

HERBAL VALERIAN (VALERIANA OFFICINALIS): A GENERAL REVIEW FOR NEURODE GENERATIVE DISEASE

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ABSTRACT

The popular herb and medicinal plant known as Valerian (*Valeriana officinalis*), a member of the Valeriaceae family, has been used for millennia, particularly in Europe, China, and the Middle East. In many parts of the world, it is commonly used as a sedative and sleep aid. However, because it relaxes smooth muscle, it is also used to alleviate stomach and intestinal cramps. The components in valerian extract that are known to be pharmacologically active include alkaloids, terpenes, organic acids and their derivatives, valepotriates, and flavones for example. It is generally acknowledged that the compounds of the Valerianaceae family, specifically the valepotriates, are what give them their sedative properties. The purpose of this page is to summarize recent studies on valerian's components, traditional use, clinical use, and scientific validation of its pharmacological effects.

I. INTRODUCTION

Neurodegenerative diseases, including Alzheimer's disease, Parkinson's disease, and others, pose significant challenges due to their progressive nature and limited treatment options. The search for effective therapies has led to interest in herbal medicines like Valerian (*Valeriana officinalis*), which offers potential neuroprotective benefits.

Valerian is a perennial herb known for its sedative and anxiolytic properties, traditionally used to alleviate sleep disorders and anxiety. Beyond its calming effects, recent research has uncovered its potential in neuroprotection. The bioactive compounds found in Valerian, such as valerenic acid and valepotriates, exhibit antioxidant, anti-inflammatory, and neurotrophic properties that could mitigate neuronal damage and support cognitive function.

Preclinical studies have demonstrated promising results, showing that Valerian extracts can attenuate oxidative stress, reduce neuroinflammation, and improve cognitive performance in animal models of neurodegenerative diseases. These findings suggest that Valerian may modulate neurotransmitter systems involved in neuroprotection and potentially slow the progression of these debilitating conditions.

While clinical studies in humans are limited and heterogeneous, preliminary evidence suggests that Valerian could be a valuable adjunctive therapy in managing symptoms associated with neurodegenerative diseases. However, further rigorous clinical trials are needed to establish its efficacy, safety profile, optimal dosage, and potential interactions with conventional medications.

In conclusion, Valerian holds promise as a natural herbal intervention for neurodegenerative diseases, offering a novel approach to complement existing treatments. Continued research efforts are essential to fully elucidate its therapeutic mechanisms and validate its clinical utility in improving outcomes for patients affected by these challenging conditions.

II. MORPHOLOGY OF VALERIAN

- 1. Plant Type:** Valerian is a perennial herbaceous plant, meaning it lives for several years and lacks a woody stem.
- 2. Height and Structure:** It typically grows to a height of 1 to 1.5 meters (3 to 5 feet). The plant has a robust, erect stem that is hollow and furrowed.
- 3. Leaves:** Valerian leaves are arranged oppositely along the stem and are compound, meaning they are divided into several pairs of leaflets. Each leaflet is lanceolate to ovate in shape, with serrated margins.

4. **Flowers:** The flowers of Valerian are small and numerous, arranged in dense, terminal clusters known as cymes. Each flower is funnel-shaped and usually pink or white in color, sometimes with a slight fragrance.
5. **Roots:** The most valued part of the plant for medicinal purposes is the underground root system. Valerian roots are fleshy, cylindrical, and often twisted, with a characteristic odor that has been described as somewhat unpleasant or pungent.
6. **Fruit:** After flowering, Valerian produces small, dry fruits that are oval-shaped and contain one seed each.
7. **Habitat and Growth:** Valerian thrives in temperate climates and is commonly found in damp meadows, riverbanks, and woodland edges. It prefers rich, moist soil conditions.



III. TAXONOMICAL CLASSIFICATION OF VALERIAN

Valerian, scientifically known as *Valeriana officinalis*, belongs to the following taxonomical classification:

- **Kingdom:** Plantae (plants) - Valerian is a flowering plant.
- **Order:** Dipsacales - This order includes plants like teasel, honeysuckle, and valerian.
- **Family:** Caprifoliaceae (honeysuckle family) - Valerian is a member of this family, which includes mostly shrubs, small trees, and herbaceous plants.
- **Genus:** Valeriana - This genus includes over 250 species of flowering plants commonly known as valerians.
- **Species:** *Valeriana officinalis* - This is the specific species of valerian commonly used in herbal medicine.

