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## MODULATION OF CNS ACTIVITY BY TRADITIONAL MEDICINES: A REVIEW ON NEURO PHARMACOGNOSY

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### ABSTRACT

Modulation of CNS Secretion may offer novel approaches in the treatment of a variety of diseases. One strategy in the modulation of CNS may be through the use of herbal medicines. This review aimed to provide information on herbal drugs acting on CNS such as, Anesthetics, Sedative-Hypnotics, Spasmolytics, Anti-seizure, Opioid analgesics, Anti-parkinsonism, Anti-depressant, Anti-psychotic, Anti-Alzheimer and Immuno-modulators. Phytotherapy offers a potential therapeutic modality for the treatment of many differing conditions. Given the activity demonstrated by many of the reviewed herbal medicines and the increasing awareness of the broad-spectrum effects of herbal medicines on autoimmune conditions and chronic degenerative processes.

### Key words:

Anesthetics, Anti-seizure, Immuno-modulators, Neuro pharmacognosy.

### INTRODUCTION

The central nervous system directs the functions of all tissues of the body. The peripheral nervous system receives thousands of sensory inputs and transmits them to the brain via the spinal cord. The brain processes this incoming information and discards 99% as unimportant. After sensory information has been evaluated, selected areas of the central nervous system initiate nerve impulses to organs or tissue to make an appropriate response.

Chemicals exerting their effects in the central nervous system (brain and spinal cord) have been used since the most primitive times to the present. Today, in addition to many medical uses, drugs acting on the CNS are used worldwide (i.e., alcohol, caffeine, and nicotine) with various degrees of societal controls due to production of addiction and/or dysfunctional behaviors.

The World Health Organization estimates that 65%-80% of the world's population use traditional medicine as their primary form of health care. The use of herbal medicine, the

dominant form of medical treatment in developing countries, has been increasing in developed countries in recent years. About one third of the adult U.S. population uses medicinal herbs as some form of alternative therapy (Foster and Tyler, 2000; Miller and Murray, 1998). Sales of herbal products at the retail level increased from an estimate of 500 million dollars to approximately 5 billion dollars in 1999, more than double the amount compared to sales just two years before (Foster and Tyler 2000; Karch 1999). Herbal medicine accounted for approximately 26% of complementary and alternative medicine used by South Australians according to MacLennan et al survey.

All psychotropic medications such as Anesthetics, Sedative-Hypnotics, Spasmolytics, Anti-seizure, Opioid analgesics, Anti-parkinsonism, Anti-depressant, Anti-psychotic, Anti-alzheimer and Immuno-modulators will have the potential to induce numerous and diverse unwanted effects. This article provides an informal review of the scientific literature regarding the effects of botanical medicines on CNS.

## METHODOLOGY

### 1. Search Strategy:

The databases MEDLINE, EBSCO, and BIOSIS were searched for appropriate studies. Titles were screened for all hits to the terms “herbs and CNS” and “Chinese medicine and CNS” and “Ayurveda and CNS.” A language restriction of English was observed.

### 2. Criteria for Inclusion:

The following parameters were necessary for study inclusion:

- Investigations on whole herbs (e.g., seed, leaf, root, stem, flower, or entire plant) standardized extracts, or extractions of whole herbs not reduced to one constituent were accepted. Research on isolated constituents or multiple herbal formulations were generally rejected. Fungi, although technically not plants, were included as they are commonly used in phytotherapy.
- Information on methods of herbal preparation, concentration of the plant preparation, and dose/exposure time were required.
- Only studies demonstrating activity with regard to CNS were included.

### 3. Herbal drugs

#### 3.1 Herbal drugs as Anesthetics:

A substance that causes lack of feeling or awareness. A local anesthetic causes loss of feeling in a part of the body. A general anesthetic puts the person to sleep for example procaine, amethocaine, cocaine. Local anesthetic toxicity involves the nervous system, including agitation, confusion, dizziness, blurred vision, tinnitus, a metallic taste in the mouth, and nausea that can quickly progress to seizures and cardiovascular collapse. Intravenous agents (non-opioid) barbiturates, opioid analgesic agents produce side effects such as Hyperkalemia, Muscle aches, malignant hyperthermia, Anaphylaxis. So herbal drugs were consider as a safe anesthetic with out side effects listed in **Tab.b**

