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Stress: A Misunderstood Torment

What is Stress?

Fear, insecurity and stress have plagued us all at some point. Yet stress is poorly understood by most of us. What is stress exactly, why do we experience it so frequently and most importantly how can we alleviate some of the stress in our lives?

Stress has a variety of facets and can be physical or psychological in nature. We all experience and express stress differently due to the simple fact that stress is not so much related to what has happened to you but how you have reacted to it. Although it can lead to disease, stress itself is not a disease but a highly evolved mechanism which allows us to access our resources and energy in order to improve our ability to react to a threat. Unfortunately, this mechanism has lost some of its relevance because today’s stressors have little to do with the stress primitive men would have faced. Whereas corporeal threats would have been common for our ancestors, most stresses today are related to demands and difficulties which are not physical in nature. In our modern work environment, the hormones released during the stress response often end up being detrimental. Indeed, the short lived response to stress known as the “fight or flight response” provides a quick burst of energy and heightened senses, whereas the chronic stress we experience today can have negative repercussions, eventually leading to impaired cognitive performance and metabolic disturbances such as hypertension, ineffective immunity and slower healing.

Figure 1. The types of stress we face now are much different than what our ancient ancestors would have faced. Today’s stresses can lead to chronic stress and negative consequences on health.

<table>
<thead>
<tr>
<th>Beneficial effect</th>
<th>Detrimental effect</th>
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<tbody>
<tr>
<td>Improves short term performance</td>
<td>Insomnia and irritability</td>
</tr>
<tr>
<td>Heightens senses in the immediate</td>
<td>Weakens the immune system</td>
</tr>
<tr>
<td>Promotes motivation and positive changes</td>
<td>Linked to metabolic syndrome, hypertension, heart disease and type 2 diabetes</td>
</tr>
<tr>
<td>Improves chances of survival in a life threatening situation</td>
<td>Elevated cortisol can lead to osteoporosis</td>
</tr>
<tr>
<td></td>
<td>Promotes weight gain</td>
</tr>
<tr>
<td></td>
<td>Emotional disorders and possible addiction</td>
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Stress can also be seen as the inability to cope. The area of your life when you feel the least control is probably where you experience the most stress. In North America, the two most common stressors are finances and work. Other common stressors include family life, personal health and other personal concerns. Your personality also affects your stress level. For example, pessimists, perfectionists and over-achievers tend to experience higher levels of stress. Negative thought patterns also increase stress levels.

The Negative Effects of Stress
The adverse health effects associated with chronic stress are significant and widespread. Stress is not only related to irritability and emotional disorders, it increases the risk of developing metabolic syndrome, a weaker immune system, hypertension, osteoporosis, weight gain, diabetes and heart disease. Stress also leads individuals to poor dietary and lifestyle choices. The reason is simple; eating has a calming effect. Unfortunately this can predispose individuals to “emotional eating”, a situation where food is unconsciously used as a way to suppress negative emotions. Regrettably, emotional eating usually leads to poor food choices. This was clearly shown in a study where the diet of employees in a busy department store was monitored. When stressed, the employees lost restraint and had an abnormally increased appetite. This led them to poor food choices and an increased consumption of saturated fat and glucose. It appears that we naturally seek high caloric foods when stressed because our demands for energy increase when we face adversity. It is therefore important to adopt healthy strategies to help deal with stress.

Coping with Stress
A number of stress reduction methods and coping strategies are available. A key component of these strategies is developing a realization that you are in control of your life. Given that we feel stress when we are unable to cope, reintroducing control is usually the first step in better stress management. Identifying the sources of stress in your life and taking charge of your thoughts, schedule and environment is essential to meet new challenges. If you are struggling with stress, you should look at your current coping strategies and find healthier ways to deal with stress. Healthy ways to deal with stress include reducing your responsibilities and daily tasks, limiting the stress in your environment, focusing on the positive in your life and establishing a strong social support network.

Several medications can also be used for stress. They typically induce relaxation through their effect on the nervous system. Benzodiazepines are an old favorite when it comes to the treatment of insomnia, anxiety and stress. Their mechanism of action is simple; they enhance the effect of the neurotransmitter gamma-aminobutyric acid also known as GABA. Given that GABA is the chief inhibitory neurotransmitter in our nervous system this leads to sedative, anti-anxiety and muscle relaxant activity. Although very effective, benzodiazepines are not recommended for long term use as they tend to cause tolerance, dependence and withdrawal symptoms when the therapy is discontinued. However, several natural options are available for the treatment of stress and insomnia.

