

Insomnia

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Insomnia is dissatisfaction with one's quantity, quality, or timing of sleep, with sleep disturbance occurring at least three times per week for at least one month, and is associated with daytime dysfunction, impairing regular activities at home or work (Becker 2006, Ringdahl et al. 2004). It commonly manifests as the inability to fall asleep (prolonged sleep latency), sleep interrupted by periods of wakefulness, or early morning waking. Insomnia is divided into two main categories: primary (extrinsic) insomnia resulting from psychosocial problems, poor sleep hygiene, situational stresses, or substance misuse or abuse, and secondary (intrinsic) insomnia caused by psychophysiological problems or comorbidities, for example, sleep apnea, restless leg syndrome (RLS), shift work disorder, and circadian rhythm disorders (Ringdahl et al. 2004). It is estimated that between 10% and 50% of Americans report insomnia at any given time (Becker 2006, Ringdahl et al. 2004). It may be transient, short-term, or long-term (Becker 2006).

Common causes of insomnia include sleep rhythm reversals, nightmares, restless leg syndrome, nocturnal leg cramps, snoring, sleep apnea, pain (i.e., arthritis or other chronic pain), dyspnea (e.g., caused by congestive heart failure), allergies, psychological stress, depression, anxiety, panic disorder, urinary frequency, gastroesophageal reflux, and hyperthyroidism (Mellman 2006, Ringdahl et al. 2004). Use of substances such as alcohol, caffeine, and nicotine, as well as many prescription and OTC medications, can cause or exacerbate insomnia. Sleep disturbances are more common in women than men, and sleep disorders are more likely to occur at specific times during the female reproductive life cycle; for example, with symptomatic premenstrual periods, physical discomforts associated

with pregnancy as well as nocturnal hypoglycemia in pregnancy, hormonal changes and neurovegetative complaints (e.g., hot flashes) associated with menopause, and old age, the latter possibly caused by decreased melatonin production (Sahota et al. 2003, Soares & Murray 2006).

Rest is a critical biological need; patients with insomnia experience significant consequences caused by lack of restorative sleep, including fatigue, exhaustion, depression, irritability, cognitive disturbances, decreased job performance, and even an increased rate of accidents, such as motor vehicle accidents.

Diagnosis

The diagnosis of insomnia is typically based on subjective reporting by the patient, or if possible, reporting by the patient's bed partner who may be able to objectively convey information about the nature of the sleep disturbance (Soares & Murray 2006). A careful history and routine physical exam are conducted to rule out or determine whether there are associated or underlying problems. The type of insomnia (difficulty with sleep onset, sleep maintenance, or early awakening) can be indicative of associated disorders. It is important to query the patient about possible precipitants of sleep problems such as relationship or work-related problems or other stressors, whether there is a family history of sleep problems, whether there have been any recent life events that may have led to the sleep disturbance (e.g., recent loss of a loved one, loss of a job, trauma, post-traumatic stress), or any circumstances that might perpetuate sleep disturbances; for example, working in bed, eating in bed prior to sleep, watching television in bed, having unrealistic expectations (e.g., that one must have eight

hours of sleep each night to feel rested), trying too hard to sleep and remaining in bed when sleep will not come easily, sleeping with a partner who snores or sleeps restlessly, or having arguments with a spouse or partner in bed. Patients should be questioned about physical problems that may cause them to wake during the night; for example, dyspnea, indigestion, pain, or restless or cramping legs. Sleep studies are rarely necessary for the diagnosis of common sleep disturbances.

Conventional treatment approaches

Conventional treatment strategies are aimed at the needs of the individual patient. A range of therapies from nonpharmacologic to drug-based are available, and treatments encompass the many possible etiologies of sleep disorders. Nonpharmacologic strategies include promotion of sleep hygiene include cognitive behavioral therapies, stimulus control therapies (e.g., patients are taught to avoid sleep incompatible behaviors such as watching television in bed and are taught to get out of bed rather than lay there trying to fall asleep if sleep does not come easily), and temporal control therapies (deliberately waking at the same time each day and getting out of bed regardless of how much sleep was obtained the previous night and avoidance of naps). {See Table 1.} Pharmacologic interventions include antidepressant and anxiolytic medications, sedatives, narcotics, and the use of dopamine agonists for the control of RLS symptoms.

