

The Longwood Herbal Task Force
(<http://www.mcp.edu/herbal/default.htm>) and
The Center for Holistic Pediatric Education and Research
(<http://www.childrenshospital.org/holistic/>)

Valerian (*Valeriana officinalis*)

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Principal Proposed Uses: Sedative hypnotic, anxiolytic

Other Proposed Uses: Spasmolytic for nervous stomach

Overview

The major modern and historical uses for valerian are as a sedative and anxiolytic, but it is also used to treat “nervous stomach”. Clinical trials have demonstrated that valerian extract is effective in the treatment of mild to moderate sleeping disorders and states of restlessness and tension. It significantly improves subjectively recalled sleep quality compared to placebo and shows a favorable adverse effect profile compared with other commonly prescribed sedative hypnotics and anxiolytics. However, most studies have been of short duration, with small and inadequately defined patient populations. Acute toxicity is limited to rare and mild gastrointestinal upset; animal studies have suggested that valerian may potentiate the effects of alcohol and barbiturates, but no human trials have confirmed these effects. Valerian should not be used within several hours of driving or operating heavy machinery. There are no studies specifically evaluating its safety during pregnancy, lactation or childhood.

Historical and Popular Uses

The Greek physician, Dioscorides, apparently recommended valerian root to treat myriad disorders including heart palpitations, digestive problems, epilepsy and urinary tract infections¹,². Valerian was recommended by Galen during the second century as a treatment for insomnia. Valerian plants are as attractive as catnip to cats, and it is rumored that the Pied Piper’s secret to clearing the streets of Hamelin was a store of valerian under his cloak.

The name valerian was probably derived from the Latin, “valere” to be healthy or strong,

referring either to its aroma or its clinical effects³. Other accounts ascribe its name to the Roman emperor, Publius Licinius Valerianus, who reigned in the 3rd century. Two other ancient names are “nard” and “phu”. “Nard” is derived from a Sanskrit word meaning “strong smell” and “phu” or “fu” refers to the usual exclamation of disgust that attends the experience of smelling the dried root.

By the 18th century, valerian was widely used as a sedative and to treat nervous disorders associated with a “restless” digestive tract as well as the “vapors” in women. Other common uses included the treatment of headaches, anxiety, palpitations, high blood pressure, irritable or spastic bowel, menstrual cramps, epilepsy and childhood behavior problems and learning disabilities^{4, 5}. During World War I, valerian was used to prevent and treat shell shock in front-line troops, and it was used during World War II to help calm civilians subjected to air raids⁶. Valerian was listed as a sleep aid and anxiolytic on the US national formulary until the 1940’s⁷. It fell into disuse as more potent sedative-hypnotic pharmacologic agents became available.

Related species have been used in Traditional Chinese Medicine (TCM), Ayurvedic Medicine and African herbal healing practices. *V. fauriei* is used in Traditional Chinese Medicine and Japanese medicine as a sedative, spasmolytic and antidepressant⁸⁻¹⁴. *V. capensis* is used in African traditional medicine as a treatment for epilepsy, hysteria and nervous disorders¹⁵.

In the 1980’s valerian again assumed a place of importance as a widely used non-prescription hypnotic and daytime sedative, particularly in France, Belgium, Switzerland, Britain, Russia and Germany^{6, 16-19}. Over 50 tons of valerian are sold each year in France alone. Adolescents and young adults appear to be particularly attracted to valerian and other herbs that affect the central nervous system²⁰. The German Commission E has given Valerian root a positive evaluation for use in states of restlessness^{21, 22}. The European Scientific Cooperative on Phytotherapy cites its indications as “tenseness, restlessness and irritability with difficulty in falling asleep”²³. The Herbal PDR lists its primary indications as “nervousness and insomnia”, as well as lack of concentration, stress headache, menstrual states of agitation, neuralgia, nervous stomach, and states of angst²⁴. It has also been included in herbal remedies for cardiovascular disorders to help reduce hypertension and reduce the effects of stress and

tension on the heart^{6, 25, 26}. Some spas put valerian in whirlpool baths to help reduce pain and enhance sleep for patients with fibromyalgia²⁷.