Stress by the numbers:

- 43% of all adults are negatively affected by stress
- 25% of Americans turn to food to alleviate stress
- 31% of women are emotional eaters versus 19% of men
- 27% of people very concerned with stress smoke, whereas only 19% of people who are not concerned about stress smoke
- 36% of stressed individuals did not exercise last week whereas 73% of people not concerned with stress exercise weekly
- 59% of stressed individuals are feeling nervous, sad or tired
- 56% of stressed individuals report difficulty sleeping
- 55% of stressed individuals report lack of interest or energy

The natural approaches used to relieve stress usually focus on two areas: ingredients which are sedative in nature and adaptogens. Adaptogens are typically natural herbs which improve our ability to deal with stress, anxiety and fatigue. Adaptogens help to maintain energy production and encourage the Resistance Stage (see page 4 and 5: The Stress Response) when dealing with stress. Common adaptogens include licorice, rhodiola, ashwagandha and eleutherococcus senticosus. Several research studies have demonstrated the ability of such plants to alleviate the psychological and physical impact of
stress. For example, in one trial performed on military cadets, rhodiola was shown to have a pronounced anti-fatigue effect.\(^2\) Other trials have demonstrated better athletic performance and improved immunity with eleutherococcus senticosus supplementation.\(^3\)

Sedatives, on the other hand, calm the nervous system. Similar to their prescribed counterparts, natural sedatives also tend to work on the GABA receptors. Natural ingredients that have been shown to calm the nervous system include theanine, GABA, 5-HTP and several herbs such as valerian or passionflower. A number of research studies have clearly shown the benefits and calming action of these ingredients. For instance, theanine was shown to be linked to a state of relaxed wakefulness in anxious individuals 60 minutes after taking the supplement.\(^4\)

The problems associated with stress are far reaching and affects most of us on an ongoing basis. Stress depletes our resources, damages our health and lessens our quality of life. Several proven techniques and dietary supplements are available to minimize the burden of stress in our lives. It is in everyone’s interest to develop better strategies to deal with stress because as Hans Selye, the Canadian researcher known as the father of stress, has said: “Every stress leaves an indelible scar, and the organism pays for its survival after a stressful situation by becoming a little older”.

**References**


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**A Note on Driving: Why Driving is Stressful?**

Diving is a high risk and unpredictable activity. There are frequent dangerous events such as near misses which can be frightening and can lead to irrational thoughts. Several stressors have been associated with driving and include:\(^5\)

- **Immobility**- which leads to muscular tension and discomfort
- **Lack of control**- traffic is highly unpredictable and variable. No matter how you drive, you cannot control congested traffic which leads to frustration and stress
- **Danger**- incidents and danger are common which leads to stress, fear and even rage
- **Territoriality**- drivers will often feel insulted or invaded which leads to a hostile mental state that is difficult to contain
- **Multi-tasking**- diversions like eating or talking on the phone increase stress by dividing attention and reducing alertness
- **Unpredictability**- driving is dangerous with the road conditions and weather also adding an element of uncertainty.

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**A Natural Solution to Promote Restful Sleep**

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Resistence to stress

Possible stressors
- Physical stress
- Emotional
- Environmental
- Metabolic

Alarm phase - Immediate response to stress

Key hormones: Epinephrine, renin, aldosterone

- Increased mental alertness
- Increased energy consumption by skeletal muscles
- Increased blood flow to skeletal muscles
- Drastic reduction in digestion and urine production
- Increased blood pressure, heart rate and respiratory rate

Time
2. Resistance - Stress Persists
Key Hormones: Glucocorticosteroids, epinephrine, growth hormone, thyroid hormones

- Higher than normal energy demands
- Glycogen reserves are being depleted
- Lipids and protein reserves are mobilized
- Glucose is conserved for the nervous system

3. Exhaustion - Collapse of Vital Systems

- Homeostatic regulation breaks down
- Problems with mineral balance arise
- Exhaustion of lipid reserves
- Inability to maintain hormonal and metabolic demands
Nearly everyone has experienced difficulty sleeping at some time in their lives. Insomnia is defined as the inability to obtain an adequate amount or quality of sleep. Individuals with insomnia may have difficulty falling asleep, difficulty remaining asleep, early morning awakenings or poor quality, non-restorative sleep. There are different classes of insomnia, depending on the severity and duration. In general, transient insomnia refers to occasional sleep disturbances lasting from days to weeks. Acute insomnia refers to the inability to achieve normal sleep for a period of three weeks to six months, and chronic insomnia can last for years.

In general it is estimated that about 30% of individuals report symptoms of insomnia, with about 10% suffering from chronic insomnia. A report on insomnia in Canada found that approximately 13.4%, or 3.3 million Canadians over the age of 15 years suffer from insomnia. These individuals declared that they experienced trouble going to sleep or staying asleep most or all of the time. On average, individuals reporting insomnia slept 6.5 hours per night, compared to 7.5 hours per night in non-insomniacs. 18% of insomniacs reported getting less than five hours of sleep per night.

The causes of insomnia are highly varied. In fact, insomnia is one of few conditions that can be categorized as both a symptom and as a condition in its own right. However, to fully understand insomnia as well as its causes and consequences, we must first take a closer look at sleep itself.

**What is Sleep?**

Sleep is not merely a period of rest or “down time” for the body, but is actually a complex sequence of stages with specific and important purposes. While you sleep your brain is performing a variety of vital tasks like forming pathways for learning as well as consolidating memories. Sleep is divided into two main types, REM or “rapid eye movement” sleep and non-REM sleep, which has 4 stages.