Nonpharmacologic treatment strategies

Nonpharmacologic therapies have proved effective and reliable for many patients with primary and secondary insomnia, whether of psychiatric or medical origin, compared with placebo and pharmacologic interventions, with none of the side effects associated with medications (Mellman 2006, Ringdahl et al. 2004, Yang et al. 2006). Therefore, when possible, it is preferable to attempt nonpharmacologic methods first, progressing to medications as needed.

The botanical practitioner's perspective

Practitioners may want to consider using botanical therapies in conjunction with nonpharmacologic strategies for the relief of sleep disorders prior to turning to pharmaceuticals. Many patients prefer a natural

approach and have concerns about dependency and side effects associated with conventional sleep medications (Brevoort 1998). The herbs presented in this article are those commonly used for general sleep promotion. To be effective, however, it is essential to also treat concurrent or underlying problems that prevent sleep.

Using herbs for sleep promotion

Herbs for sleep promotion may be taken 30 and 60 minutes before bed. However, herbs for sleep problems

Table 1: Sleep Hygiene

Sleep hygiene refers to a set of practices that promote restful, effective sleep. These include:

- Wait until you are sleepy to go to bed
- If you are not asleep after 20 minutes, get out of bed and do something relaxing, for example, read
- Use rituals that help you relax each night before bed, for example, taking a warm bath
- Get up at the same time each morning
- Avoid taking naps if possible
- Keep a regular schedule for meals, medications, chores, and other activities
- Don't eat, watch TV, use the computer, or talk on the phone in bed—use bed only for sleep (and sex)
- Do not have caffeine after lunch
- Do not have a beer, a glass of wine, or any other alcohol within six hours of bedtime
- Do not have a cigarette or any other source of nicotine before bedtime
- Do not go to bed hungry, but don't eat a big meal near bedtime
- Avoid rigorous exercise within six hours of bedtime
- Unclutter and clear sleeping room of desks, computers and other work items
- Check for potential allergens such as molds, dust, pollens and mites.
- Ensure that your bed gives proper support. Uncomfortable pillows can also be disturbing.
- Ensure sufficient exercise during the day; adequate exercise helps to promote restful sleep
- Journal writing at bedtime is a fabulous way to process emotions, feelings and the day's events, which clears the heart and mind before sleep
- Use relaxation and stress-reducing techniques before bed, such as yoga, meditation, contemplation and prayer, listening to soothing music, or tuning into the night sky and moon
- Create a regular bedtime and stick to it
- Encourage the client to examine attitudes about not sleeping, especially the emotions/thoughts that arise while not sleeping
- Make your bedroom quiet, dark, and a little bit cool

associated with chronic anxiety yield the best results when taken several times throughout the day rather than only prior to bedtime. It may take several weeks to notice consistent improvement. The dosage range for most formulae is 2 to 5 mL three to four times daily, with an additional dose of 2 mL taken every half-hour for two to four doses in the few hours prior to bedtime. Dosing may be repeated in the night if the patient wakes and is unable to return to sleep. Herbal teas for relaxation also may be taken prior to bedtime; however, the need to urinate from drinking tea is apt to lead to waking and thus can be counterproductive. It is not advisable to combine botanical sedatives, tranquilizers, and anxiolytics with conventional pharmaceuticals due to possible interactions and potentiation of sedative action.

A clarification of nomenclature related to sleep promotion is necessary, as the terms sedative, hypnotic, and tranquilizer are not synonymous (Wheatley 2005). Tranquilization refers to an emotional calming that may or may not lead to sleep, but that does not promote drowsiness; sedation refers to a reduction in cognitive function that is favorable to sleep promotion, and a hypnotic directly promotes sleep. Adaptogens, principal herbs for the treatment of fatigue, provide important

general benefits for patients suffering from the effects of sleep deprivation or disturbance. (See Table 2)

