

Nutrition *News and Views*

November/December 2006

Vol.10, No.6

For health professionals only

INSOMNIA

Judith A. DeCava, CNC, LNC

If you are reading this at 2:30 AM, you may have insomnia. Insomnia is the most common of the over 90 recognized sleep disorders. Up to 40% of adult Americans report at least occasional insomnia, and of those, almost 20% have severe insomnia. Almost a third of adults have frequent trouble sleeping.

Insomnia is the inability to get the amount of sleep you need (trouble falling asleep, trouble staying asleep, waking too early, or some combination of these) **plus** feeling terrible the next day (sleepy, tired, irritable). Insomnia affects quality of life, productivity, cognition, even safety; it's associated with depression and anxiety. People with insomnia have a much harder time functioning during the day than do people without it. Sleep is essential. Some people need only four hours of sleep a night. Others are unproductive and cranky unless they get 10 hours. Although requirements vary among individuals, your personal needs remain similar throughout your life. If you need seven hours nightly this week, chances are you'll need that amount 10 years from now. Though recognized as a "major public health problem," insomnia is **not** a diagnosis in itself. It is a **symptom** of something else. The important thing is to determine and then help the specific underlying causes(s). The mind and body are involved as well as environmental, nutritional, and social factors. Most people—up to 80%—can overcome insomnia with self-help measures that address the causes(s) of poor sleep. ⁱ

DO OLDER PEOPLE NEED LESS SLEEP?

No. What changes with age are sleep **patterns**, not the need for sleep. If you need seven hours of sleep to feel your best when you're 40, you'll probably always need that much. It's the ability to get the **solid** seven or eight hours you need that may diminish. Nighttime sleep can become fragmented—you awaken more easily and return to sleep with more difficulty. There is less deep, restorative sleep that normally occurs soon after you nod off. With many brief awakenings, you may feel you've been up all night, though you've slept somewhat. That's usually why older people may compensate with daytime naps. Actually, "medical illnesses, or treatments for those illnesses" are more likely at fault than age itself. Getting up often to go to the bathroom, discomfort, pain, difficult breathing, emotional stress, and other consequences of illness or disease are common sleep disruptors. In short, aging itself does not explain insomnia. People who are aging "successfully"—in good health and leading an active, involved life—"seem to preserve a more youthful pattern of sleep." In other words, physical and psychological well-being are keys to sleeping well even into old age. Many habits and choices that are within our control improve sleep significantly for many older folks. For one thing, many older people don't get outside enough and not exposed to enough natural light, which can disrupt biological rhythms that regulate the sleep-wake cycle. Eating well, exercising regularly, staying interested and involved in life—many actions can help. ⁱⁱ

POSSIBLE CAUSES OF INSOMNIA

Insomnia can be **primary** (not directly associated with other health conditions), **secondary** (caused by illnesses such as arthritis, heart disease, multiple sclerosis, depression, etc.), **chronic** (lingering for months or years), or **temporary** (lasting days or weeks, though it can reappear).

Drugs: Some cases of every sleep disorder "are induced by commonly prescribed drugs." SOME of the drugs that can cause insomnia are: **Blood pressure drugs**, including some beta-blockers (like Inderal), furosemide (Lasix), methyldopa, clonidine, reserpine. Some **cholesterol-lowering drugs** such as Mevacor (lovastatin). Some **weight loss pills**. **Hormones**, such as thyroid drugs (like Synthroid), oral contraceptives, progesterone, or cortisone. Bronchodilators, theophylline (Theo-24). Phenytoin (Dilantin), Levodopa, Quinidine (antimalarial). **Anti-cancer** drugs. Nicotine (Nicorette, tobacco). Other stimulants including amphetamines. Over-the-counter pain and cold relievers containing **caffeine** like Anacin, Excedrin, Empirin. Decongestants (like Sudafed). ⁱⁱⁱ

Physical problems including sleep apnea (waking up frequently, severe snoring, brief periods of not breathing); disorders such as asthma, chronic obstructive pulmonary disease, congestive heart failure, coronary heart disease, gastro-esophageal reflux (GERD), kidney disease, rheumatoid or osteoarthritis, other pain-related disorders, hyperthyroidism, hypoparathyroidism, benign prostatic hyperplasia, nerve disorders like Parkinson's, MS, and so on. Discomfort, metabolic speed-up, trips to the bathroom, or other symptoms of these conditions can keep one awake. Restless legs syndrome (unpleasant or uncomfortable leg sensations at night that are relieved by walking, rubbing, or other movements that prevent sleeping) is another frustrating problem.