Valerian is often used in combination with other sedative herbs such as chamomile, lemon balm, passion flower, St. John's wort, hawthorn berries and hops²⁸⁻³¹. Some consumers combine it with melatonin. In 1998, valerian was the 10th most popular herbal remedy sold in the United States³².

Botany

Medicinal species: *Valeriana officinalis* is the species used in Europe. The genus contains over 250 species, with many more subspecies. *V. fauriei* is used in Traditional Chinese Medicine and Japanese medicine⁸⁻¹⁴. *V. capensis* is used in African traditional medicine¹⁵. *V. edulis* is used in Mexico and *V. wallichii* is used in India. *V. edulis* contains substantially higher concentrations of valepotriates (up to 8%), which have mutagenic properties *in vitro*³³.

Common names: All-heal, amantilla, baldrian, Belgian valerian, capon's tail, cat's love, common valerian, English valerian, fragrant valerian, garden heliotrope, German valerian, great wild valerian, heliotrope, Indian valerian, setewale, setwall, valerian, valeriana, valeriana radix, vandal root, Vermont valerian, wild valerian, Baldrianwurzel (Ger), Balderbrackenwurzel (Ger), Katzenwurzel (Ger), racine de valeriane (Fr)^{7, 24, 34}

Botanical family: Valerianaceae

Plant description: The part of the plant used medicinally is the root or rhizome. The rhizome is light grayish brown, about the size of a finger joint, bearing many rootlets. The fresh root has no odor, while the dried root smells distinctly unpleasant, akin to old gym socks, due to isovaleric acid. The plant itself is 50 to 150 cm tall with pinnate leaves and white or pink hermaphroditic flowers with three stamens; the stem is upright and without branches^{24, 35}. It is sometimes used as a border in perennial gardens.

Where it's grown: Valerian is native to Europe and Asia and has naturalized in eastern North America. This tall perennial prefers moist woodlands; it has been extensively cultivated in northern Europe. Most of the European supply is grown in Holland. It is cultivated in low lying, damp sandy humus with lime fertilizer. It is harvested in the late fall and dried.

Biochemistry

Valerian: Potentially Active Chemical Constituents

- Iridoid valepotriates (0.5% -2.0%)³⁶: valtrates, isovaltrate, didrovaltrate, valeroidate and others
- Volatile essential oil (0.2 – 02.8%)³⁷: bornyl isovalerenate and bornyl acetate; valeronic, valeric, isovaleric and acetoxyvaleric acids; valeranal, valeranone, cryptofaurinol; and other monoterpenes and sesquiterpenes
- Alkaloids (0.01 – 0.05%): valeranine, chatinine, alpha-methyl pyrrolketone, actinidine, skyanthine and naphthyridylmethylketone³⁸⁻⁴¹
- Lignans: hydroxypinoresinol

Valerian contains over 150 chemical constituents; many are physiologically active. There is substantial variation in the chemical constituents in plants from different sources, growing conditions, processing methods and storage conditions^{16, 42-49}. Even in standardized plant extracts sold in Germany, there is some variation in the amount of different chemical constituents that may account for clinical efficacy⁵⁰. Despite these differences, the clinical effects appear to be remarkably consistent across different preparations⁵¹.

Although the sedative effects of the plant's root have been known for centuries, the exact chemical compounds responsible for its activities have not been identified and agreed upon. There is little correlation between the content of volatile oils and the plant's clinical effects³⁷. Valerian's effects on the central nervous system have been variously attributed to valepotriates, their breakdown products (baldrinals), valeronic acid, valeranal and valeranone, and other constituents in the essential oil^{16, 52-54}.