<table>
<thead>
<tr>
<th>Stage 1</th>
<th>Stage 2</th>
<th>Stage 3</th>
<th>Stage 4</th>
<th>Stage 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-5%</td>
<td>45-55%</td>
<td>4-6%</td>
<td>12-15%</td>
<td>20-25%</td>
</tr>
</tbody>
</table>

Figure 2. There are five stages of sleep, two “light” sleep stages, two “deep” sleep stages and REM or “rapid eye movement” sleep.
Generally, sleep begins in non-REM sleep. Stages 1 and 2 are the lightest stages of sleep during which individuals are easily awakened by noises and movements. As sleep progresses through stages 2 - 4 of non-REM sleep, eye movement stops and brain wave patterns become slower. Stage 4 is characterized by very slow brain wave patterns. Stages 3 and 4 of non-REM sleep are considered “deep sleep” and are the restorative portion of sleep, during which one is not easily awakened. This part of sleep is considered necessary for feeling well rested and energized the next day.4

REM sleep follows stage 4 of non-REM sleep. This first occurs about 90 minutes after one initially falls asleep. During REM sleep your eyes move rapidly, and breathing rate, heart rate and blood pressure increase. Dreaming occurs during REM sleep, and the centres of the brain responsible for learning and memory are stimulated. It is suggested that dreaming is the brain’s way of sorting and storing new memories and information acquired while awake.4 However, the other stages of sleep are also important for learning and memory.4

Throughout the night the brain continuously cycles through the stages of sleep. As the night progresses the duration of REM sleep increases, and the time spent in stages 3 and 4 of non-REM sleep decreases. Overall one spends almost half of their total sleep time in stages 1 and 2 of non-REM sleep, with the rest of the time being divided between stages 3 and 4 and REM sleep. Interestingly, infants spend about half their time sleeping in REM sleep.4

These various sleep stages mean that it is not just the quantity of sleep that is important, but also the quality. When sleep is frequently interrupted, or cut short, this can result in not enough time being spent in REM sleep or in non-REM stages. Both types of sleep are important for learning, memory and restorative processes, and a loss of the correct balance of sleep types can have negative consequences.4

### A Note on Sleep: How much is enough?

Recent times have definitely seen a decrease in the average amount of sleep. The current average for adults is about six to seven hours of sleep per night.4,5 This is a great change from 1910, when most people slept around nine hours a night!4 Our 24/7 lifestyles and an effort to balance all of the responsibilities of life and work have led many individuals to sacrifice sleep in order to get things done. However, this strategy can have a negative influence on both health and day to day performance. While “catching up” on sleep on the weekends can help, it cannot totally erase the sleep debt accumulated during the week, and can make it harder to get up at the right time during the week.4

When given unlimited opportunity for sleep, most adults will sleep about eight to eight and a half hours per night, although sleep needs vary both between individuals and by age. Studies suggest that the optimal amount of sleep needed to achieve good daytime performance, avoid sleep debt and sleepiness during the day, as well as for preventing health problems related to inadequate sleep is about seven to eight hours per night for adults and nine hours or more for children and teenagers. Keep in mind, however, that the quality of this sleep is also vital to achieve these goals.4

One interesting study has suggested, that not only is too little sleep a potential problem, but so is too much.5 The study examined the sleeping habits of over one million men and women as part of the American Cancer Society’s Cancer Prevention Study II, and associated these with the risk of mortality. Surprisingly, reports of insomnia were not associated with increased risk of mortality once the data was corrected for other factors. In fact, the best survival was found among individuals sleeping seven hours per night. Sleeping eight hours or more, or six hours or less, were both associated with a slightly increased mortality risk. This increased risk was highest (reaching 15%) for individuals sleeping more than 8.5 or less than 4.5 hours per night.5 The finding that longer periods of sleep are associated with an increased risk of mortality is surprising, and currently, the reason for this is not known. But it seems that either too much or too little sleep can be potentially harmful.
Causes of Insomnia

Physical Causes
In many cases insomnia is caused by some type of underlying condition. It is estimated that this is the case for approximately 75-90% of insomniacs. Often these conditions are medical in nature. A number of studies have demonstrated a strong link between insomnia and poor physical health, chronic health conditions or pain. Pain in particular seems to be a major cause of insomnia. Obviously, when a person is experiencing a high level of chronic pain, it becomes very difficult to sleep. Many chronic diseases are also associated with an increased risk of insomnia. This could be due to the fact that many diseases result in painful conditions, or it could also be a result of the stress and worry experienced by an individual when they are suffering from a disease.

Among Canadians, a wide range of chronic conditions have been found to be related to sleeping difficulties. These conditions include: fibromyalgia, arthritis, rheumatism, back problems, migraine, heart disease, cancer, chronic bronchitis, emphysema, chronic obstructive pulmonary disease, stomach, intestinal ulcers, and bowel disorders. For example, over 20% of individuals with arthritis, back problems or migraines reported insomnia. This is compared to only around 12-13% of individuals without these problems.