### 3.2 Herbal drugs as Sedative-Hypnotics

Sedative-hypnotics are drugs which depress or slow down the body's functions. Often these drugs are referred to as tranquilizers and sleeping pills or sometimes just as sedatives. Barbiturates and benzodiazepines are the two major categories. All sedatives can cause physiological and psychological dependence. Dependent users may get withdrawal symptoms ranging from restlessness and insomnia to convulsions and death. The Literature survey suggests that the use of Herbal drugs are free of side effects enlisted in **Tab.b**

**3.3 Herbal drugs as Spasmolytics** muscle relaxant is a drug which affects skeletal muscle function and decreases the muscle tone. Spasmolytics, also known as "centrally-acting" muscle relaxants, are used to alleviate musculoskeletal pain and spasms and to reduce spasticity which shows side effects such as syndrome heart failure, paralysis lethargy, as well as anti cholinergic side effects. Herbal drugs such as-**Tab.b**

**3.4 Herbal drugs as Anti-seizure:** Epilepsy is a common chronic neurological disorder characterized by recurrent unprovoked seizures. About 50 million people worldwide have epilepsy, with almost 90% of these people being in developing countries. Currently there are 20 medications approved by the Food and Drug Administration for the use of treatment of epileptic seizures in the US. According to European survey, 88% of patients with epilepsy, reported at least one anticonvulsant related side effect. Some examples include

mood changes, sleepiness, or unsteadiness in gait, drug rashes, liver toxicity (hepatitis), or aplastic anemia. Natural treatment to seizures using following herbs as in **Tab.c**

**3.5 Herbal drugs as Opioid analgesics:** An Opioid is a chemical that works by binding to opioid receptors, which are found principally in the central nervous system and the gastrointestinal tract. The side effects of opioids include sedation, respiratory depression, and constipation. **Tab .c**

**3.6 Herbal drugs as Anti-parkinsonism:** Parkinson disease is a degenerative disorder of the central nervous system that often impairs the sufferer's motor skills, speech, and other functions. But lost of side effect **Digestive Tract:** Nausea; vomiting; diarrhea; **Nervous System:** Uncontrolled movement (twitching) of face, eyelids, mouth, hands, or legs; **Circulatory System:** Palpitations (pounding in the chest); irregular heartbeat; chest pain; changes in blood pressure. **Skin:** Flushing; rash; increased sweating; hives; itching; hair loss; a normal skin sensation. **Other:** Difficult urination; urinary incontinence; difficulty swallowing; numbness; increased salivation; dry mouth or nose; grinding of the teeth; difficulty opening mouth; taste changes; bitter taste; Devoid of side effect herbal such as *Mucuna prurens* was used. **Tab .b**

### 3.7 Herbal Antidepressants and Anxiolytics:

An antidepressant is a psychiatric medication used to alleviate mood disorders, such as major depression and dysthymia and

anxiety disorders such as social anxiety disorder. St. John's Wort is by far the most widely-used and well-studied herbal antidepressant. A number of other herbs have been used traditionally to treat depression and related ailments like anxiety, but the research on most of these treatments is sparse. **Tab .d**

**3.8 Herbal drug as Anti-psychotic:** An antipsychotic (or neuroleptic) is a tranquilizing psychiatric medication primarily used to manage psychosis (including delusions or hallucinations, as well as disordered thought), particularly in schizophrenia and bipolar disorder. Antipsychotics are among the biggest selling and most profitable of all drugs, generating \$22 billion in global sales in 2008.

A number of harmful and undesired (adverse) effects have been observed, including lowered life expectancy, weight gain, enlarged breasts and milk discharge in men and women (hyperprolactinaemia), lowered white blood cell count (agranulocytosis), involuntary repetitive body movements (tardive dyskinesia), diabetes etc. Herbal drug such as **Tab .d**

**3.9 Herbal drug as Anti-Alzheimer:** Alzheimer's disease (AD) is the most common form of dementia in the elderly, accounting for 50% to 75% of patients with dementia. Dementia is characterized by memory impairment and at least one of the following: aphasia, apraxia, agnosia, or a disturbance in the ability to think abstractly and to plan, initiate, sequence, monitor, and

stop complex behavior. More than four million people have AD in the United States. Vitamin E, withania somnifera, Ginkgo Biloba is the herbal drug most commonly used. **Tab .d**

**3.10 Herbal Immunomodulators:** Immunomodulators alters the activity of immune function through the dynamic regulation of informational molecules such as cytokines.