Hormonal imbalance: High levels of thyroid hormone can cause anxiety, restlessness, hyperarousal, and difficulty sleeping. Adrenal hormone imbalance can lead to sleeping problems. The fluctuation of female hormones—particularly during times of significant changes such as puberty, pregnancy, perimenopause, and menopause—as well as imbalances due to toxic hormone-disrupting chemicals or imbalances due to poor dietary habits or deficiencies, can cause insomnia. Nearly 80% of pregnant women have disturbed sleep. Sleep becomes more elusive in women over age 40 as estrogen levels fluctuate tremendously. Women going through menopause may have symptoms that keep them from sleeping properly.

Nocturnal hypoglycemia: A drop in the blood glucose level causes the release of adrenaline, glucagons, cortisol and growth hormone—all of which can stimulate the brain. When it happens at night, wakefulness can occur.

Caffeine from coffee, colas, and teas, especially in the evening, can be too stimulating. Alcohol consumption: Alcohol may help you fall asleep, but the sleep will be fragmented and unsettled. You may wake up suddenly in the middle of the night and can't get back to sleep. Smoking: Insomnia is yet another reason to avoid cigarettes.

Allergies or intolerances to certain foods, chemicals, and toxins can affect quality and quantity of sleep. These may include anything from mercury toxicity and solvent exposure to reactions from refined sugars and pasteurized milk. Deficiencies and imbalances: Depletion of any number of nutrients or imbalances of nutrients can affect the nervous system, hormonal equilibrium, and duration or progression of various illnesses.

Persistent stress is the most common cause of chronic insomnia. "It isn't how much stress you have in your life, but how you handle it." Insomniacs carry more physical tension—faster heart rate, shallow and quick breathing, more muscle tightness, and other reactions—into the night than do good sleepers. If you are worried, have relationship issues, are over-worked, sad, frustrated, or otherwise distressed, then you may have trouble sleeping. Your body may have disrupted levels of neurotransmitters or higher concentrations of stress hormones that contribute to sleeplessness. Some people are easily hyperaroused, responding to everyday stress in a more intense manner than do other people. **Anxiety** and **depression** frequently cause insomnia. In one large study, insomnia was found BEFORE the onset of anxiety or depression in 40% of affected persons and AFTER the onset of anxiety or depression in 72%. Caretaker insomnia: Parents of newborns who have repeated nighttime awakenings or adults who care for family members with medical disorders often complain of insomnia.

Keeping erratic hours, rotating shift work, jet lag, and the like: Anything that disrupts your natural biological clock (circadian rhythm) can disturb your sleep pattern. Prolonged naps or naps taken late in the day can aggravate insomnia. Though an eight-hour night of sleep is now embraced, historically people went to bed when it was dark and rose with the sun, adapting to nature's schedule and getting more sleep (typically more than 10 hours). Exposure to artificial lights at night can upset one's body clock by disturbing secretion of melatonin, a hormone that helps regulate sleep, by the pineal gland. When it's dark, we stay awake, sometimes for many hours after sunset, by using artificial lighting. Nighttime exposure to light puts in motion a chemical process that can affect the sleep/wake cycle. Research indicates that artificial light may have a very powerful effect on internal rhythms.

Other environmental factors like noise. We're bombarded with artificial noises or total silence rather than natural noises such as the flow of water, wind through the trees, etc. Or we may have a sleeping partner who snores loudly, has body jerking, or thrashes about. Central heat and air conditioning may create too much of a change in temperature. An uncomfortable bed, strong odors, disarray of surroundings, electromagnetic fields (EMFs), and other factors may disturb sleep. Television picture tubes, wireless Internet connections, electrical wiring, and cellphones emit electromagnetic fields "that may contribute to frequent waking, aches and pains, and muscle spasms." EMFs have been found to decrease melatonin production.

Inactivity. Regular exercise (including a morning walk, bike ride, or run to get natural sunlight too!) can release tension and stress and promote better and deeper sleep. Lack of exercise is not conducive to sleep. On the other hand, over-training can also lead to sleep disorders.^{iv}

HOW ABOUT SLEEPING PILLS?