Sleep disorders, including restless leg syndrome and sleep-related breathing disorders such as sleep apnea, dyspnea and snoring, are also commonly associated with interrupted sleep and insomnia.

Mood and Psychological Disorders
Another major cause of insomnia is psychological or mood disorders. Anxiety and depression have long been associated with sleeping difficulties. In fact, psychological causes are estimated to account for approximately 40% of all cases. Among Canadians, about one third of individuals reporting a mood disorder (such as depression or panic attacks) also reported suffering from insomnia. This is compared to only around 12% of individuals without mood disorders.

In general, individuals suffering from anxiety or other mood disorders have a very high probability of also experiencing insomnia. What is much less certain is whether the insomnia is a result of the mood disorder, or whether insomnia precedes and actually contributes to the development of depression and anxiety disorders. Although it has been traditionally assumed that insomnia is a secondary consequence of depressive disorders, other research has shown that in some cases, insomnia may be a risk factor for the development of psychological disorders. In fact, one large-scale European trial found that more often than not, insomnia actually precedes the mood disorder rather than following it. Furthermore, several long-term studies have shown that insomnia is a significant risk factor for the development of depressive disorders. As to whether insomnia causes depression or vice versa, it has been suggested that both conditions have a very similar pathology, making an individual who is susceptible to one condition highly susceptible to the other as well.

Lifestyle Factors
Lifestyle factors are another major cause of insomnia. Such factors include work schedule, stress at home and at work, obesity, physical activity, alcohol and drug use, education, income, age and marital status. For example, it has been found that a high proportion of obese individuals suffer from insomnia. In a study of insomnia in Canadians, 22% of highly obese individuals reported insomnia, as compared to 12% of individuals with normal weights. The study also found a slight relationship between physical activity levels and insomnia; with moderately active individuals reporting less insomnia than sedentary individuals. These results match those of a Japanese study that reported that habitual exercise was associated with a lower incidence of sleeping difficulties.
Not surprisingly, drinking coffee or other high caffeine beverages can also negatively affect sleep. Caffeine consumption has been linked to reduced overall sleep time, delayed onset of sleep and disrupted sleep quality in individuals drinking coffee throughout the day.\textsuperscript{13} Consumption of caffeine before bedtime has also been shown to disturb normal sleep patterns, shifting REM sleep into the earlier part of the night and stages 3 and 4 of non-REM sleep into the later part of the night.\textsuperscript{14} Research suggests that caffeine may decrease secretion of melatonin, the main hormone responsible for sleep synchronization.\textsuperscript{15}

Higher rates of insomnia have also been reported among heavy drinkers, smokers, individuals with low income or no formal education, women, shift workers, older individuals, widows and widowers and unemployed individuals.\textsuperscript{2,7} In some cases these sleeping problems are related to changes to circadian rhythms, or sleep wake cycles. For example, this is experienced by shift workers, whose schedule is constantly changing. This is also the cause of “jet lag”. In many of these cases, however, the actual cause of the insomnia may be the stress associated with an individual’s situation.

### Stress and Insomnia

Stress is a very common cause of insomnia. In fact, in a number of studies it has been the primary cause identified.\textsuperscript{7} Among Canadians, nearly a quarter of those who reported their days as “quite a bit” or “extremely” stressful also reported suffering from insomnia.\textsuperscript{2} The type of stress experienced also influenced the risk of suffering from insomnia, with the highest incidences occurring in those reporting stress related to a physical health problem, the death of a loved one, personal/family responsibilities or difficulties related to a personal relationship.\textsuperscript{2}

#### Table 1: Percentage of Canadians reporting insomnia by main source of stress\textsuperscript{2}

<table>
<thead>
<tr>
<th>Source of Stress</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Own physical health problem</td>
<td>31.7%</td>
</tr>
<tr>
<td>Death of loved one</td>
<td>24.6%</td>
</tr>
<tr>
<td>Own emotional/mental health problem</td>
<td>24.0%</td>
</tr>
<tr>
<td>Personal and family’s safety</td>
<td>16.6%</td>
</tr>
<tr>
<td>Other personal/family responsibilities</td>
<td>16.4%</td>
</tr>
<tr>
<td>Personal relationships</td>
<td>15.8%</td>
</tr>
<tr>
<td>Caring for others</td>
<td>15.6%</td>
</tr>
<tr>
<td>Employment status (unemployment)</td>
<td>14.6%</td>
</tr>
<tr>
<td>Financial situation</td>
<td>14.5%</td>
</tr>
<tr>
<td>Health of family members</td>
<td>14.4%</td>
</tr>
<tr>
<td>Other</td>
<td>14.2%</td>
</tr>
<tr>
<td>Caring for own children</td>
<td>12.1%</td>
</tr>
<tr>
<td>Own work situation</td>
<td>11.9%</td>
</tr>
<tr>
<td>Time pressures/not enough time</td>
<td>8.1%</td>
</tr>
<tr>
<td>None</td>
<td>8.0%</td>
</tr>
<tr>
<td>School</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

Although life stress is more strongly associated with insomnia than work stress, stress at work is another significant cause of sleeping difficulties. In one study it was found that a poor psychosocial work environment doubled one’s risk of developing sleeping problems!\textsuperscript{11} Furthermore, as mentioned previously, insomnia seemingly caused by a medical or psychological problem may actually be due to the stress and worry associated with having the condition, rather than the condition itself.