However, as with the development of many nascent pharmacological strategies, the occurrence of adverse events generates barriers to successful therapeutic applications. Such obstacles have delayed progress in the use of several synthetic cytokines. In order to maintain relevance for clinical phytotherapy, this informal survey was limited to herbal medicines available in the marketplace or preparations that represent multi-component botanical medicines. **Tab .e**

**3.11 Complete Index of Ayurvedic Formulations For CNS.(Tab a)**

## CONCLUSION

Although many of the plants listed in this review appear to affect CNS, it is the lead author's opinion that future research will further demonstrate the broad-spectrum activity of herbal medicine. Currently, the research on the influence of botanical medicines on CNS and other messenger molecules is limited. Informational molecules and many of their receptors may likely turn out to be modulated by plants, both herbal medicines and foods, providing potential for future therapeutics.

Further research (particularly clinical studies) is indicated to elucidate the effects of botanical medicines and to support or refute the hypotheses presented in this article.

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**Table a: Complete Index of Ayurvedic Formulations For CNS**

SI no	Name of formulation	Type of the dosage form	Company name
<b>Antidepressants and Anxiolytics</b>			
1	Alert	capsules	vasu
2	Ashwagandha hills	capsules	Herbal hills
3	Geriforte	Tablets	Himalaya
4	Hibril capsules	capsules	Vital care
5	Hibril oil	oil	Vital care
6	Slepan	capsules	AVVS
7	Smrita	capsules	R.K.pharmacy
8	Stresswon cap	capsules	Padmavati pharma
9	x-stress	capsules	Fidalgo
<b>Anorexia</b>			
10	Aship tab	Tablets	Reliance
11	Aship syrup	Powder	Reliance
12	Brain gain	syrup	Nidco
13	Brahmi cap	capsules	Kottakkal arya
14	Mentat	liquid	Himalaya
15	Shankhapushpi Ras cap	capsules	Madaan
16	Shankhapushpi syr	syrup	Jagritu
17	Somiwin cap	capsules	padmavati
<b>Nervine tonics</b>			
18	Gold	pill	Shree baidynath
19	MIG 2K with gold	capsules	Dhara
20	Rich glo	capsules	Dhara
<b>CNS stimulants</b>			
21	Chetna tali oil	oil	Dharmani
22	Coprovit	capsules	Fidalgo
23	Zandopa	powder	zandu
<b>Sedative and Tranquillizers</b>			
24	En-vita forte	liquid	Ayush
25	prasham	liquid	Ayurveda rasahala
26	Stresscom	capsules	Dabur
27	Stresswin	capsules	Baidyanath

**Table b: List of Anesthetics Sedative-Hypnotics Spasmolytics drugs**

SI NO	DRUG	PART USED	FAMILY
<b>Anesthetics</b>			
1	<i>Tephrosia purpurea</i>	whole plant	Fabaceae
2	<i>Anacyclus pyrethrum</i>	Roots	Asteraceae
3	<i>Gynandropsis gynandra</i>	Flower	Cleomaceae
<b>Sedative-Hypnotics</b>			
4	<i>Hedychium spicatum</i>	Rhizomes	Zingiberaceae
5	<i>Indigofera tinctoria</i>	Shrub	Fabaceae
6	<i>Jatropha curcus</i>	Leaves	Euphorbiaceae
7	<i>Leucas aspera</i>	Aerial parts	Lamiaceae
8	<i>Luffa echinata</i>	Flowers	Cucurbitaceae
9	<i>Melia azaderach,</i>	Root, Bark	Meliaceae
10	<i>Mesua ferrea</i>	Flowers	Guttiferae
11	<i>Momordica charantia</i>	Whole plant	Cucurbitaceae
12	<i>Morus indica</i>	Fruits	Moraceae
13	<i>Mucuna pruriens</i>	Seeds	Fabaceae
14	<i>Nerium indicum</i>	Leaves	Apocynaceae
15	<i>Ocimum sanctum</i>	Whole plant	Lamiaceae
16	<i>Pisum sativum</i>	Seeds	Fabaceae
17	<i>Psoralia corylifolia</i>	Seeds	Fabaceae
<b>Spasmolytics</b>			
18	<i>Hedychium spicatum</i>	Rhizomes	Zingiberaceae
19	<i>Luffa echinata</i>	Flowers	Cucurbitaceae
20	<i>Mimusops elengi</i>	Fruit	Sapotaceae
21	<i>Pterocarpus santalinus</i>	Wood	Fabaceae
22	<i>Symplocos spicata.</i>	Flowers	Symplocaceae