Valerian

Valerian has been used for sleep disorders, nervous conditions, anxiety, musculoskeletal tension, and pain for at least 2000 years (Upton 1999). The ESCOP Monographs indicate valerian for the relief of temporary mild nervous tension and/or difficulty falling asleep, uses that are corroborated by the German Commission E and the World Health Organization (Blumenthal 1998, ESCOP 2003). The WHO further describes valerian as a gentler alternative or substitute for stronger sedatives; for example, benzodiazepines and for the treatment of anxiety-related sleep disturbances (World Health Organization 1999). A systematic review by Stevinson and Ernst identified nine clinical trials evaluating the efficacy of valerian for sleep promotion. Of these, three found strong evidence of efficacy in reducing sleep latency and improving sleep quality (Fugh-Berman 1999, Stevinson & Ernst 2000). Valerian contains sesquiterpenes of the volatile oils (e.g., valeric acid), iridoids (e.g., valepotriates), alkaloids, furanofuran lignins, and free amino acids such as γ -aminobutyric acid (GABA), tyrosine, arginine, and glutamine (Upton 1999). The valeric acid and valepotriates are commonly cited as the active ingredients in valerian, and although it has been demonstrated that they possess direct sedative effects, it is likely that all of the active constituents of valerian function in a synergistic manner to produce a clinical response (Hadley & Petry 2003, Wichtl 2004). Animal studies suggest the inhibition of enzymes that degrade GABA as one possible mechanism of action. Valerian is considered more effective when used chronically rather than acutely as a sleep aid. It is a reasonable mild alternative to benzodiazepines and does not lead to sleepiness or grogginess upon waking. It is well tolerated by most patients, although herbalists have reported paradoxical effects (stimulation) in as many as 10% of patients. Vivid dreams have been reported as the most common side effect of valerian use (Wheatley 2001). Theoretical dose-related physical impairment may occur within the first few hours after ingestion, thus it is advised that patients do not drive or operate heavy machinery while taking valerian. Chronic use over years may lead to withdrawal symptoms if the herb is

Table 2: **Ranking Levels of Botanicals for Sleep Promotion**

The following herbs are ranked on a scale of 1-5. A "1" denotes general relaxation that facilitates sleep rather than sedation (tranquilization), while a "5" is a hypnotic. The range in between denotes sedation. A range suggests that the effects of the herb are dose dependent.

Herb	Rank
California poppy	1-3
Hops	2-5
Lavender	1
Chamomile	1
Lemon balm	1
Motherwort	1-3
Passion flower	1-4
Kava kava	2-5
Skullcap	1-3
Valerian	2-4

discontinued abruptly (Blumenthal 2003). Although there are no known contraindications, caution is advised in combining sedative herbs with sedative pharmaceuticals. It is considered safe when used appropriately at a dose of 2 to 3 g of crude herb per cup, one to several times daily, 1 to 3 mL tincture one to several times daily, or 10 to 15 mL of tincture 30 to 60 minutes before bed (Blumenthal 1998, Low Dog 2004). Valerian may be used as a single herb preparation; however, several trials have demonstrated efficacy of multiherb products including valerian, hops, and lemon balm (Blumenthal 2003). Valerian root is considered contraindicated in pregnancy due to lack of demonstrated safety and the mutagenic potential of valepotriates, although the actual valepotriate content of commercial products has been found to be extremely low (Blumenthal 2003, Upton 1999).

Hops

Hops, a primary ingredient in beer, has long been used for its sedative effects. Historically, it was taken internally as well as stuffed into herbal pillows as a sleep aid (ESCOP 2003, Low Dog 2004). Hops is approved by the German Commission E for mood disturbances, restlessness, anxiety, and sleep disturbances and by ESCOP for tenseness, restlessness, and sleep disorders (ESCOP 2003, Blumenthal 1998). Hops may have CNS depressant effects. Animal studies suggest sedative, hypnotic, and spasmolytic effects; however, there is a dearth of good quality human clinical trials on the use of hops for the treatment of sleep disturbances (Basch & Ulbricht 2005, ESCOP 2003, Schiller et al. 2006). Hops have a long history of safe use, with few anecdotal adverse events reports (Basch & Ulbricht 2005). It is considered safe when used in recommended doses. It is generally recommended, based on theoretical grounds of drug potentiation, that hops not be combined with herbs that effect the CNS, including barbiturates, antidepressants, sedatives, and antipsychotics (Basch & Ulbricht 2005, Low Dog 2004). Neither ESCOP nor the German Commission E provides contraindications to use nor reports on drug interactions (Blumenthal 1998, ESCOP 2003). For insomnia and sleep disturbances, hops are often combined with other sedative herbs, including passionflower, skullcap, or valerian. Caution is advised when driving or operating

heavy machinery. Use of hops is not advised during pregnancy or by women with a history of estrogen-sensitive cancers.