### Primary Chronic Insomnia

In a few cases, there is no obvious underlying condition behind an individual’s chronic sleeping difficulties. These individuals are said to suffer from primary insomnia. In these cases the person experiences hyperarousal, meaning that they are more “revved up” than a normal individual. This hyperaroused state prevents normal sleep from occurring. In these cases there is usually increased activity evident in both the autonomic nervous system (the part of the nervous system that regulates organ systems and bodily processes) as well as certain
hormonal pathways.\textsuperscript{1} This results in higher cortisol levels, higher body temperatures, faster heart rates, and a different pattern of brain waves during sleep.\textsuperscript{1,4}

The Negative Effects of Insomnia

Obviously there are negative consequences to not getting enough sleep. Studies in rats have shown just how important sleep can be. Normal rats have a lifespan of between 2 and 3 years. However, when deprived of REM sleep they live for only five weeks, and when deprived of sleep altogether, they live only two to three weeks.\textsuperscript{4} While the consequences for humans experiencing insomnia are not this drastic, they can still be quite debilitating.

Insomnia can cause a number of problems during the day, such as excessive sleepiness, fatigue, a lack of energy, difficulty concentrating, depressed mood, and irritability. Because of this, insomnia can impair quality of life as much as, or even more than other chronic medical problems.\textsuperscript{4} In several studies examining quality of life in insomniacs, decreased quality of life was reported for virtually all dimensions of the 36-item Short Form Health Survey of the Medical Outcomes Study (SF-36). This survey assesses eight aspects of life quality including: physical functioning, role limitation due to physical health problems, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional health problems and mental health.\textsuperscript{16-18} In fact, insomniacs were found to score worse in many areas than individuals with congestive heart failure or depression.\textsuperscript{19}

Reduced performance at school or work is another obvious consequence of insomnia. Individuals with sleep problems have been reported to be less able to focus at work, to have less job satisfaction and to be more likely to miss work due to health problems than good sleepers.\textsuperscript{3,20}

Insomnia can also have negative effects on a person’s health. As discussed above, individuals with insomnia are much more likely to develop depression.\textsuperscript{9,10} Another very recent finding is that sleep deprivation may increase food intake, and could possibly contribute to obesity.\textsuperscript{18} In a study conducted on 12 healthy men, it was found that a night of sleep deprivation (4 hours of sleep) resulted in increased food consumption the following day.\textsuperscript{21} Although further research would be required to determine if this effect is maintained for persistent insomnia, it is a very interesting finding.

Finally, one of the most dangerous side-effects of insomnia is an increased risk of accidents. Research has shown that insomniacs are two to four times more likely to have an accident than non-insomniacs.\textsuperscript{22,23} In one study involving over 8000 individuals, it was found that eight percent of individuals with insomnia had been involved in an industrial accident in the preceding year, as compared to only one percent of non-insomniacs.\textsuperscript{24}

Natural Solutions for Insomnia

Many individuals rely on prescription drugs to help them get to sleep. Unfortunately, many of these drugs have potential side effects, and can lead to dependence. The good news is that there are a number of natural alternatives that can help you get a good night’s sleep. For example, more and more research is showing that in many cases certain behavioural changes or patterns can actually be as effective as pharmaceutical sleep aids! There are also a number of natural supplements that have been shown to help induce relaxation and healthy sleep patterns with far fewer negative side effects than sleeping pills.

Behavioural Changes

Behavioural therapies have come a long way from counting sheep! Often they will involve sleep restriction techniques or stimulus control procedures or both. Sleep restriction procedures involve limiting the time spent in bed to the actual time spent sleeping. For example if individuals report spending 6 out of 8 hours spend in bed actually sleeping, then they would begin spending only 6 hours in bed, and then increase the time in bed as sleep efficiency increases. Stimulus control procedures help to create a positive association with the bedroom, instead of one of anxiety and frustration. These procedures include going to bed only when sleepy, using the bedroom...
only for sleeping, not reading or TV watching etc., moving to another room if unable to sleep within 15-20 minutes, arising at the same time every morning regardless of amount of sleep obtained and limiting naps to only one hour prior to 3:00pm.

In one study, involving 78 adults with chronic insomnia, these behavioural strategies were found to be more effective than pharmaceutical treatment, with longer lasting effects. Furthermore, a large meta-analysis showed that stimulus control alone could reduce sleep-onset time from an average of 64 minutes to an average of 33 minutes.

Another common strategy that has been used is progressive relaxation. Numerous studies have found that this technique, which involves progressively relaxing the various parts of the body, effectively reduces the time it takes to fall asleep. In one study this technique was found to reduce sleep onset time by over 22 minutes. This was compared to a set of arbitrary relaxation exercises, which reduced sleep onset time by only 2.8 minutes.