**Table c: List of Anti-seizure Opioid analgesics Anti-parkinsonism drugs Tab c**

SI NO	DRUG	PART USED	FAMILY
<b>Anti-seizure</b>			
23	<i>Celestrus paniculata</i>	Seeds	Celastraceae
24	<i>withania somnifera</i>	Roots	Solanaceae
25	<i>ocimum gratissimum</i>	shrub	Lamiaceae
26	<i>Taxus wallichiana</i>	Whole plant	Taxaceae
27	<i>Nyctanthes arbortristis</i>	Flowers	Oleaceae
28	<i>Eugenia Caryophyllata</i>	Fruit	Myrtaceae
29	<i>Lippie alba</i>	Leaves	Verbenaceae

<b>Opioid analgesics</b>			
30	<i>Papaver somniferum</i>	Seeds	Papaveraceae
31	<i>Papaver bracteatum</i>	Seeds	Papaveraceae
32	<i>Thebaine</i>	Seeds	Papaveraceae
<b>Anti-parkinsonism</b>			
33	<i>Mucuna prurens</i>	Seeds	Fabaceae

**Table d: List of Antidepressants and Anxiolytics, Anti-psychotic, Anti-alzheimer drugs**

<b>SI NO</b>	<b>DRUG</b>	<b>PART USED</b>	<b>FAMILY</b>
<b>Antidepressants and Anxiolytics</b>			
34	<i>Hypericum perforatum</i>	Whole plant	Clusiaceae
35	<i>Crocus sativus</i>	Flowers	Iridaceae
36	<i>Lavandula angustifolia</i>	Flowers	Lamiaceae
37	<i>Salvia elegans</i>	Flowers	Lamiaceae
38	<i>Salvia sclarea</i>	Flowers	Lamiaceae
39	<i>Ocimum tenuiflorum</i>	Whole plant	Lamiaceae
40	<i>Artemisia absinthium</i>	Leaves	Asteraceae
<b>Anti-psychotic</b>			
41	<i>Cannabis sativa</i>	Seeds	Cannabaceae
<b>Anti-alzheimer</b>			
42	<i>Withania somnifera</i>	Roots	Solanaceae
43	<i>Ginkgo biloba</i>	Leaves	Ginkgoaceae
44	<i>Vitamin E</i>	-----	-----

**Table e: List of Immunomodulators drugs**

SI NO	DRUG	PART USED	FAMILY
<b>Immunomodulators</b>			
45	<i>Aloe secundiflora</i>	Sap	Asphodelaceae
46	<i>Angelica sylvestris</i>	Root	Apiaceae
47	<i>Asparagus racemosus</i>	Root	Asparagaceae
48	<i>Bupleurum falcatum</i>	Root	Apiaceae
49	<i>Cinnamomum cassia</i>	Bark	Lauraceae
50	<i>Cnidium monnieri</i>	Rhizome	Umbelliferae
51	<i>Coptis spp.</i>	Rhizome	Ranunculaceae
52	<i>Panax ginseng</i>	Root	Araliaceae
53	<i>Perilla frutescens</i>	Leaf	Lamiaceae
54	<i>Picrorhiza kurroa</i>	Rhizome	scrophulariaceae
55	<i>Polygala tenuifolia</i>	Root	Polygalaceae
56	<i>Silybum marianum</i>	Seed and fruits	Asteraceae
57	<i>Smilax glabra</i>	Rhizome	Liliacea
58	<i>Tinospora cordifolia</i>	Root and herb	Menispermaceae
59	<i>Withania somnifera</i>	Root and leaf	Solanaceae
60	<i>Gracilistylus Acanthopanax</i>	Root	Sclepiadaceae
61	<i>Astragalus membranaceus</i>	Root	Fabaceae
62	<i>Cinnamomum cassia</i>	Root	Lauraceae
63	<i>Codonopsis pilosula</i>	Stem	Campanulaceae
64	<i>Derris scandens</i>	Herb	Fabaceae
65	<i>Epimedium brevicornum</i>	Root	Berberidaceae
66	<i>Oldenlandia diffusa</i>	Root	Rubiaceae
67	<i>Rauwolfia serpentina</i>	Root	Apocynaceae