So, the complete taxonomical classification of Valerian (*Valeriana officinalis*) is:

- **Kingdom:** Plantae
- **Order:** Dipsacales
- **Family:** Caprifoliaceae
- **Genus:** Valeriana
- **Species:** *Valeriana officinalis*

IV. CHEMICAL COMPOSITION OF VALERIAN

Valerian (*Valeriana officinalis*) contains a variety of chemical compounds that contribute to its medicinal properties. Here are some of the key chemical constituents found in valerian:

1. **Valerenic acids:** These are considered the primary active compounds in valerian. Valerenic acids, including valerenic acid and acetoxyvalerenic acid, have been shown to interact with gamma-aminobutyric acid (GABA) receptors in the brain, similar to benzodiazepines, which are drugs known for their sedative effects.
2. **Volatile oils:** Valerian contains volatile oils such as bornyl acetate, valerenic acid, valeranone, and others. These oils contribute to the characteristic odor of valerian and may have mild sedative effects.
3. **Sesquiterpenes:** These are another group of compounds found in valerian, including valerenal, valeranone, and others. They contribute to the plant's aroma and may have sedative properties.
4. **Alkaloids:** Some valerian species contain alkaloids such as chatinine and valerianine, although *Valeriana officinalis* itself contains very low levels of alkaloids compared to other species in the genus.
5. **Flavonoids:** Valerian contains several flavonoids, including hesperidin, linarin, and apigenin. Flavonoids have antioxidant properties and may contribute to the overall medicinal effects of valerian.

6. **Amino acids:** Valerian contains various amino acids, including arginine, glutamine, and tyrosine, which play important roles in the plant's metabolism and potential health benefits.
7. **Polysaccharides:** These complex carbohydrates are found in the root of valerian and may contribute to its medicinal properties, although their exact role is not fully understood.

V. PHARMACOLOGICAL PROPERTIES OF VALERIAN DRUG

Valerian (*Valeriana officinalis*) is renowned for its pharmacological properties, which primarily stem from its interaction with the nervous system and various biochemical pathways. Here are the key pharmacological properties of valerian:

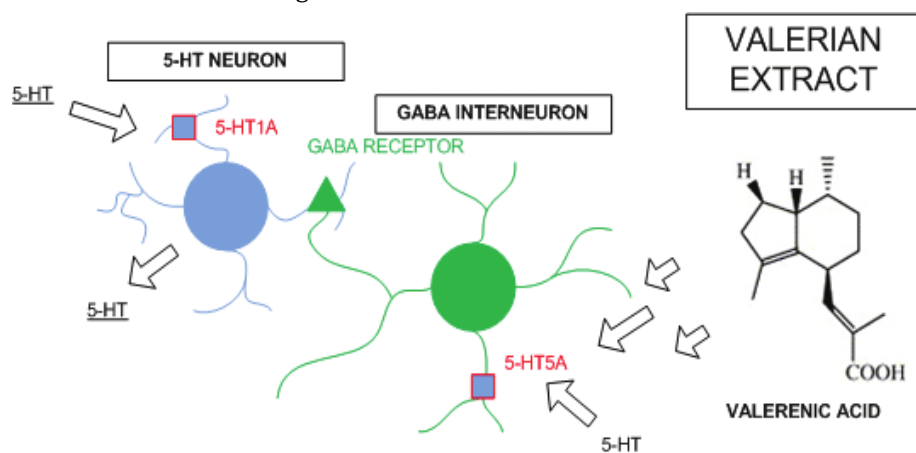
1. **Sedative and Anxiolytic Effects:** Valerian is widely used for its sedative and anxiolytic (anxiety-reducing) properties. The herb is believed to act on the gamma-aminobutyric acid (GABA) neurotransmitter system in a manner similar to benzodiazepine drugs, albeit with a different mechanism. Valerian's compounds, particularly valerenic acids, bind to GABA receptors in the brain, which leads to calming effects and reduction of anxiety symptoms.
2. **Hypnotic Properties:** Valerian is also used as a mild hypnotic, helping to improve sleep quality and alleviate insomnia. It is often used as an alternative to synthetic sleep aids due to its more gentle and natural action.
3. **Muscle Relaxant:** Valerian has muscle relaxant properties, which can help in relieving muscle tension and spasms. This effect is beneficial for conditions involving muscular pain and stiffness.
4. **Anticonvulsant Activity:** Some studies suggest that valerian may have anticonvulsant properties, which could potentially be beneficial in conditions characterized by seizures and epileptic episodes. This effect is related to its modulation of GABAergic neurotransmission.
5. **Antioxidant Effects:** Valerian contains flavonoids and other compounds with antioxidant properties. These antioxidants help neutralize harmful free radicals in the body, reducing oxidative stress and supporting overall health.
6. **Anti-inflammatory Properties:** Valerian has been shown to exhibit mild anti-inflammatory effects, which may contribute to its therapeutic benefits in conditions involving inflammation, although these effects are less well-studied compared to its sedative properties.
7. **Cardiovascular Effects:** Some research suggests that valerian may have cardiovascular benefits, including lowering blood pressure and improving heart health markers. These effects are thought to be mediated through its calming influence on the nervous system.