Paradoxical intention is yet another strategy that has been shown to be effective in some cases. It is based on the premise that the fear of not being able to sleep reduces sleep quality. This technique involves a person actually trying to stay awake in bed in a dark room. As the patient stops trying to fall asleep, their anxiety about not being able to sleep dissipates, and they have an easier time sleeping.

Neurotransmitters
For individuals who would like to avoid pharmaceutical sleep aids, there are a number of effective, natural options. Some of these include naturally occurring neurotransmitters and hormones. Neurotransmitters are chemical messengers in the brain that transmit signals from one neuron to another. These brain chemicals act to modulate an enormous number of functions in the human body, including sleep. Supplementing with some of these natural sleep regulating molecules has been shown to be effective for combating the effects of insomnia.

GABA
Gamma-aminobutyric acid (or GABA) is the most important inhibitory neurotransmitter in the brain. GABA acts like a "brake" during times of stress or anxiety, regulating brain excitability and inducing relaxation. GABA receptors are highly concentrated in the hypothalamus; the region of the brain associated with sleep. Studies have shown that chronic insomniacs have 30% less GABA in their brain than people who don’t have trouble sleeping. This chemical imbalance may be an underlying cause of primary insomnia.

Supplementation with GABA has been shown to affect the brain directly, increasing α-brain waves (those associated with relaxation) and reducing β-brain waves (those associated with anxiety and stress). In one small study, GABA supplementation reduced sleep latency (transition time from wakefulness to stage 1 of Non-REM sleep) by 20%, and increased the time spent in late-stage deep sleep by another 20%.

Melatonin
Melatonin is a sleep hormone that acts as a neurotransmitter in the brain. Melatonin is produced by the pineal gland, and its main action is to control the body's internal clock. Melatonin has been shown to increase sleep time and reduce the time it takes to fall asleep. It can also help to reset the body's sleep-wake cycle, a benefit to those suffering from jet lag or a similar schedule disruption.

Supplemental melatonin's effects on sleep are extensive and well documented. In one study, supplemental melatonin reduced sleep latency times by an average of 115 minutes in a group of insomniacs. Supplemental melatonin is particularly well-researched with respect to dealing with disruptions in the body's internal clock, such as jet lag and shift work, with no fewer than 10 clinical studies demonstrating its ability to resynchronize the body's altered circadian rhythms governing sleep. Another important aspect of melatonin is that in addition to
improving sleep quality, it has also been shown to improve morning alertness and does not produce withdrawal symptoms when discontinued.30

5-HTP
Serotonin is a neurotransmitter that is essential for sleep modulation in its own right, and that can also be converted by the body into melatonin. 5-HTP is L-5-hydroxytryptophan, a metabolite of the amino acid tryptophan and a precursor to serotonin. 5-HTP boosts serotonin levels, and can also increase REM and deep sleep phases, making sleep more restful.

Supplemental 5-HTP has been successfully studied for the treatment of a number of conditions, including anxiety, depression, chronic fatigue, and migraines. Studies examining its positive effects on sleep go back to the early 1970’s, and a recent study revealed that 5-HTP supplementation was able to reduce the number of sleep-terror episodes in children by nearly 84%.31 Also, since 5-HTP can help reduce symptoms of depression and anxiety, this could be beneficial for insomnia related to an underlying mood disorder.

Other Natural Sleep Aids
L-Theanine
L-Theanine is a non-essential amino acid found in green tea, and is the component that is responsible for the relaxing effect of this famous beverage. Research has shown that L-theanine can act directly on the brain, influencing brain wave patterns in a similar fashion to GABA, and also indirectly by stimulating GABA production. Supplemental L-theanine helps to reduce anxiety by increasing α-brain waves, which the brain produces in significant quantities only in states of effortless and relaxed alertness.32 This is precisely the kind of state that precedes stage I sleep. The relaxing effects of L-theanine also occur very quickly, setting in only 15-30 minutes after ingestion32, making L-theanine a very convenient and effective sleep aid.

Valerian Root
Valerian root has been used for millennia in the traditional folk remedies of a wide range of cultures (from ancient China to ancient Greece) to promote calmness, relaxation and sleep. Valerian root contains essential oils which provide most of its sedative effect, while fractions known as valepotriates add a regulatory effect on the central nervous system. It is thought that the key to Valerian’s overall efficacy is its ability to stimulate the production of GABA.33

A number of large placebo-controlled human studies have provided scientific evidence of Valerian’s effectiveness against insomnia, particularly via the reduction of sleep latency and an improvement in sleep quality. One study including 128 individuals reported that the greatest benefit of valerian was for self-described “poor sleepers”.33 Evidence has also suggested that valerian could help to improve sleep in individuals suffering from withdrawal from benzodiazepines, a commonly prescribed pharmaceutical sleep-aid.34

Passionflower
Passionflower, or Passiflora incarnata, is officially listed as a natural sleep aid in the monographs of the European Medicines Agency as well as the National Health Products Directorate of Health Canada.
Passionflower has a long history of use in traditional medicine and preventative health circles, and is often used in combination with other herbal sleep-aids, like valerian root. For example, in one study including 20 patients with psychosomatic disorders, patients were administered either a passionflower/valerian root combination or the drug Propaphenin®. The effects of these treatments on brain activity were then assessed using EEG brain mapping. It was found that the drug required six weeks to reduce brain hyperactivity while the passionflower/valerian root extract combination accomplished this in only two weeks. This led the scientists to conclude that the valerian/passionflower combination was more efficient than Propaphenin® and that it had great potential as a natural, herbal sedative. 