Millions of prescriptions are filled each year for sleeping pills such as Ambien, Sonata, Restoril, Lunesta, and the like. Since 2000, these prescriptions have increased in all age groups, nearly doubling for children and young adults. Persons 65 years and older suffer more insomnia and use more medications than any other group. Doctors also prescribe unofficial sleep aids, including anti-depressants and anti-epileptic drugs. New drugs continue to hit the market. One new novel arrival is Rozeram, a melatonin-receptor agonist (activator); it doesn't seem to have a potential for abuse, but its sleeping benefits are not impressive. Few of these drugs have been

tested in trials that lasted longer than 6 weeks. Yet many people take them nightly for months and even years. Lunesta is the only prescription sleep medication approved for long-term use. Truly, treating insomnia with drugs remains “an exercise of educated guesswork.” And the underlying cause is often never approached. Then there are **side effects** of these drugs. The list is extensive, but may include headaches, anxiety, daytime sleepiness or dizziness, gastrointestinal distress, abnormal thinking, behavior changes, falls, ataxia (inability to coordinate muscles), memory loss, and addiction (which manufacturers prefer to call “dependency”). Short-term (recommended) use of six popular sleeping pills was studied. The conclusion was that the short-term benefits of these drugs may not justify the increased harm, especially to older people. The drugs increased the chances of cognitive (mental) problems by almost five times, physical or motor problems by nearly three times, and daytime fatigue by nearly four times. However, “non-pharmacological treatments”—therapies OTHER than drugs—were found to be effective for aspects of insomnia and are “associated with durable long-term improvement in sleep.”

What about **over-the-counter** medications—mostly antihistamines? There is no systematic evidence to demonstrate effectiveness and there are concerns about risks. Adverse effects include “residual daytime sedation, diminished cognitive function, and delirium, the latter being of particular concern to the elderly.”

Then perhaps a nightcap—an **alcoholic drink** or two—can relax a person to sleep? Consumption of alcohol in the evening may help you fall asleep, but that sleep will often be fragmented and light. Alcohol inhibits melatonin secretion. It suppresses the dream state of sleep (REM) as well as the delta phase (the deepest state of sleep). As little as one drink can disturb the sleep of some individuals, but this varies.^v

Melatonin is a natural sleep aid, isn't it? Melatonin is NOT a food, nutrient, or herb. It's a hormone. Hormones are powerful, and like other hormones, it's best to allow your own body to regulate its production as much as possible. From the amino acid tryptophan and other nutrients, the body makes melatonin. Secreted by the pineal gland, it helps to set the body's internal clock for waking and sleeping. The **drug** melatonin may, in some cases, bring on slumber quickly, but usually only when insomnia is due to things that disrupt the body's production of melatonin (like inadequate sunlight exposure, jet lag, or shift work). An analysis of 25 studies found that melatonin pills work only slightly better than a placebo (an increase of less than 10 minutes of sleep per night). This was when it was used for jet lag, shift work, or medical conditions. Another trial found that the drug shortened the amount of time it took to fall asleep but had no effect on sustaining sleep or improving the quality of sleep. Usually, people don't have insomnia due to a melatonin deficiency, so taking the drug won't help. Melatonin levels may decrease as some people age, but there are ways to slow this tendency including outdoor exposure and eating foods that contain melatonin precursors. Relatively small doses of the drug are needed, yet the level may remain elevated throughout much of the next day. The pineal gland releases melatonin only at night. “Physiological” doses (amounts close to what the body would normally produce) are best, but the amount naturally secreted is “extremely variable from person to person.” How much you should take? “There's no relationship between the amount of melatonin you make at night and whether or not you have bad sleep, or whether more melatonin will help you sleep better.” So, it's anyone's guess. There's no information about the safety of long-term use. Some people have side effects such as vomiting, rashes, or daytime fatigue, especially when the dose is too high. A woman's ovulation may be inhibited by disturbing hormone levels.^{vi}

TIPS FOR A GOOD NIGHT'S SLEEP

It is critical to identify and treat the underlying cause(s) of insomnia. Good “sleep hygiene” is a start:

Set a schedule. Stabilize your sleep-wake cycle. Go to bed at a set time (but only when you're sleepy) each night and get up at the same time each morning. Disrupting your schedule may lead to insomnia. “Sleeping in” on weekends makes it harder to wake up early on Monday morning because it re-sets your sleep cycle. Some people should avoid taking naps. Force yourself to rise at the same hour every morning, no matter how little sleep you got the night before. Enough sleep is whatever makes you feel fit and alert the next day.

Relax before bedtime. Have a relaxing routine—a warm bath, reading, or whatever makes it easier to fall asleep. You can train yourself to associate certain restful, tranquil activities with sleep and make them part of your nighttime ritual. Having sex before bed will relax some people; climaxing can act as a natural sedative.