Isovaleric acid is responsible for the herb's unpleasant aroma. *Actinidine* is a powerful attractant to cats, who will roll in valerian; catnip contains similar chemical compounds⁵⁵. Valerian also seems to be one of several plant species that concentrate chromium and are sometimes used to correct deficiencies of this mineral in developing countries⁵⁶.

The essential oil is also thought to contribute to valerian's sedative effects^{35, 57-59}.

Valerenic acid has spasmolytic and muscle relaxant effects and inhibits the breakdown of gamma aminobutyric acid (GABA) in the central nervous system (CNS)^{35, 52}. *Valeric acid* was once considered to be responsible for the sedative effects of this herb, but studies evaluating the isolated compound failed to document any sedative effects³³.

Roots dried at temperatures less than 40 degrees Centigrade, as the German pharmacopeia requires, contain 0.5% - 2.0% *valepotriates*⁶⁰⁻⁶². Although valepotriates were once thought to be the active ingredients, these compounds are chemically unstable: they degrade readily, are poorly absorbed and are not found in teas (infusions) and tinctures^{58, 63-66}. Instead, their degradation products, *baldrinals*, are found in such preparations, and may account for much of valerian's sedative effect^{59, 61, 67, 68}.

The lignan *hydroxypinoresinol* also binds benzodiazepine receptors in the amygdala and is thought to work synergistically with bornyl acetate, valerenic acid, and the valepotriates in terms of valerian's overall sedative effects⁶⁹.

Valerian's alkaloids are present only in minute amounts⁴¹. They have cholinesterase activity *in vitro* which has not been verified in animals or humans³⁷.

Because no single chemical within valerian has been shown to account for its clinical effects, most herbalists now conclude that it is a combination of ingredients, rather than a single ingredient, that accounts for valerian's medicinal effects⁷⁰.

Remedies prepared from related species, *V. edulis* (Mexican valerian) or *V. wallichii* (Indian valerian) contain mixtures of valepotriates, with large amounts of didrovaltrate and isovaltrate; these preparations are used to treat problems with mental concentration, stress and anxiety³⁵.

The onset of action appears to be within 30 minutes; the effects are largely gone within four hours. However, other studies note cumulative benefits from taking the herb several times daily over one month. Additional pharmacokinetic studies are needed.

Experimental Studies

Valerian: Potential Clinical Benefits

1. Cardiovascular: Coronary dilating and antiarrhythmic effects
2. Pulmonary: none
3. Renal and electrolyte balance: none
4. Gastrointestinal/hepatic: Spasmolytic
5. Neuropsychiatric: Sedative hypnotic, anxiolytic, attention-enhancing (treatment of ADHD), other neurologic conditions
6. Endocrine: none
7. Hematologic: none
8. Rheumatologic: none
9. Reproductive: none
10. Immune modulation: none
11. Antimicrobial: none
12. Antineoplastic: none
13. Antioxidant: none
14. Skin and mucus membranes: none
15. Other/miscellaneous: none

1. **Cardiovascular:** Coronary dilating and antiarrhythmic effects

- i. *In vitro data:* none
- ii. *Animal data:* Valerian extract has coronary dilatating and antiarrhythmic effects in rabbits, mice and cats; valepotriates prevented the appearance of acute coronary insufficiency, abolished vasopressin-induced arrhythmia, provoked a short-lived increase of coronary blood flow, and had moderate positive inotropic and negative chronotropic effects⁷¹. In mice, valeranone, found in small quantities in valerian and in larger amounts in its relative, *Nardostachys jatamansii*, exerted weak hypotensive effects³⁷. In cats, intravenous injection of valerian extracts produced a significant increase in coronary blood flow, a transient fall in blood pressure and a decrease in heart rate⁷².
- iii. *Human data:* Valerian is included in a German heart tonic to maintain neuro-cardiac

stability⁶. In an open, multicenter trial of 2,243 patients with a variety of functional cardiac disorders, an herbal combination (valerian, hawthorn, cereus and camphor) was associated with improvement in 84% of patients⁷³.