VI. MECHANISM OF ACTION OF VALERIAN DRUG

The mechanism of action of valerian (*Valeriana officinalis*) involves multiple biochemical pathways, primarily centered around its interaction with the nervous system, particularly the gamma-aminobutyric acid (GABA) neurotransmitter system. Here's a detailed look at how valerian exerts its effects:

1. **GABAergic Activity:** Valerian contains compounds known as valerenic acids, including valerenic acid and acetoxyvalerenic acid. These compounds are believed to enhance GABA availability in the brain by inhibiting the breakdown of GABA, prolonging its effects. GABA is the main inhibitory neurotransmitter in the central nervous system, meaning it reduces neuronal excitability. By increasing GABA levels or enhancing its function, valerian promotes calming and sedative effects, which can help reduce anxiety and induce sleep.
2. **Modulation of GABA Receptors:** Valerenic acids in valerian are thought to bind to GABA receptors, specifically the GABA-A receptor subtype. This binding enhances the binding of GABA itself to its receptors, thereby potentiating its inhibitory effects on neuronal activity. This mechanism is similar to the action of benzodiazepines, though valerian's effects are typically milder and more subtle.
3. **Serotonergic Effects:** Valerian has also been shown to modulate serotonin receptors in the brain, particularly the 5-HT_{1A} receptor. Serotonin is another neurotransmitter involved in mood regulation and sleep-wake cycles. By influencing serotonin receptors, valerian may contribute to its anxiolytic and sleep-promoting effects.

- Adenosine Receptor Activity:** Some studies suggest that valerian may interact with adenosine receptors, which play a role in promoting relaxation and sleepiness. By modulating these receptors, valerian may contribute to its sedative and sleep-inducing properties.
- Anti-inflammatory and Antioxidant Effects:** Although less well-studied, valerian's constituents, such as flavonoids and volatile oils, may also exert mild anti-inflammatory and antioxidant effects. These properties could potentially contribute to its overall therapeutic benefits, particularly in reducing oxidative stress and inflammation that can affect neurological health.



VII. MEDICINAL USE OF VALERIAN

Valerian (*Valeriana officinalis*) has been traditionally used for various medicinal purposes, primarily due to its calming and sedative effects. Here are the main medicinal uses of valerian:

- Insomnia and Sleep Disorders:** Valerian is most commonly used as a natural remedy for insomnia and other sleep disorders. It helps improve sleep quality and reduce the time it takes to fall asleep. The sedative effects of valerian are attributed to its ability to enhance GABA activity in the brain, promoting relaxation and inducing sleepiness.
- Anxiety and Stress Relief:** Valerian is also used to alleviate symptoms of anxiety and stress. Its anxiolytic properties are thought to be related to its effects on GABA receptors, which help calm the nervous system and reduce feelings of anxiety and tension.
- Muscle Relaxation:** Due to its muscle relaxant properties, valerian is used to relieve muscle tension, spasms, and cramps. This makes it beneficial for conditions such as muscle stiffness, menstrual cramps, and tension headaches.
- Mild Sedation and Relaxation:** Valerian is sometimes used to promote overall relaxation and reduce nervousness. It can be helpful for individuals experiencing mild restlessness or agitation.
- Digestive Aid:** In some traditional practices, valerian has been used to support digestive health, particularly in relieving symptoms of gastrointestinal distress such as bloating and cramping.
- Mood Enhancement:** Valerian's ability to modulate neurotransmitter systems, including GABA and serotonin, may contribute to its mood-enhancing effects. It is sometimes used as a complementary treatment for mild mood disorders.
- Pain Relief:** Valerian's muscle relaxant and mild analgesic properties make it useful in alleviating certain types of pain, although it is primarily used for its calming effects.

VIII. CONCLUSION

In conclusion, valerian (*Valeriana officinalis*) is a valuable herbal remedy known for its calming, sedative, and muscle relaxant properties. It has been traditionally used to improve sleep quality, reduce anxiety and stress, alleviate muscle tension, and promote overall relaxation. The primary mechanism of action involves its interaction with the GABA neurotransmitter system in the brain, enhancing GABAergic activity and promoting a sense of calmness and tranquility.

Valerian's benefits extend beyond sleep and relaxation, potentially offering support for mood, cardiovascular health, and digestive comfort. It contains various bioactive compounds, including valerenic acids, volatile oils, flavonoids, and others, which contribute to its therapeutic effects.

While generally considered safe for short-term use, valerian may cause drowsiness or dizziness in some individuals, especially when taken in higher doses or combined with other sedatives. Long-term safety and effectiveness require further research. It's advisable to use valerian under the guidance of a healthcare provider, particularly if you have underlying health conditions or are taking medications

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