Chill out. A nighttime drop in body temperature is nature's way of telling your body it's time for sleep. Taking a warm bath before bedtime is one way to get your body temperature to drop (after you emerge), helping you nod off more easily. **Warm your feet.** Warming up cold feet (even with an old-fashioned hot water bottle) can help some folks who have trouble falling asleep. Or wear warm socks to bed.

Avoid stimulants. Avoid drinks that contain caffeine, particularly from late afternoon to bedtime. Coffee, chocolate, soft drinks, non-herbal teas, diet drugs, and some pain relievers (Anacin, Excedrin, etc.) contain

caffeine. Smokers tend to sleep lightly and often wake up in the early morning due to nicotine withdrawal. Alcohol can rob you of deep sleep and REM sleep and keeps you in the lighter states of sleep. Other substances, including strong spices and refined sugars, act as stimulants for certain people.

Don't lie in bed awake. If you can't get to sleep, don't just lie in bed. The anxiety of being unable to fall asleep can contribute to insomnia. Do something else, like reading, watching television, or listening to music, until you feel tired. Just don't do or watch or read things that may be too intense or stimulating.

Sleep until sunlight. If possible, wake up with the sun, or get outdoors in bright light in the morning. Sunlight helps the body's internal biological clock reset itself each day. Exposure to an hour of morning sunlight is recommended for people having problems falling asleep. If you can't get outside, use indoor lights with full-spectrum bulbs (which mimic natural sunlight).

Control your environment. Maintain a comfortable temperature (usually on the cool side) in your bedroom. Extreme temperatures may disrupt sleep or prevent you from falling asleep. A comfortable bed, soft sheets and blankets, a neat and clean room, soothing colors, a relaxing decor, and other items in your sleep surroundings can help. Place your alarm clock where you can't see it during the night; it won't help to know the time—it may make you more uptight. Block out noise; use earplugs or run a small fan or a table fountain. Turn down the lights an hour or two before you go to bed. Darkness helps your body prepare for sleep. Sleep in a room that's as dark as possible. The bedroom should not be used for eating, work, television or anything else except for sleep and intimacy. If your sleeping partner snores, thrashes, or otherwise disturbs your sleep, go to another room.

Exercise. Try to engage in physical activities for at least 20-30 minutes a day. Daily exercise often helps people sleep, although strenuous exertion within four hours of bedtime may interfere with sleep. So get your exercise earlier in the day, at least 5-6 hours before going to bed. Compared with people who remain sedentary, exercisers not only sleep longer, but also fall asleep much faster. Weight training as well as aerobic activities should be included. Yoga, stretching, breathing exercises, and other relaxation techniques can significantly improve sleep efficiency, total sleep time, sleep latency, number of awakenings, and sleep quality. Insomnia has both psychological and physiological components related to hyperarousal of the autonomic nervous system. Relaxation techniques reduce arousal. Outdoor activities can contribute to improved sleep quality.

Eat well. Include whole, natural foods that are rich sources of tryptophan, such as turkey, chicken, beef, milk products, potatoes, eggs, nuts, brown rice. Also include unrefined carbohydrates like whole grains, fresh fruits, and vegetables, which have a mildly sedating effect. AVOID refined carbohydrates (like refined sugars). They can cause reactive hypoglycemia—an initial upward spike of blood sugar followed by a downward plunge below normal. You may wake up and have difficulty getting back to sleep. Alcohol can have the same effect. Stay clear of hydrogenated fats, fried foods or other altered fats. Eat REAL foods which can help maintain sleep through the night. Don't eat a lot just before bedtime. Minimize fluid intake after the evening meal to prevent waking to use the bathroom. Severe calorie restriction—drastic diets—can cause sleep disturbances including insomnia.

De-stress. Re-educate your nervous system in how to respond to stressful aspects of life. This can be accomplished through meditation, biofeedback, and relaxation techniques (stretching, progressive muscular relaxation, yoga, tai chi, deep breathing, or whatever is appealing). If you worry or fret about things, get in the habit of writing them down on a small pad kept by your bed or schedule a little time earlier in the day to write down everything that is bothering you or that you need to remember—a worry book. Then deal with these things in the morning or another time. Replace negative thoughts with positive ones (the Pollyanna therapy).