No controlled trials have evaluated its effects in patients with specific cardiovascular disorders.

2. **Pulmonary:** none
3. **Renal and electrolyte balance:** none
4. **Gastrointestinal/hepatic:** Spasmolytic. Valerian is traditionally used in the treatment of intestinal spasms, colic, and “nervous stomach”. Valerian has a bitter flavor, and bitters have historically been used to enhance appetite and digestion.
 - i. *In vitro data:* Valerenic acid, valtrate and valeranone exert spasmolytic effects in guinea pig ileum through direct effects on smooth muscle^{74, 75}.
 - ii. *Animal data:* none
 - iii. *Human data:* none
5. **Neuro-psychiatric:** Sedative-hypnotic, anxiolytic, attention-enhancing (treatment of ADHD), other neurologic conditions
 - a. Sedative-hypnotic. Numerous studies have shown that valerian extract possesses mild sedative and tranquilizing characteristics, but the mechanism of action for this effect has not been clarified. Some constituents influence gamma-aminobutyric acid (GABA) metabolism and cortical membrane receptors.
 - i. *In vitro data:* Valerian extracts containing amino acids and valerenic acid bind weakly with the GABA(A) receptor in rat brain assay⁷⁶⁻⁷⁸. In rat brain cortex, aqueous extract of valerian inhibited the uptake and stimulated the release of GABA, leading to increased concentrations of GABA in synaptic clefts⁷⁹; these effects may be due in part to the presence of GABA in valerian root extracts^{80, 81}, and/or to valerenic acid’s ability to inhibit GABA breakdown⁸².
 - ii. *Animal data:* In mice, intraperitoneal injections of valerenic acid, valeranal and whole herb extracts produced significant sedation, ataxia and anticonvulsant effects^{52, 67}. Intraperitoneal injections of 100 mg/kg had sedative effects as strong as barbiturates; doses of 400 mg/kg led to death⁵³. In comparison with diazepam and

chlorpromazine, valerian extract had weak anticonvulsive properties⁸³. Valerian root extract (Valdispert[®]) reduced motility and increased thiopental-induced and pentobarbital-induced sleeping time⁸³⁻⁸⁵. Even the aroma of valerian root exerted sedative effects in mice⁸⁶.

In rats, valerian had sedative effects on EEG activity⁸⁷. Valerian extract, but not its individual chemical constituents, significantly decreased glucose metabolism in the brain⁸⁸. Valepotriates suppressed symptoms associated with diazepam withdrawal⁸⁹. This has led some authors and clinicians to propose that valerian may be useful in treating benzodiazepine withdrawal syndrome⁹⁰.

Cats given 10 mg/kg of a valerian extract by gastric lavage had a significant decrease in restless, fearful and aggressive behaviors⁹¹.

iii. *Human data:* Case series and randomized controlled trials have demonstrated that valerian extract is effective in the treatment of mild-to-moderate sleeping disorders without adverse effects on REM sleep or significant hangover effects.

In an open label case series of 11,168 patients, over 70% reported that valerian was effective in helping them fall asleep, reducing sleep disturbances and decreasing restlessness and tension⁹². In adults whose sleep was disturbed by heavy traffic noise, Seda-Kneipp[®] (a combination of valerian and hops) reduced noise-induced sleep disturbances, increasing both slow-wave sleep and REM sleep⁹³. In an open label trial of another valerian-containing herbal remedy, Novo-Baldriparan[®], 89% of 225 patients with sleep difficulties reported improvements in their ability to fall asleep and 80% reported improvements in their ability to sleep through the night; most also reported an improvement in overall well-being⁹⁴.

Randomized trials have consistently demonstrated that valerian is significantly more effective than placebo in improving sleep in persons with disturbed sleep⁹⁵⁻¹⁰³.