Passion flower

Passion flower is a folk remedy used for anxiety. In Brazil it is called “maracuja” and its juice is used as a popular beverage. Valued by the Eclectic physicians for its use in treating insomnia, passion flower is a useful adjunct in the management of nervous disorders that impact sleep, and is popular among herbalists to include in formulas for general sleep disturbances, perimenopausal sleep disturbances, depression, and anxiety (Dhawan et al. 2004, Wichtl 2004). It has not been associated with acute or chronic toxicity. Animal studies have confirmed sleep-inducing effects of the herb; however, there is a complete lack of human clinical trials (Soulimani et al. 1997, Wheatley 2005). The pharmacologic profile of the extracts suggests that large doses may result in central nervous system depression and bradycardia, prolonged QT interval, and ventricular tachycardia (Fisher et al. 2000). In a Cochrane Database review, two studies,



Humulus lupulus

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evaluating two distinct passion flower formulations, were not able to differentiate *passiflora* from benzodiazepines for any of the outcome measures. The authors reported that the lack of statistical difference may be interpreted in two ways: (1) the medications were equally effective, or (2) the absence of difference may be explained caused by Type 2 error (sample sizes not large enough or insufficient number of studies for inclusion) (Miyasaka et al. 2007). ESCOP endorses its use in the treatment of tenseness, restlessness, and irritability, and difficulty in falling asleep (ESCOP 2003). The German Commission E supports its use for the treatment of nervous restlessness (Blumenthal 1998). There are no known side effects or contraindications to use, although the theoretic contraindication of sedative herbs with sedative pharmaceuticals is generally applied.

Skullcap

Skullcap has a long historical reputation of use as an anxiolytic, antiseizure, and sedative herb; it is commonly used both for nervous disorders and sleep problems. However, there is surprisingly little clinical research on this herb. Studies with *S. baicalensis*, a species commonly used in TCM as an anti-inflammatory antibacterial, antiviral, and anti-atherosclerotic herb, have demonstrated binding of several alleged active flavonoids, including baicalin and its aglycone baicalein,

to the benzodiazepine site of the GABA-A receptor (Awad et al. 2003). A recent animal study demonstrated significant anxiolytic activity of *S. lateriflora* crude herb administered as aqueous and hydroethanolic extracts (Awad et al. 2003). Extracts were analyzed and compared with valerian and passion flower extract for constituents that might indicate anxiolytic or sedative activity. GABA and glutamine were identified in varying amounts, although it remains uncertain at this time just how much these amino acids contribute to the actions of skullcap. Hepatotoxic reactions have been reported after ingestion of preparations allegedly containing skullcap. Adulteration of skullcap herb by *Teucrium* spp., a known hepatotoxic herb, is recognized, and is most likely the culprit in supposed skullcap associated hepatotoxicity, rather than skullcap itself. Marketplace standards are (ideally) applied to prevent this from occurring. Nonetheless, it is this possibility of adulteration with *Teucrium* that leads to the contraindication of skullcap during pregnancy. One source reported symptoms giddiness, stupor, confusion, and seizures associated with overdose of skullcap tincture; similar findings have not been otherwise reported in the herbal literature (AltMedDex).

California poppy

California poppy, an herb indigenous to California and used by Native Americans as a sedative, hypnotic, and analgesic, remains widely popular among herbal practitioners today as a reliable treatment for sleep disorders, especially overexcitement and sleeplessness, and also as an antispasmodic when there is muscular tension, restlessness, and pain (Bone 2003, Hoffmann 2003, Low Dog 2004). Of interest is that the liquid extract of this herb was included in the Parke-Davis catalog in 1890, in which it was referred to as an “excellent soporific and analgesic, above all harmless” (Bone 2003). Its efficacy was compared to morphine, but without the side effects associated with that drug (e.g., constipation, addiction) (Bone 2003). Animal studies have demonstrated binding of alkaloids in California poppy to GABA receptors. Sedative effects have been demonstrated at higher doses, whereas anxiolytic effects are predominant at lower dose ranges (Rolland et al. 1991). These effects are may be mediated by interactions of California poppy with benzodiazepine receptors. *In vitro* and animal studies



Passiflora incarnata



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Eschscholzia californica

have demonstrated spasmolytic effects on smooth muscle (Rolland et al. 2001). A combination formula containing California poppy (80%) and *Corydalis cava* (20%) extracts demonstrated *in vitro* ability to interact with opiate receptors, suggesting an analgesic activity, and in two controlled clinical trials normalized disturbed sleep patterns without carryover effects or dependency (Bone 2003).