Behavior interventions. Sleep restriction therapy and/or cognitive-behavior therapy have been shown to be successful approaches that especially target those who have stress maladaptation problems or cognitive patterns that perpetuate insomnia. Sleep restriction therapy involves keeping your body slightly sleep deprived so you can increase your ability to sleep soundly. After a while, perhaps several weeks, sleep is much better, a sleep cycle is set (you sleep for the amount of time you need), and you feel better.

Other professional interventions. Massage therapy, acupuncture, chiropractic manipulation, and other therapies are effective treatments for insomnia. Poor sleep habits can be a sign of underlying illness—sleep apnea; restless leg syndrome; side effect of medications; chronic pain; thyroid disorders; enlarged prostate; menopausal symptoms; depression, anxiety, or other psychological issues; alcoholism; and so on. Get the help you need. If depression or anxiety is involved, you may need psychological counseling.^{vii}

Your mind. The most powerful sleep aid may be your own mind. People's sleep problems "have a lot to do with their own attitudes and beliefs about sleep." If you can change your expectations AND coping strategies when

reality falls short, better sleep will follow. “Stewing about sleep can become a self-fulfilling prophecy.” You can break the vicious cycle of fretting about whether you’ll sleep (which makes it harder to fall asleep). Accept that some sleep changes are unavoidable due to any number of circumstances. Realize that you probably sleep more than you think you do. Don’t panic if you fall asleep, then wake for several hours; at least during that first portion of the night, you’re getting mostly deep sleep. If you can’t fall asleep, try to stay awake; for some people, this reduces the time it takes to fall asleep. Give sleep the attention it deserves (see the above). Learn to function on less sleep when you need to; use what energy you have to reset both your mood and your schedule. We often overtax our minds and our ability to relax diminishes. Don’t give up.^{viii}

Aromatherapy. Various scents and essential oils can help soothe you to sleep and reduce restlessness during sleep. In a study on lavender oil, tranquilizing drugs were withdrawn from patients and, after two weeks of disturbed sleep, patients’ rooms were infused with the smell of lavender oil each night for two weeks. The time asleep actually increased over levels experienced while using drugs. And patients were far less restless.^{ix}

NUTRITION

Nutrition can have a profound effect on sleep. The fuel you give your body directly affects the brain’s intricate and complex biochemistry. In addition to food sensitivities or allergies, over-consuming nonfoods (low or no nutritional value; toxic or disruptive ingredients) or stimulants (caffeine, nicotine, refined sugars, and the like), nutritional deficiencies and imbalances must be considered.

Amino acids (building blocks of protein) may be depleted due to poor quality foods or various physical or psychological stressors. The need for tryptophan is well-researched but other amino acids may also be involved. One recipe is to soak 20 almonds, 1 tablespoon of poppy seeds, and 1 tablespoon of pumpkin seeds in about 1 cup water for 8 hours. In the evening, put the mixture in a blender (including the soaking water) along with a little raw honey (or Rapadura) and blend until smooth. Drink about 1 hour before going to bed. The nuts and seeds are all rich in tryptophan. Milk is also a good source, so some certified grade-A raw milk or organic yogurt in the evening may benefit snooze time. On the other hand, some people sleep better with a **carbohydrate** snack before bed. If so, make sure it is unrefined, natural, and light such as a piece of fruit or a whole grain roll.^x

Vitamin B complex is usually a factor when anything involving the nervous system is amiss. Studies have found that thiamin (B1), riboflavin (B2) niacinamide (B3), folate, pyridoxine (B6, one of the nutrients that enhances the body’s conversion of tryptophan to melatonin), and vitamin B12, all play a role in improving sleep patterns. The WHOLE B-complex is essential as well as its associated nutrients.^{xi}

Minerals can calm an ungrounded nervous system. Calcium and magnesium can have soothing effects. Depletion of magnesium has been associated with disruption of normal biologic rhythms including sleep cycles and may affect neurotransmitter balances. A low-potassium diet aids sleeping efficiency and sleep consolidation. Zinc, when deficient, improves sleep quality and quantity. Chromium complexes may be effective for blood-sugar imbalances, which often cause middle-of-the-night wakefulness. A deficiency of iron and/or vitamin E complex may be involved in restless legs syndrome or obstructive sleep apnea. Eat your greens, seaweeds, raw nuts and seeds, whole grains, and milk products from pasture-fed animals!^{xii}