For example, in three randomized, placebo-controlled trials (N=128, N=8 and N=121) of adults with insomnia or other sleep problems, those given aqueous valerian extract (400-600 mg) one hour before bed had a statistically significant

decrease in sleep latency and a significant improvement in sleep quality and daytime mood. The improvement was most notable among people who were poor or irregular sleepers, smokers, and people who thought they normally had long sleep latencies. Valerian had no detectable "hangover" effect the next morning^{33, 97, 99}.

In two randomized, placebo-controlled, double-blind studies of healthy young people without sleep difficulties, aqueous valerian extract (450 or 900 milligrams taken 30 minutes before bed) had a significant sleep-promoting action without a significant residual or "hangover" effect¹⁰¹.

Valerian affects EEG measures of sleep in both poor and normal sleepers. The effect of a valerian extract (Valdispert Forte, 405 mg t.i.d.) on EEG recordings of sleep was studied in 14 elderly poor sleepers. Subjects in the valerian group had an increase in slow-wave sleep (SWS) and a decrease in stage 1 sleep. There was no effect on self-reported sleep quality, sleep onset time, REM sleep time or time awake after sleep onset¹⁰². In a randomized double-blind study the effects of 60 and 120 mg valerian (Harmonicum Much[®]) were investigated in 11 adults by computer analysis of sleep stages and questionnaires. Both dosages showed a decrease of sleep stage 4 and a slight reduction of REM-sleep, and a slight increase of sleep stages 1, 2 and 3. Changes in the beta-intensity of the EEG during REM-sleep showed a stronger hypnotic effect for the 120 mg dosage than for 60 mg. Maximum effect was observed between 2 and 3 hours post medication¹⁰⁴.

Two randomized trials have compared the effectiveness of valerian-containing herbal combinations to placebo in treating insomnia. In one randomized, placebo-controlled, double-blind cross-over study of 27 patients with sleep difficulties, 400 mg of a valerian-containing preparation (Valerina Natt[®]) was compared with a similar herbal remedy that did not contain valerian, but did contain lemon balm and hops. Of the 27 patients, 21 rated the valerian-containing mixture as significantly more effective than the control preparation in terms of sleep quality; 24 of the 27 patients (89%) reported "improved sleep" and 12 of these patients (44%) reported "perfect sleep" after taking the valerian-containing preparation. No adverse effects were observed¹⁰⁵. In a placebo-controlled trial of 15 patients with insomnia, there was a

significant decrease in slow wave sleep and an increase in stage II sleep among those assigned to the herbal combination remedy (500 mg valerian and 120 mg hops)¹⁰⁶.

At least four randomized, controlled trials have compared valerian-containing herbal remedies to benzodiazepines in the treatment of insomnia. A valerian-lemon balm herbal preparation was compared to Halcion (0.125 mg), and placebo in a double-blind trial of 20 adults suffering from insomnia. The two active treatments were equivalent and both were significantly better than placebo; the herbs caused less daytime sedation and impaired mental functioning than the Halcion¹⁰⁷. These results were confirmed in a subsequent study of 68 patients¹⁰⁸. Similarly, in another randomized trial, an herbal combination (hops and valerian) was equally effective as benzodiazepine medications in improving sleep, but had fewer side effects²⁹. Finally, in a controlled study of 80 healthy volunteers, two herbal combinations (containing valerian and hops) were compared to flunitrazepam and placebo to assess potential hazards in driving or operating machinery. Objectively measurable impairment of performance on the morning after medication occurred only in the flunitrazepam group. In addition, 50% of the volunteers in the flunitrazepam group reported mild side effects, compared with only 10% from the other groups. Examination of acute effects of the plant remedies 1 to 2 hours after administration revealed a very slight, but statistically significant impairment of vigilance and a retardation in the processing of complex information¹⁰⁹.

b. Anxiolytic

- i. *In vitro data*: See above data for sedative effects.
- ii. *Animal data*: See above data for sedative effects.
- iii. *Human data*: Both open label studies and randomized controlled trials support valerian's use as a mild anxiolytic.

