraceutical is defined as "Any substance that may be considered a food/part of a food and imparts medical or health benefits, including the prevention and treatment of disease". Such products may range from isolated nutrients, dietary supplements and diets to genetically engineered 'designer' foods, herbal products, and processed foods like cereals, soups, and beverages.

Nutraceuticals have important role in the treatment of various chronic diseases such as colon cancer, diabetes, and Alzheimer's disease. Nutraceuticals are derived from various natural sources like medicinal plants, marine organisms, vegetables, and fruits. Nutraceuticals could also be used to improve health, delay the aging process, prevent chronic diseases, increase anticipation, or support the structure or function of the body. Recent studies have shown promising results for these compounds in various pathological complications like diabetes, atherosclerosis, cardiovascular diseases (CVDs), cancer, and neurological disorders.

## Nutraceuticals - An Introduction

### Classification of Nutraceuticals

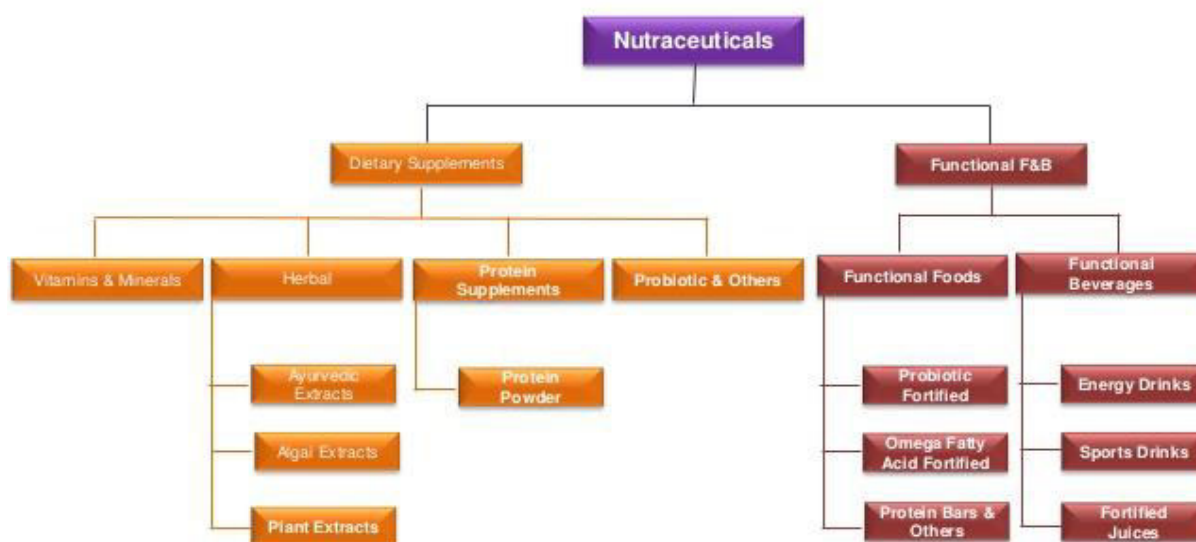


Figure No.1

The WHO predicts that by 2020 over 65 million people will have dementia and the prevalence of other neurodegenerative brain diseases, like Alzheimer's, is additionally increasing. The pressure to supply successful treatments is rising but has proved unsuccessful so far. Scientists are increasingly looking to food products to assist in slowing disease progression and treating symptoms. Nutraceuticals usage cause diversification in pharmaceutical industry.

**Recent Trends in Nutraceutical Research:** Recent developments within the field of Nutraceuticals and food science have specific aims at improving the benefits of functional foods. Food polymers in delivering dietary bio-actives and the security and Efficacy of emerging Nutraceuticals in the global market are categorized as sub-tracks.

Nutraceutical (from nutrition + pharmaceutical) may be a commercial term used for foods or food products that might help to prevent and treat diseases. Nutraceuticals can include

- Minerals, vitamins, and other dietary supplements
- Herbal products
- Dietary enzymes: bromelain, papain
- Dietary fiber
- Hydrolyzed proteins
- Phytonutrients: resveratrol
- Carotenoids: lycopene
- Prebiotics
- Probiotics