The **hypothalamus** gland participates in generating sleep by helping to control the body’s internal daily clock AND in other ways not associated with the circadian cycle. Support with hypothalamus glandular supplements and nutrients for brain/nerve tissues. The **pineal** produces and secretes melatonin; it contains GABA, serotonin, norepinephrine, dopamine, and other peptides that affect mood, sleep, and arousal levels. Activation of the sympathetic nervous system can increase the concentration of melatonin-synthesizing enzymes in the pineal, enhancing melatonin secretion. The rhythm of melatonin excretion is influenced by factors such as diet, posture, and activity. Pineal glandulars, foods rich in tryptophan, and support to the nervous system may be of value.^{xiii}

Homeopathic remedies sometimes help you get the rest you need. Passiflora Lehning Drops (a combination), aconite, arsenicum album, chamomilla, coffea, ignatia, nux vomica, pulsatilla, sepia, and others have been used. Consult a knowledgeable homeopath to ascertain the specific remedy for you.^{xiv}

Various **herbs** have been used for sleep troubles, some of which have undergone scientific scrutiny with positive results. One of the most studied is valerian, found to be a safe and effective herb for sleep problems. It works as well as benzodiazepine drugs such as Valium. It can help people fall asleep faster and have a more relaxed, high-quality night’s sleep. It increases activity of GABA (gamma-aminobutyric acid) receptors, which are involved in regulating normal sleep. Hops, especially along with valerian, lessen the time it takes to fall asleep and improves overall sleep efficiency. Chaste tree may increase the body’s own production of melatonin during

the night. Kava has a long history of use soothing nerves and promoting deep sleep without causing daytime drowsiness. It's effective for anxiety, restlessness, stressful feelings, and enhancing the dream state. Passionflower is a widely used, safe, sedating-type herb that can be taken over a long period of time. It is particularly indicated when an overactive mind, worry, or nightmares cause insomnia. Reishi mushroom tones the adrenals and calms the mind. St. John's wort, when used for several months, can help some types of chronic insomnia, particularly when there is depression. Chamomile is a nervine that calms and soothes and is especially well-suited for sleeplessness coupled with digestive difficulties. Catnip is a gentle herb that contains sedative or tranquilizing properties that are similar to valerian. Skullcap is a very safe herb used to "feed" the nervous system and should be taken long-term. Lavender is approved in Germany for restlessness and insomnia, used internally and externally (absorbed through the skin or by inhalation). Lemon balm has long been used to reduce the effects of stress and anxiety, to promote restful sleep, calm the nervous system, and relieve insomnia. California poppy and Corydalis cava, taken together, help normalize disturbed sleeping behavior. Suanzaorentang, a traditional Chinese formula, can significantly improve sleep quality. Ashwagandha is an Ayurvedic remedy used as a sleep aid. For folks who can get them, peanut leaves or peanut shoots (as teas) have been used for hundreds of years for their sedative, sleep-inducing effect.^{xv}

The goal is to approach ANY underlying cause of insomnia. If there is adrenal or thyroid imbalance, for example, nutrients to support these areas should be provided. A general nutritional protocol may include: **Cataplex B** (2 before two meals), **Cataplex G** (3 before two meals), **Neuroplex** (1 before two meals), **Calcifood** (1 wafer with two meals), **MinTran** (4 tablets 30 minutes before a meal), **Valerian Complex** (2 an hour before bedtime).

ⁱ Health, April 2006, 20(3): 180; Tufts University Health & Nutrition Letter, September 2005, 23(7): 6; Jane Bradbury, *Lancet*, 12 Jan 2002, 359(9301): 140; Tori Hudson, *Townsend Letter for Doctors & Patients*, Apr 2004, 249: 152.

ⁱⁱ UC Berkeley Wellness Ltr, Apr 1993, 9(7): 8; Lynne Lamberg, *JAMA*, 16 July 2003, 290(3): 319-23; *Health News*, Oct 2005, 11(10): 8.

ⁱⁱⁱ J Bradbury, *Lancet*, 12 Jan 2002, 359(9301):140; *HealthNews*, 4 Mar 1997, 3(3):1-2; S Wolfe et al, *Worst Pills, Best Pills*, NY(Pocket Books), 1999.