In an open label case series, 70 hospitalized patients with diverse psychosomatic diagnoses were given 150 – 300 mg daily doses of Valmane[®]. Functional cardiac disorders, tachycardia, hypertension, sweating, restless legs and other dysregulations were influenced positively by Valmane. The preparation produced mild sedative effects and was effective in the treatment of restlessness and

tension. Apart from mild daytime fatigue, there were no adverse somatic or psychotropic effects¹¹⁰.

In a double-blind trial of 48 adults placed in an experimental situation of social stress, valerian supplements reduced subjective sensations of anxiety but did not cause any measurable sedation¹¹¹. In a randomized, double-blind study of 80 adult patients with various anxiety syndromes, standardized valerian extract (Valdispert[®] 270 mg daily) was as effective and well tolerated as clobazam 30 mg daily, according to the Hamilton Anxiety Rating Scale and the Leeds anxiety questionnaire¹¹².

Herbal combinations containing valerian have also been more effective than placebo in randomized trials. In a German study, Euphytose[®] (six herbs including valerian) was compared with placebo over 28 days of treatment in 182 patients diagnosed with adjustment disorder and anxious mood; there was a statistically significant improvement in Hamilton anxiety scores in the 91 patients treated with the herbal mixture, compared to their own baseline scores and to the outcome scores in the placebo treated group¹¹³.

Valerian-containing herbal remedies have also compared favorably with medications in the treatment of anxiety-related disorders. In a double-blind controlled trial of 100 adults suffering from anxiety disorders, patients were assigned to twice-daily treatment with an herbal combination (50 mg of valerian and 100 mg of St. John's wort) or diazepam (2 mg) for two weeks; the herbal combination was reportedly effective in 78%, while diazepam was effective for only 54% of patients ($P < 0.01$). Side effects were reported by 4% of those taking the herbs vs. 14% of those taking diazepam¹¹⁴. In a controlled clinical trial among 20 patients suffering from irritation, unrest, depression and insomnia, ten patients were given an herbal combination of valerian (100 mg) and passionflower extract (6.5 mg) and ten were given chlorpromazine (40 mg) daily for six weeks. Improvements in EEG's were noted within two weeks for the herbal group versus six weeks for the chlorpromazine group; the two groups had comparable improvements in depression and anxiety. Side effects were reported only in the chlorpromazine group¹¹⁵.

c. Attention-enhancing (treatment of ADHD)

i. *In vitro data*: none

ii. *Animal data*: none

iii. *Human data*: In Germany valerian is sometimes used to treat attention deficit hyperactivity disorder (ADHD) in children¹¹⁶. German studies from the 1960's reported that valerian could antagonize the hypnotic effects of alcohol, enhancing concentration and coordination⁶.

In a randomized, placebo-controlled, double-blind study, valepotriates (Valmane[®]) demonstrated a dose-dependent increase in concentration abilities in 24 healthy volunteers; when given in combination with alcohol, they did not affect blood alcohol levels, sedative effects or effects on driving performance¹¹⁷.

There are no controlled trials evaluating valerian's use in treating attention deficit hyperactivity disorder (ADHD)⁶.

d. Other neurologic conditions. Some European herbalists and physicians use valerian-containing preparations to treat a variety of central, peripheral and autonomic nervous system problems and psychosomatic conditions¹¹⁰.

i. *In vitro data*: See above studies on sedative effects.

ii. *Animal data*: Unlike diazepam, valerian did not affect spontaneous ambulation and rearing or approach-avoidance conflict in mice in a water-lick conflict test. On the other hand, valerian and imipramine significantly inhibited immobility induced by a forced swimming test in rats and significantly reversed reserpine-induced hypothermia in mice, leading researchers to conclude that valerian may be a useful antidepressant¹⁰.

iii. *Human data*: Among 80 hospitalized geriatric patients enrolled in a placebo-controlled trial for 14 days, those assigned to an aqueous valerian extract had significant improvements in mood and behavioral disturbances as well as sleep¹⁰⁰.