These relaxing effects of passionflower are key to its ability to help improve sleep.

Lemon Balm

Melissa officinalis, commonly known as lemon balm, is classified as a sleep aid in the monographs of the British, European and German Commission E Pharmacopeias as well as in the compendium of the Natural Health Products Directorate of Health Canada. With roots originating in the folk medicine traditions of southern Europe, lemon balm - like passionflower - has demonstrated its greatest efficacy when used in combination with other herbal extracts.

At least half a dozen human studies have examined lemon balm's effects on various sleep disorders, often in combination with valerian root. These studies have shown consistently positive results. In one multicentre, double-blind, placebo-controlled study among 98 healthy volunteers with minor sleep disorders, 33.3% of the study group reported an improvement in sleep quality vs. only 9.4% of the placebo group. Another major study included 225 patients with difficulties falling asleep, staying asleep, and experiencing states of nervous agitation. After taking the lemon balm-containing combination for two weeks, 89% of individuals saw improvements in their ability to fall asleep, 80% saw improvements in staying asleep, and 82% experienced reduced levels of nervous agitation.

Sleep better, Live better

Sleeping well is essential for maintaining a high quality of life. A good night’s sleep makes us feel refreshed and ready to meet the challenges of the day. Unfortunately, many people have problems sleeping, due to a medical condition or simply due to the stress and worries of everyday life. The good news is that there are many natural strategies for improving sleep quality and duration. Behavioural strategies have proven to be extremely effective. Oftentimes individuals just need to approach sleep differently, and to shed their preconceived notion that they won’t be able to sleep! Being more active, reducing coffee consumption or developing better strategies for coping with stress can all be effective solutions for sleeping difficulties. Finally, for those that still need help getting to sleep, there are natural sleep aids available that are clinically demonstrated to improve sleep quality without the side-effects of pharmaceutical sleeping pills.

References

L-THEANINE: A Versatile Nutrient

Green tea is a widely consumed beverage, especially in Asia where it has been consumed for hundreds of years. Numerous studies both in animals and humans have consistently supported the positive health benefits of green tea in various pathologies including cardiovascular, diabetes, cholesterol, cancer, bone health, inflammation, aging, as well as numerous neurological conditions like dementia, Parkinson’s disease, Alzheimer’s Disease, depression and so on.1

How is it that many natural products can have such a diverse range of health benefits? Unlike pharmaceuticals that are produced with a “single molecule single disease” approach (the classic “magic bullet”), natural products differ in that many of them contain literally hundreds of active constituents. Some of these actives have been pharmacologically verified and studied, but many others remain to be uncovered and further researched. Green tea, like other natural health products such as curcumin from the turmeric root, pomegranate, ginger, garlic etc., contains many types of active molecules each with its own properties and mechanism of action.

One group of constituents commonly found in green tea are polyphenols, a broad category encompassing hundreds of different molecules, including catechins, tannins, lignans and other flavanoids as well as minerals, proteins and amino acids. The most well known active compound found in green tea is probably EGCG, or epigallocatechin gallate, a catechin with antioxidant and anti-cancer properties. However there are other widely studied compounds from green tea that have very different properties. One of these compounds is the amino acid, L-theanine. L-theanine is unique in that unlike the 22 amino acids that are broadly classified into essential and non-essential and present in various products like whey soy and egg protein, it is mainly found in the tea plant where it comprises 1-2% of dry weight of the tea leaf. L-theanine is a typical amino acid with an amino (NH2) and acid (COOH) groups and has a similar structure to the more widely present L-glutamine however its properties are quite unlike those of L-glutamine. In green tea L-theanine may represent up to 50% of total amino acids present.1

Figure 1. The molecular structure of L-Theanine

Pharmacological Properties of L-Theanine

Relaxation Effect

The human brain generates various types of weak electric pulses (brain waves) that are classified as alpha, beta, delta and theta waves. Each of these waves are associated with particular physiological activity e.g. theta waves are associated with drowsiness while alpha waves are associated with relaxation. Repeated clinical trials have shown that L-theanine powerfully activates alpha waves and induces relaxation in test subjects.2 Not only that, but these effects were very quick, occurring within 15-30 minutes following ingestion. Moreover, there was dose response effect, meaning the higher the dose used the stronger the effect. Typical doses used were between 50-200mg of L-theanine orally per day.2 In addition, L-theanine is also thought to counteract the effects of caffeine possibly by inducing alpha waves and/or directly reducing caffeine levels at the receptor sites.3 This makes sense since caffeine is naturally present in the green tea and yet most people do not find that green tea induces the typical effects expected of a caffeine containing beverage. In fact, in Asia green tea is frequently used as a relaxant as well as a during social events.
The quick acting action of L-theanine is important in that the nutrient must reach the brain rapidly to induce its relaxation effects. The brain is protected by the so-called blood-brain-barrier, a membrane that prevents toxic and foreign compounds from entering the brain. L-theanine however, easily penetrates the blood-brain-barrier, allowing it to act directly on the brain. An interesting aspect of L-theanine research has recently been reported in the Journal of Veterinary Behavior where one set of researchers reported that L-theanine significantly reduced anxiety related emotional disorders in cats, while another research group reported L-theanine as an effective treatment for phobias in dogs.