^{iv} UC Berkeley Wellness Ltr, May 1994, 10(8): 7; Kristen Whatley, *Natural Health*, Nov/Dec 1998: 66-70; Christiane Northrup, *Health Wisdom for Women*, July 2000, 7(7): 5-8; *Science News*, 15 July 2000, 158(3): 40; Michael J Sateia & Peter D Nowell, *Lancet*, 27 Nov 2004, 364(9449): 1959-73; Joseph Mercola, *Townsend Ltr D&P*, June 1998, 179: 27; *Health*, May/Jun 1996, 10(3): 23; Julian Whitaker, *Health & Healing*, Mar 2006, 16(3): 6-8; Sharon Parmet, *JAMA*, 21 May 2003, 289(19): 2602; Tim Batchelder, *Townsend Ltr D&P*, July 2002, 228: 47-48; Carolos H Schenck, et al, *JAMA*, 21 May 2003, 289(19): 2475-79; F Speer, *Pediat Clin Noth Am*, Nov 1954, 1:1029-37; A Kahn, et al, *Pediatrics*, Oct 1989, 84(4): 595-603; Y Hasegawa, et al, *Jap J New Remedies Clinic*, 10 Mar 1983: 1-27; *Mob Mortal Wkly Rep*, 2 Mar 1990, 39(8): 125-6; TL Schwend, *Physician & Sport Med*, Sept 1995, 23(9): 44-56; B Lindelof, et al, *Arch Environ Health*, Mar/Apr 1992, 267: 795; AWK Ang, et al, *Psychosom Med*, 1995, 57: 299-302; Barbara Tunick, *Veg Times*, July 2003, 311:35-41; Robert Pela, *Natural Health*, Dec 2004/Jan 2005, 35(1): 52-56; Tori Hudson, ND, *Townsend Ltr D&P*, Apr 2004, 249: 152-55; Elizabeth Barker, *Natural Health*, June 2006, 36(6): 77-80; David Williams, *Alternatives*, Aug 1998, 7(14): 106-9; *Health*, June 2006, 20(5): 22; BA Phillips & FJ Danner, *Arch Inter Med*, 1995, 155:734-37; Janet Raloff, *Sci News*, 27 May 2006, 169(21): 330-32.

^v B Harder, *Science News*, 26 Nov 2005, 168(22):344-45; *Worst Pills, Best Pills News*, Jan 2006, 12(1):1-3; J Whitaker, *Health & Healing*, Mar 2006, 16(3): 6-8; M Sateia & P Nowell, *Lancet*, 27 Nov 2004, 364(9449):1959-73; *What Doctors Don't Tell You*, Jan 2006, 16(10):4; *Health News*, Apr 2006, 12(4):7; *Health Facts*, Dec 2005, 30(12):1-3; R Ivker, *Natural Health*, Jul/Aug 1999, 29(6): 54-56; R Sahelian, *Health News Naturally*, Fall 1995:12.

^{vi} LR Pinto, Jr., et al, *Sleep*, 2004, 27(6):1089-92; A Gaby, *Townsend Ltr D&P*, Apr 2002, 225:31; IV Zhdanova, et al, *J Clin Endocrinol Metab*, 2001, 86:4727-30; D Schardt, *Nutr Action Healthlitr*, Jun 2002, 29(5):13-15; *HealthFacts*, Dec 2005, 30(12):1-3; B Tunick, *Veg Times*, Jul 2003, 311:35-41; UC Berkeley Wellness Ltr, May 2006, 22(8): 8; D Williams, *Alternatives*, Aug 1998, 7(14):106-9; D Garfinkel, et al, *Lancet*, 26 Aug 1995, 346(8974):541-44.

^{vii} *Altern Med Alert*, Nov 2004, 7(11):S1-S2; R Ivker, *Nat Health*, Jul/Aug 1999, 29(6):54-55; *HealthNews*, 9 Dec 1997, 3(16):8; R Anderson, *Townsend Ltr D&P*, Nov 1998, 184:48; T Hudson, *Townsend Ltr D&P*, Apr 2004, 249:152-55; NK Fuchs, *Women's Health Letter*, Dec 2005, 11(12):1-3; J Newman, *Health*, Mar 2000, 14(2):113-18; J Mercola, *Townsend Ltr D&P*, Nov 1999, 196:50-51; *Health*, Oct 1998, 12(7): 54; *Sleep*, 1997, 20(7):505-11; E Schiff, *Alternative Med Alert*, Nov 2004, 7(11):121-24; S Vartan, *Environmental Mag*, Jul/Aug 2003, 14(4):40-41; C Ott, *Nat Health*, Mar 2003, 33(2):68-71; L Denworth, *Health*, Jun 2002, 16(5):86-90; UC Berkeley Wellness Ltr, Sept 2003, 19(12):4-5 & Apr 2002, 18(7):8 & Aug 2001, 17(11):8 & Mar 1997, 13(6):8; M O'Brien, *Complementary Med for Physician*, Jun 2000, 5(5):34-35; J Hill, *Health*, Sept 2003, 17(7):47-55; *Sci News*, 3 Dec 2005, 168(23):366; *Health*, Apr 1997, 11(3):31-2; SB Khalsa, *Appl Psychophysiol Biofeedback*, 2004, 29(4):269-78; A Keelly, *Yoga J*, Mar/Apr 2002, 166:96-103; A Fincke, *Body & Soul*, Jan/Feb 2003:36-43; P O'Connor, et al, *JAMA*, 2 Apr 1997, 277(13):1034-35; NA Singh, et al, *Sleep*, 1997, 20(2):95-101.