Among 121 patients with sleep disturbances enrolled in a controlled trial, those assigned to an alcoholic extract of valerian (600 mg daily for 28 days) had a significant improvement in depression, mood and global functioning as well as sleep; no significant side effects were reported¹⁰³.

6. **Endocrine:** none
7. **Hematologic:** none
8. **Rheumatologic:** none
9. **Reproductive:** none
10. **Immune modulation:** none
11. **Antimicrobial:** none
12. **Antineoplastic:** none
13. **Antioxidant:** none
14. **Skin and mucus membranes:** none
15. **Other/miscellaneous:** none

Toxicity and Contraindications

All herbal products carry the potential for contamination with other herbal products, pesticides, herbicides, heavy metals, and pharmaceuticals.

Furthermore, allergic reactions can occur to any natural product in sensitive persons

Allergic reactions and contact dermatitis to valerian have been reported, but are rare.

Potentially toxic compounds in valerian: See Biochemistry section for a list of ingredients¹¹⁸.

Toxicity testing in rats revealed that the essential oil of valerian had the lowest toxicity of any essential oil tested, including oil of peppermint and oil of anise^{23, 119}.

Acute toxicity: In a study of 23 patients taking a nonprescription valerian extract preparation (doses from 0.5 to 12 grams), no acute or subclinical evidence of liver damage was observed^{120, 121}. Valerian extract may have caused nausea in 1 of 166 people taking 400 milligrams one hour before bedtime⁹⁷. In other studies, up to 10% of patients reported side effects such as headache and stomach upset³³.

Valerian is on the FDA's Generally Recognized as Safe (GRAS) list and is approved for use as a food. Overdoses as high as 20 times the normal daily dose have not been associated with significant morbidity¹²². A young adult drug user attempted to get high by injecting an alcoholic solution of valerian; he became ill, but recovered over three days¹²³.

Unlike benzodiazepines, valerian appears to cause no residual morning sleepiness or impairments in driving abilities; however, it may impair judgment and driving ability for two to three hours after intake¹⁰⁹. Drivers and operators of heavy machinery should be cautioned NOT to use valerian prior to using dangerous equipment.

Chronic toxicity: The Herbal PDR suggests that long-term use may be associated with headaches, restless states, sleeplessness, mydriasis and vague cardiac disturbance^{24, 37}; however, there are no long-term data specifically evaluating these concerns, and given the usual indications for using valerian, it is difficult to determine a causal relationship. Chronic use of high doses (at least 5 grams daily) can lead to withdrawal symptoms if the herb is abruptly discontinued^{2, 124}. Cautions about hepatic impairment have been based

on a combination multi-herb and medication preparation that is unavailable in the US¹²⁰,¹²⁵. Cytotoxic effects have been reported *in vitro*, but the compounds responsible for these effects (valepotriates) rapidly decompose during storage and following oral administration^{126, 127}.

Limitations during other illnesses or in patients with specific organ dysfunction: Unknown

Interactions with other herbs or pharmaceuticals: Unknown. A middle-aged woman who took St. John's wort, valerian and loperamide suffered an adverse reaction and was hospitalized; the agent or interactions responsible for her symptoms (agitation, delirium, coma, unresponsiveness) were not determined¹²⁸. Animal studies suggest that valerian may potentiate the sedative effects of barbiturates^{10, 52, 83, 84}. Although many authors have speculated about potential interactions between valerian, alcohol, barbiturates and benzodiazepines in humans, no such interactions have been reported^{129, 130}. One study found no potentiating effects of valerian on alcohol's impact on concentration, attentiveness, reaction time or driving performance¹³¹.