Kava kava

Kava kava is used in its native South Pacific Islands as a sedative, aphrodisiac, and recreational and religious beverage (Wheatley 2005). It has earned a reputation as a useful botanical for the treatment of anxiety, sleep disorders, restlessness, and as a muscle relaxant (Blumenthal 2003). Practitioners might consider it for anxiety-related sleep disorders, muscle twitching, and restless legs that interfere with sleep. Short-term studies suggest that kava kava is effective for insomnia, particularly in improving sleep quality and decreasing the amount of time needed to fall asleep, and that the kava-methysticine pyrones act centrally as antispasmodics and anticonvulsants (Wheatley 2005, 2001). The mechanisms of action proposed for kava include decreased levels of glutamate, an excitatory neurotransmitter, activation of dopaminergic neurons, interaction with GABA receptors, direct action on muscles leading to relaxation, elevation of dopamine and

serotonin levels via inhibition of monoamine uptake, and cellular actions similar to mood stabilizers (Boonen & Haberlein 1998, Davies et al. 1992, Gleitz et al. 1996, Grunze et al. 2001, Jussofie et al. 1994, Schirmacher et al. 1999, Singh & Singh 2002). The German Commission E contraindicates kava kava in patients with endogenous depression (Blumenthal 1998). Some individuals do not like the feeling they get when taking kava kava, reporting a sensation of numbness that is unpleasant. Suggesting a lower dose may prevent this feeling, but some patients may just not tolerate kava kava well. There is a possible potentiation of the effects of alcohol, barbiturates, and other substances affecting the CNS when used with kava kava; therefore simultaneous use is inadvisable (Blumenthal 2003). Patients with prior or current liver disease, or those taking medications that carry a risk of hepatotoxicity, should not use this herb.

Chamomile

Chamomile is noted both for its effects on the gastrointestinal (GI) system for the treatment of spasms and dyspepsia, and as a tranquilizer and mild sedative. It appears that inhalation of the essential oil containing vapor when drinking the tea may play an important role in the sedative effects of this herb (Masago et al. 2000). Constituents including flavonoids and apigenins may bind to benzodiazepine receptors in the CNS (Avallone et al. 1996). Animal studies demonstrate anticonvulsant and CNS depressant activity, whereas human studies are lacking (Wheatley 2005). Chamomile is a gentle herb considered safe for children and pregnancy and lactating women, immortalized by Beatrix Potter when Peter Rabbit's mother gives it to the naughty Peter to promote sleep. There are no contraindications to use or known interactions.

Lemon balm

A recent randomized controlled clinical trial found lemon balm to be "beneficial in moderating subjective mood in response to mild psychological stress" (Kennedy et al. 2003). Although sleep measurements were not made in this study, the findings suggest changes supportive of sleep induction. ESCOP supports the use of lemon balm as a sedative for tenseness, restlessness, and irritability, as well as the symptomatic relief of minor digestive complaints; for example, spasms (ESCOP

2003). The German Commission E supports its use for nervous sleeping disorders (Blumenthal 1998). Like chamomile, lemon balm is considered a gentle herb to be taken as a tea, also rich in volatile oils that calm the mood, and it also may be taken in tincture form (Masago et al. 2000). It has been traditionally called “the gladdening herb,” which has lent to its modern use as not only a tranquilizer and mild hypnotic, but as an anxiolytic and mild antidepressant. There are no contraindications to use or known interactions.