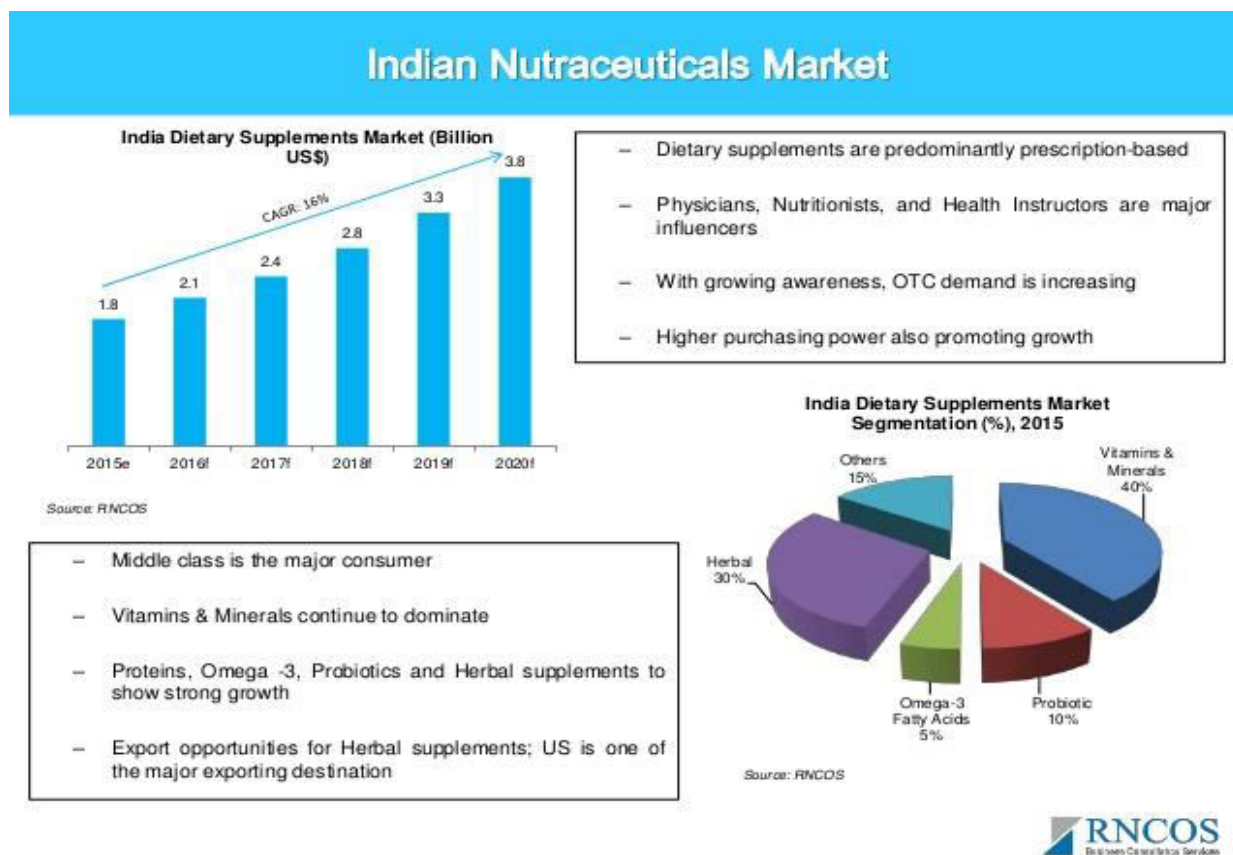


Figure No.2

Nutraceuticals are usually natural substances and, unlike drugs, aren't substances synthesized for a certain purpose. Nutraceuticals offer opportunities for pharmaceutical companies to form their products more consumer-oriented, and for food producers to make brands with a medical image. Adding vitamin supplements or omega-3 could potentially transform a mainstream food substance, while brands traditionally related to pills could broaden into drinks and snack bars. These examples show that innovation is coming from both directions, so successful nutraceutical companies will need to keep their eyes on competitors from both food and pharmaceuticals.  
 Eg: Yakult used as nutraceutical

