

Herbal remedies for CNS disorders

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Abstract

Herbs, which have always been the principal form of medicine in developing countries, are once again becoming popular throughout the developing and developed world. The conventionally used drugs possess many side effects; the cost of modern drug is beyond the reach of most people with low income. Because of this, the need of alternatives that are effective, cheap, and safe is very common. Herbal remedies that have demonstrable psychotherapeutic activities have provided a potential to psychiatric pharmaceuticals and deserve increase attention in future studies. In this review article, the traditional herbal approaches for treatment of various CNS disorders are presented.

Introduction

The use of herbal remedies is widespread throughout the world and its use may be increasing. These are taken for a wide range of perceived benefits and treatment of specific conditions. A search for novel pharmacotherapy from medicinal plants for psychiatric illnesses has progressed significantly in the past decade. This is reflected in the large number of herbal preparations for which psychotherapeutic potential has been evaluated in a variety of animal models.⁽¹⁾ The disease is characterized by loss of memory and impairment of multiple cognitive and emotional functions. All critical analysis on commercial and other information available on traditionally known CNS active herbal remedies indicate that the most popular amongst such remedies are those which are clinically and preclinical the most well studied ones, and which are also recommended for therapeutic purposes by the health authorities of many Western and other countries outside the USA.⁽²⁾ Ancient pharmacopoeias from different regions of the world have recorded numerous herbal medicines purported to have psychotropic potential. These offer a vast repertory of potential substances that can be developed into modern psychiatric pharmaceuticals. Many of today's conventional drugs originated directly or indirectly from plants; many valuable psychoactive drugs, such as yohimbine, ephedrine, tubocurarine, and galanthamine, were discovered through the study of indigenous remedies. So there is a pressing need for development of herbal medicines which will be safe and having lesser side effects.

Anxiety

Anxiety is defined as a subjective emotional state of uneasiness, not pleasant and even fearful. When the anxiety reaches pathological levels the subject experiences conductal changes, apprehension, motor troubles, sweating, and hypertension.⁽³⁾ Phytotherapeutic interventions that may benefit anxiety disorders are classed as 'anxiolytics', and usually have

effects on the GABA system either via inducing ionic channel transmission by voltage-gated blockage, or through alteration of membrane structures, or less commonly via binding with benzodiazepine receptor sites (e.g., GABA-a).⁽⁴⁾

The roots of ashwagandha have been classified in Ayurvedic medicine as a 'Rasayana', a medicine used to enhance physical and mental performance. A preclinical study observed adaptogenic effects of ashwagandha given to rats over 21 days {25 or 50 mg/kg, orally (p.o.)} in a stress inducing procedure. A methanolic extract of ashwagandha root was found to inhibit the specific binding of GABA ligands and enhanced the binding of flunitrazepam to their receptor sites, displaying a GABA-mimetic activity. Many flavonoids were found to be ligands for the γ -aminobutyric acid type A (GABAA) receptors in the central nervous system (CNS); which led to the hypothesis that they act as benzodiazepine-like molecules. This is supported by their behavioral effects in animal models of anxiety, sedation and convulsion.⁽⁵⁾ Kava rhizome used for the treatment of the Anxiety.⁽⁶⁾

Alzheimer disease

Alzheimer Disease (AD) is a progressive brain disease affecting greater than 5.0 million Americans with approximately 11 to 16 million people projected to be afflicted with AD by the year 2050.⁽⁷⁾ Alzheimer's disease (AD) is a progressive and complex neurodegenerative disease, characterized by progressive decline in memory, language and other cognitive functions. It is associated with impairment of the basal forebrain cholinergic system, especially in the elderly.⁽⁸⁾ Neuroinflammatory processes in the brain are believed to play a crucial role in the development of Alzheimer's and Parkinson's disease as well as injury associated with stroke.⁽⁹⁾

There is a growing body of evidence to suggest that flavonoids and other polyphenols may be able to counteract this neuronal injury, thereby delaying the. For example, a Ginkgo biloba extract has been shown

to protect hippocampal neurons against nitric oxide and beta amyloid.⁽¹⁰⁾ Induced neurotoxicity Huperzine A (HupA), a novel Lycopodium alkaloid isolated from the herb *Huperzia serrata* ('Qian Ceng Ta') and used in Chinese folk medicine, is a potent, reversible, selective and well-tolerated inhibitor of AChE.^(11,12)

Parkinsons disease

Studies of patients with Parkinson's disease (PD) suggest that the characteristic clinical symptoms of bradykinesia, rigidity, and resting tremor are frequently accompanied by impairments in cognitive function. Between 15% and 20% of PD patients develop a frank dementia,⁽¹³⁾ and less severe cognitive impairment is a well-recognized feature early in the disease.⁽¹⁴⁾ The pattern of cognitive impairments seen in the early stages of PD resembles that produced by frontal-lobe damage and includes deficits of executive Functions, such as planning and working memory.⁽¹⁵⁾ The disturbance of neuronal membranes by the soluble oligomers of the protein α S is a likely first step in the pathophysiological cascades of PD. A considerable amount of scientific data shows that a possible neuroprotective characteristic of polyphenolic compounds is exerted through anti-aggregating properties.

Huntingtons disease

Huntington's disease is a progressive, fatal, neurodegenerative disorder caused by an expanded CAG repeat in the huntingtin gene, which encodes an abnormally long polyglutamine repeat in the huntingtin protein. Huntington's disease has served as a model for the study of other more common neurodegenerative disorders, such as Alzheimer's disease and Parkinson's disease. A range of drugs used for symptomatic treatment of HD and experimental therapies targeting HD molecular pathology.⁽¹⁶⁾

Antidepressant

Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-worth, disturbed sleep or appetite, and poor concentration. St. John's wort (*Hypericum perforatum*) is an herbal remedy used widely for the treatment of depression.⁽¹⁷⁾ In one of the review 7 herbal remedies have been identified namely hypericum, lavender, borage, roseroot, chamomile, saffron and ginseng, for which preclinical and clinical trials suggest their anti-depressive influence. For. hypericum and saffron extracts, anti-depressive effect in subjects with mild or moderate depression was confirmed.⁽¹⁸⁾

Epilepsy

Epilepsy is a common neurological abnormality. In modern medicine, epilepsy is considered to be a chronic brain syndrome of various etiology characterized by

recurrent seizures and usually associated with loss or disturbance of consciousness. The current clinically available antiepileptic drugs are associated with a variety of side-effects and chronic toxicities. Scanty evidences reported that *Berberis vulgaris* extract may be useful in convulsion and epilepsy. Berberine has demonstrated a wide range of pharmacological Activities. Berberine, an isoquinoline alkaloid is reported to modulate several neurotransmitter systems like N-methyl-Daspartate, nitric oxide and serotonin, which modulate convulsions.⁽¹⁹⁾ Wide range of herbs found to be beneficial in in preclinical animal models of epilepsy including *Melanthera scandens*, *punica granatum* etc.^(20,21)

Conclusion

A search for novel pharmacotherapy from medicinal plants for psychiatric illnesses has been progressed significantly. As a result of which large number of herbal preparations having therapeutic potential has been evaluated in a variety of animal models. The objective of this review is to provide an overview of herbal extracts and constituents that have significant therapeutic effects in animal models of anxiety, depression, neurodegenerative disorders like, AD,PD,HD and epilepsy.

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