Lavender

Lavender is a mild sedative used for restlessness, nervous exhaustion, and sleep disorders, and is often included in sedative herbal formulas (Wichtl 2004). It approved by the German Commission E for the treatment of mood disturbances and functional abdominal complaints, for example, nervous stomach, is used as a tranquilizing herb in the form of tea, included in tinctures, and as an aromatherapy agent (Blumenthal 1998). It is a gentle herb with no reported side effects or expected drug interactions. A relaxing bath can be taken prior to bed using five to seven drops of lavender essential oil added to a tub of hot water, or several drops. Alternatively, or additionally, an aromatherapy atomizer containing lavender oil can be sprayed near the sleeping area to promote a sense of calm. The essential oil is not to be taken internally.



Matricaria recutita

Motherwort

Motherwort has been traditionally used as a nerve, tranquilizer, and mild sedative for irritability and tension. Its use is approved by the German Commission E for the treatment of nervous cardiac conditions and thyroid hyperfunction (Blumenthal 1998). It is an excellent addition to formulae for sleep disorders in perimenopausal women experiencing anxiety or heart palpitations, and for patients with subclinical hyperthyroid function. Patients experiencing heart palpitations or other cardiac symptoms, or hyperthyroid symptoms should seek the care of a qualified medical practitioner to rule out serious underlying disorder.

Protocol for sleep troubles

The following formulae are examples of how herbs might be combined to address a variety of sleep related problems. Patients can expect results within a couple of weeks of beginning a therapy, although some may experience rather immediate benefits.

Difficulty falling asleep

Tea: Combine equal parts of the following bulk herbs. Prepare by steeping 2 tsp of herbs in 1 cup of boiling water for 10 minutes. It is important to steep the tea in a covered vessel to preserve the medicinal volatile oils.

Lavender (<i>Lavandula officinalis</i>)	1 part
Chamomile (<i>Matricaria recutita</i>)	1 part
Lemon balm (<i>Melissa officinalis</i>)	1 part
Total: 3 parts	

Dose: Drink 1 to 4 cups daily, but discontinue drinking about one hour prior to bed to avoid night waking from the need to urinate from drinking tea too close to bedtime.

Tincture:

California poppy (<i>Eschscholzia californica</i>)	20 mL
Hops (<i>Humulus lupulus</i>)	20 mL
Passion flower (<i>Passiflora incarnate</i>)	20 mL
Valerian (<i>Valeriana officinalis</i>)	10 mL
Skullcap (<i>Scutellaria lateriflora</i>)	10 mL
Total: 100 mL	

Dose: Take 2 to 4 mL for four doses starting 2 hours prior to bedtime. Repeat one to three doses during the night if night waking is a problem. For individuals in whom hops is contraindicated, omit the hops and increase the California poppy and passion flower each by 10 mL. For

those who cannot tolerate valerian, omit and increase the passion flower by 10 mL.

Inability to Sleep Associated with Anxiety

Tincture:

Passion flower (<i>Passiflora incarnate</i>)	30 mL
California poppy (<i>Eschscholzia californica</i>)	25 mL
Motherwort (<i>Leonurus cardiaca</i>)	15 mL
Kava kava (<i>Piper methysticum</i>)	15 mL
Skullcap (<i>Scutellaria lateriflora</i>)	15 mL

Total: 100 mL

Dose: Take 2 to 4 mL three to four times daily, and two to four doses within the 2 hours prior to bedtime.

Difficulty Sleeping Caused by Musculoskeletal Pain or Restless Legs

Tincture:

Cramp bark (<i>Viburnum opulus</i>)	30 mL
California poppy (<i>Eschscholzia californica</i>)	25 mL
Corydalis (<i>Corydalis ambigua</i>)	15 mL
Hops (<i>Humulus lupulus</i>)	15 mL
Kava kava (<i>Piper methysticum</i>)	15 mL

Total: 100 mL

Dose: Take 2 to 4 mL as needed for pain relief, up to six doses daily.

Difficulty Sleeping Associated with Perimenopausal Complaints

Tincture:

Black cohosh (<i>Cimicifuga racemosa</i>)	30 mL
Hops (<i>Humulus lupulus</i>)	20 mL
Motherwort (<i>Leonurus cardiaca</i>)	15 mL
Passion flower (<i>Passiflora incarnate</i>)	15 mL
Sage (<i>Salvia officinalis</i>)	10 mL
Lavender (<i>Lavandula officinalis</i>)	10 mL

Total: 100 mL

Dose: 3 to 5 mL as needed in the evening and prior to sleep, up to four doses daily.

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