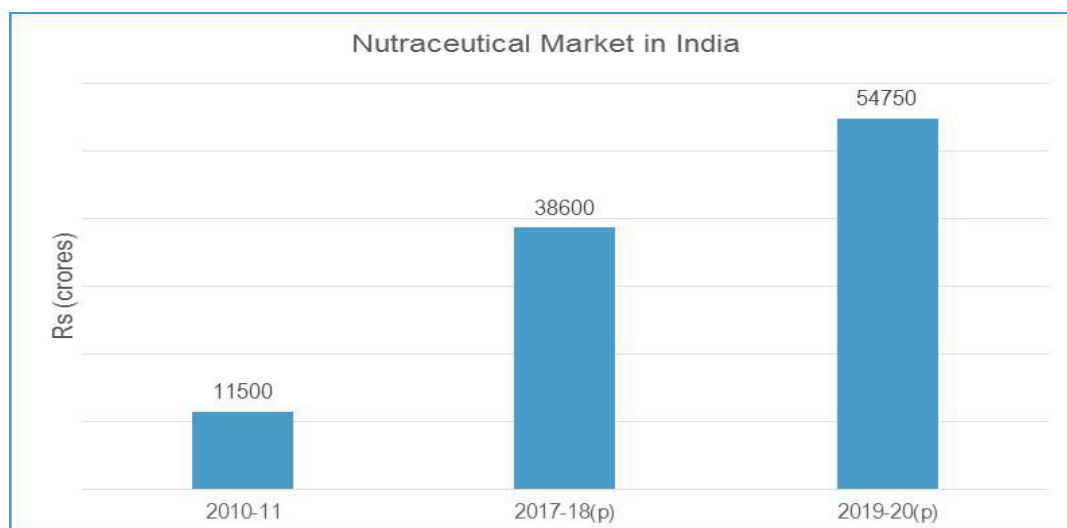


Figure No.3



**DESCRIPTION**

Nutritional supplement research concerning brain health and nervous disorder is becoming an important focus. This comprehensive introduction to bioactive nutraceuticals for brain and neurological provides a foundation review for research by neuroscientists, clinical neurologists, pharmacology researchers, and nutrition scientists.

**Key Features for research of nutraceuticals for brain health are:**

- \* Research from content including nutrition and brain health
- \* Reviews about nutritional supplements and their impact on the brain should be included.

**CINNARIZINE:**

Cinnarizine is an antihistamine and calcium channel blocker of the diphenylmethylpiperazine group. [1] It's also known to promote cerebral blood flow, then is used to treat cerebral apoplexy, post-trauma cerebral symptoms, and cerebral arteriosclerosis.[2] However, it's more commonly prescribed for nausea and vomiting due to motion sickness[3] or other sources such as chemotherapy,[4] vertigo,[5] or Meniere's disease.[6]

The nonproprietary name springs from the cinnamyl substituent on one of the nitrogen atoms, combined with the generic ending "-rizine" for "antihistaminics/cerebral (or peripheral) vasodilators". [7] It's not available in the United States or Canada. it's also been cited as one of the most used drugs for seasickness within the British Royal Navy. [8]

It acts by interfering with the signal transmission between the vestibular system of the inner ear and the vomiting centre of the hypothalamus by limiting the activity of the vestibular hair cells which send signals about movement.[11] It's also effectively combined with other nootropics, primarily piracetam; in such combination, each drug potentiates the opposite in boosting brain oxygen supply.

Action of cinnarizine	Target of action
Calcium ion channel antagonist	T-type calcium channels
Antihistaminic	H1 receptors
Antiserotonergic	5-HT2 receptors
Antidopaminergic	D2 receptors

**CITICOLINE:**

Citicoline (INN), also referred to as cytidine diphosphate-choline (CDP-Choline) or cytidine 5'-diphosphocholine is an intermediate in the generation of phosphatidylcholine from choline, a standard biochemical process in cell membranes. Citicoline is of course occurs in the cells of human and animal tissue, particularly the organs. Studies suggest that CDP-choline supplements increase dopamine receptor densities.[1]

Citicoline shows its positive effect on cognition for improving brain health. The neuroprotective effects exhibited by citicoline because it preserves cardiolipin, sphingomyelin, arachidonic acid content of phosphatidylcholine, and phosphatidylethanolamine, and it partially restores phosphatidylcholine levels, and stimulates glutathione synthesis and glutathione reductase activity and these all activities of citicoline improves brain health. Citicoline augments cellular communication by increasing the supply of neurotransmitters, including acetylcholine, norepinephrine, and dopamine.

**PIRACETAM:**

Piracetam (sold under many brand names) may be a medication in the Racetams group, with the chemical name 2-oxo-1-pyrrolidine Acetamide. it's approved in the United Kingdom[2] but is not approved in the United States. [3][4] Within the UK, piracetam is prescribed mainly for myoclonus. [5] but is employed off-label for other conditions. it's marketed as a nootropic (cognitive enhancer). Studies of Piracetam's cognitive effects have had equivocal results, sometimes showing modest benefits in specific populations and sometimes showing minimal or no benefit.[6]

Piracetam has been found to diminish erythrocyte adhesion to vascular wall endothelium, making any vasospasm within the capillary less severe. This contributes to its efficacy in promoting microcirculation, including in the brain and kidneys. Suggested uses include Alzheimer's disease, dementia, memory function, alcoholism, Raynaud's phenomenon, deep vein thrombosis (DVT), stroke, dyskinesia, dyslexia, brain injury, and vertigo.