Safety during pregnancy, lactation and/or childhood: Unknown. No adverse effects have been reported when taken in typical doses, but safety during pregnancy and lactation has not been established. Some tinctures contain 40% - 60% alcohol. Mutagenic effects on bacteria were reported from the decomposition products of valtrate and isovaltrate, but these compounds are unstable in aqueous solution^{132, 133}; the implications for human use of this finding in bacteria are uncertain. In pregnant rats given valepotriates for 30 days, there was no impact on fertility, fetotoxicity or other adverse effects on mother or offspring¹³⁴. Long-term administration to pregnant rats and their offspring did not lead to any adverse effects³⁷.

Typical Dosages

Provision of dosage information does NOT constitute a recommendation or endorsement, but rather indicates the range of doses commonly used in herbal practice.

Doses are given for single herb use and must be adjusted when using herbs in combinations. Doses may also vary according to the type and severity of the condition treated and individual patient conditions.

Adult doses: There is disagreement on the optimal form and dose of valerian. The composition and concentration of commercially available valerian extract preparations vary widely, and caution must be exercised in determining appropriate dosage regimens. Reputable physicians and herbalists recommend a range of doses:

Tea (infusion or decoction): 150 ml hot water poured over ½ - 1 tsp (2 - 5 gm) dried root, steeped for 10 - 15 minutes and strained. One cup two times daily and before bed^{21, 35}. Tea bags contain, on average, 2 grams of dried root per bag. Total daily dose is up to 15 grams²⁴.

Concentrated infusion: 2 - 4 ml one to three times daily¹³⁵

Tincture: ½ - 1 tsp (1 - 3 ml) one to three times daily^{16, 21}

Extracts: 0.3 – 1.0 ml, equivalent to 2 - 3 grams of drug, one to three times daily^{21, 135}

Plant juice: 1 tablespoonful three times daily²⁴

Pills or capsules: For treatment of mild-to-moderate sleeping disorders, most studies have used 400 to 900 mg of valerian extract orally one to two hours before bed^{97, 101, 105}.

Oral doses for restlessness and tension range from 100 to 1800 mg of valerian extract daily and can be administered once daily or in three divided doses; most often doses of 300 - 400 mg are suggested for use up to three times daily^{1, 16, 110}.

External use: 100 grams of dried herb mixed with 2 liters of hot water; this is steeped, strained and added to the bath^{21, 24}.

Pediatric dosages: The German Commission E recommends valerian extract 220 milligrams three times daily for treatment of restlessness and sleep disorders in children fourteen years of age and younger. However, only products that are free of valepotriates and

baldrinals are approved for children as these substances have been implicated as mutagenic alkylating agents^{21, 136}. Fortunately, these substances are very unstable and are not found in the vast majority of valerian products, and the small amounts in the remainder are rapidly metabolized following oral ingestion. The European Scientific Cooperative on Phytotherapy approves of valerian for children from 3 - 12 years of age under medical supervision²³.

Availability of standardized preparations: Different commercial preparations have commonly been standardized according to the content of valepotriates, as have crude drugs. Newer European standards set 0.5% essential oil as a minimum standard.

Dosages used in herbal combinations: Variable. More than 80 commercial preparations containing valerian are available in the UK.

Proprietary names: Baldrisedone, Valmane, Baldrian Dispert, Baldrian Phyton coated tablets, Baldrianetten N, Sedalint Baldrian, Sedonium, Valdispert¹³⁶

Multi-ingredient preparations containing valerian: Euvegal coated tablets, Hova Kinder suppositories, Hovaletten coated tablets, Luvased tablets, Moradorm tablets, Plantival drops, Valdipert tablets¹³⁶

NOTE: The German Commission E and the Herbal PDR note that valerian should be stored away from light^{21, 24}.

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