^{viii} Dorothy Foltz-Gray, *Health*, June 2001: 93-97; UC Berkeley Wellness Ltr, May 1995, 11(8): 8.

^{ix} David Williams, *Alternatives*, Jan 1996, 6(7): 53-54; *HlthFacts*, Oct 1995, 20(197): 3; Mark Hardy et al, *Lancet*, 9 Sept 1995, 346(8976): 701.

^x R Sandy, *Int J Neurosci*, 1992, 67: 127-44; U Voderholzer et al, *Neuropsychopharmacology*, 1998, 18: 112-24; *Eating Well*, Oct/Nov 2005, 4(3): 21; Virender Sodhi, *Natural Health*, May 2000, 30(4): 88; JG Lindsley et al, *Sleep*, 1983, 6: 247-56; Jason Barker & Chris Meletis, *Townsend Ltr D&P*, Apr 2004, 249: 71-74; MJ Chambers, *Physician Sports Med*, Aug 1991, 19(8): 107-14.

^{xi} M Werbach, *Townsend Ltr D&P*, Apr 2004, 249:156; JS Prendiville & LN Manfredi, *Semin Dermatol*, Mar 1992, 11: 88-97; R Kones, *South Med J*, Dec 1990, 83(12):1454-58; H Mohler et al, *Nature*, 5 Apr 1979, 278:563-65; M Okawa, *Proc 5th World Cong Biol Psych*, Flore, Italy, 9 June 1991; T Ohta et al, *Japanese Psychiatry & Neuroogyl*, 1991, 45(1):167-68; Jason Barker & Chris Meletis, *Townsend Ltr D&P*, Apr 2004, 249:71-74.

^{xii} R Sahelian, *Health News Naturally*, Fall 1995:12; R Pela, *Nat Health*, Dec 2004/Jan 2005, 35(1):52-56; J Barker & C Meletis, *Townsend Ltr D&P*, Apr 2004, 249:71-74; MD Drennan, et al, *Sleep*, 1991, 14(4):357-60; Chris Hobbs, *Herbs for Health*, Sept/Oct 2001, 6(4): 68-69; SA Rogers, et al, *Int Clin Nutr Rev*, Jan 1990, 10(1):253-58; M Werbach, *Townsend Ltr D&P*, Apr 2004, 249:156; *What Doctors Don't Tell You*, May 2006, 17(2):5.

^{xiii} Acres USA, Nov 1998, 28(11): 37; JE Sherin et al, *Science*, 12 Jan 1996, 271: 216-19; *Williams Textbook of Endocrinology*, ed. Jean D Wilson & Daniel W Foster, Philadelphia(WB Saunders Co), 1992: 183-85.

^{xiv} Harald Gaier, *What Doctors Don't Tell You*, Nov 2005, 16(8): 22; Nan K Fuchs, *Women's Health Ltr*, Jan 2006, 12(1): 6-7.

^{xv} K Bone, *Townsend Ltr D&P*, Apr 2005, 261:44; B Baugh & C Hobbs, *Herbs for Health*, June 2006, 11(2):25-30; K Bone, *Nutrition & Healing*, Feb 2005, 12(1):7 & Jan 2003, 10(1):5-6; DM Taibi, et al, *Holis Nurs Pract*, May/June 2004, 18(3):120-26; Felise Milan & Ronit Fallek, *Altern Therapies in Women's Health*, Feb 2004, 6(2): 9-12; *Herbs for Health*, Nov/Dec 2002, 7(5): 64; F Donath et al, *Pharmacopsychology*, 2000, 33(2): 28; S Foster, *Herbs for Health*, May/June 2003, 8(2):47-52; V Sodhi, *Natural Health*, Jul/Aug 1999, 29(6):44-45; David Williams, *Alternatives*, Aug 1992, 4(14): 112.