**METHYLCOBALAMINE:**

Methylcobalamine(mecobalamin, MeCbl, or MeB12) may be a cobalamin, a sort of vitamin B12. Methylcobalamin is additionally used in the treatment of peripheral neuropathy, diabetic neuropathy, and as a preliminary treatment for



amyotrophic lateral sclerosis.[4] It's important to treat vitamin B12 deficiency with hydroxocobalamin or cyanocobalamin or a combination of adenosylcobalamin and methylcobalamin, and not methylcobalamin alone.[8] Methylcobalamin is produced by some bacteria. Within the environment, it's responsible for the biomethylation of certain heavy metals. for instance, the highly toxic methylmercury is produced by the action of methylcobalamin.[10] During this role, methylcobalamin is a source of "CH3+". a scarcity of methylcobalamin can lead to megaloblastic anemia and subacute combined degeneration of the spinal cord.[11]

**METHODOLOGY**

To check the availability, quality and quantity of the nutraceutical drug products, a survey was conducted by us in pune city. Well known hospitals were shortlisted and our survey was accomplished. We selected the nutraceuticals which were majorly used for improvising brain health. After the study we concluded that, these nutraceutical drugs mentioned in the below Table No. 1 respectively, were most commonly in use.

Sr. No	NAME OF THE HOSPITAL	NAME OF THE PHARMACIST	NUTRACEUTICAL DRUGS AVAILABLE
1.	JEHANGIR HOSPITAL	Mr. ASHOK	METHYLCOBALAMINE CITICHOLINE, PIRACETAM, NIMODIPINE, CINNARIZINE
2.	RUBY HALL CLINIC	Mr. DATTA	PREGABALINE, METHYLCOBALAMINE, CITICHOLINE,NIMODIPINE, CINNARIZINE.
3.	SASOON HOSPITAL	Mr. SURESH	METHYLCOBALAMINE, CINNARIZINE
4.	INAMDAR HOSPITAL	Ms. TRUPTI	PREGABALINE, METHYLCOBALAMINE, PIRACETAM.
5.	NOBLE HOSPITAL	Mr. SOHEL	PREGABALINE, METHYLCOBALAMINE, CITICHOLINE,NIMODIPINE, PIRACETAM.
6.	SAHYADRI SUPER SPECIALITY HOSPITAL	Mr. NITIN SHINDE	PREGABALINE, METHYLCOBALAMINE, CITICHOLINE,NIMODIPINE, CINNARIZINE.
7.	VILLOO POONAWALLA MEMORIAL HOSPITAL	Mr. NIKHIL	METHYLCOBALAMINE, CITICHOLINE,NIMODIPINE, PIRACETAM, PREGABALINE,CINNARIZINE.
8.	JEEVANLAKSHMI MEDISALES	Mr. MANOJ	METHYLCOBALAMINE, PIRACETAM.
9.	SANCHETI HOSPITAL	Mr. SHAHANAWAZ	METHYLCOBALAMINE, CITICHOLINE, PREGABALINE.
10.	MJM HOSPITAL	Mr. PRITAM	METHYLCOBALAMINE, CITICHOLINE, PREGABALINE, CINNARIZINE.
11.	SAHYADRI SUPER SPECIALITY HOSPITAL	Ms. VANDANA	METHYLCOBALAMINE, CITICHOLINE, PIRACETAM, CINNARIZINE.
12.	DEENANATH MANGESHKAR HOSPITAL	Ms. HEMA	METHYLCOBALAMINE, CITICHOLINE,NIMODIPINE, PIRACETAM, PREGABALINE,CINNARIZINE.
13.	POONA HOSPITAL	Ms. MANALI	METHYLCOBALAMINE, CITICHOLINE,NIMODIPINE, PIRACETAM, PREGABALINE,CINNARIZINE.
14.	SANJEEVAN HOSPITAL	Ms. SHRUTI AND Ms.AISHWARYA	METHYLCOBALAMINE, CITICHOLINE,NIMODIPINE, PIRACETAM, PREGABALINE,CINNARIZINE.

Table No.1

**CONCLUSION**

The result after the investigation concluded that, the knowledge about nutraceutical drug products were quite limited amongst people. Lacking of awareness and appropriate education about nutraceuticals, people are not preferring these products during the treatment of neurological disease. As nutraceuticals are highly expensive, most of the people are not opting for nutraceutical medication and this leads to more difficulties in treatment. People associated with medical streams should take the initiative to increase the awareness of nutraceutical products and to lower the expense of nutraceuticals so these drugs will be beneficial for all.



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