Blood Pressure Lowering Effect

Many peptides (group of amino acids joined together) have been shown to help lower blood pressure. Such peptides are present in milk, fish (bonito, mackerel), flaxseed, legumes and even green tea which undergoes fermentation with yeast or bacteria. The fermentation process breaks down the longer chain molecules into smaller ones that not only have their characteristic unique physiological properties but also are of sufficiently smaller size and therefore more absorbable (bioavailable) and thus more active. L-theanine has been shown to lower blood pressure (both systolic and diastolic) in animals and humans. In animal studies rats that are prone to developing hypertension (spontaneously hypertensive), and which are considered a close model to the human disease, were used. L-theanine was repeatedly found to lower blood pressure in these rats. Similarly, a recent 2009 human study showed that 200mg of L-theanine with a standardized green tea formulation significantly reduced blood pressure. The mechanism of action is thought to be due to the reduction of various neurotransmitters, particularly serotonin, both in the central nervous system (brain) and at the peripheral tissue (blood vessel) level.

Improvement of Learning

Animal studies examining the effect of L-theanine on memory and learning have consistently shown that the amino acid has a positive effect on these factors. For example, the results of specific tests, such as the Operant and the Avoidance tests have shown that L-theanine improves the performance of the animals. For example, L-theanine improves the animal’s ability to learn its way back through a maze, or to learn to avoid a negative stimulus, like a shock. Neurotransmitters like dopamine and serotonin are both linked to memory and learning.

Depression

Many risk factors are recognized as contributors to the depression. Stress is a particularly well-established factor that can cause depression. Inflammation is also associated with depression as evidenced by the raised levels of inflammatory proteins like C-reactive protein (CRP) in individuals suffering from depression. Several animal studies have suggested that L-theanine has a
tranquilizing effect on the brain. Human clinical studies have confirmed these animal findings and have shown that L-theanine can effectively lower stress levels in human participants under acute stress.8,9

Furthermore, a study conducted in Japan in 2010 found a strong correlation between green tea intake and depression.8 In other words, the higher the intake of green tea, the lower the incidence of depression. This study was impressive in that it was fairly large (over 1000 patients), included seniors (over the age of 70 years) and that many of the confounding factors that can influence the study, such as age, sex, disease status, inflammation, body mass index, folic acid intake etc. were carefully adjusted for. The study also showed a dose response relationship, with a lower incidence of depression being associated with higher daily consumption of green tea.8

Another much larger study also from Japan analyzed over 42,000 individuals aged over 40 years. Again, this study confirmed a strong correlation between green tea consumption and improved mental health. The authors suggested that catechins and L-theanine were probably the reason for the activity of the green tea.9

Immune Enhancement

Green tea and its various constituents have been shown to exert a powerful effect on the immune system. L-theanine has been shown to stimulate various important immune system cells, including macrophages, neutrophils and natural killer cells, as well as the production of cytokines, the chemical messengers that help the various immune cells to communicate and co-ordinate their actions.10,11

A recent double blind placebo controlled study has shown that a standardized and proprietary L-theanine with green tea extract reduced the occurrence of colds and respiratory tract infections.10 The authors attributed this protective effect to raised levels of gamma delta T cells. These are highly specialized immune cells that are considered the first line of defense against infection. Moreover, these cells also produce gamma interferon, a powerful antimicrobial compound. Supplementation with L-theanine has also been shown to raise cellular glutathione levels. Glutathione is a powerful antioxidant that the body produces to protect its cells against free radical damage and against dangerous toxins.10,11,12

Various animal studies have pointed to the fact that L-theanine can also exert potent anti cancer effects.12,13 Such effects included increasing apoptosis or “cellular suicide” by damaged cells, preventing cellular proliferation or multiplication of cancer cells and immune system enhancement. Furthermore, L-theanine has been found to work synergistically with radiation and chemotherapy to reduce unwanted side effects as well as to improve the cancer killing effects of drugs like doxorubicin.13,14

Other Physiological Effects

L-theanine is such a versatile molecule that research continually uncovers new and exciting applications. Many of these studies are double blind placebo controlled human studies, the gold standard for evaluating unbiased pharmacological efficacy. Several studies have assessed L-theanine’s immune stimulation in athletes undergoing endurance and high intensity exercise. Athletes are particularly prone to reduced immune function in large part due to the excessive formation of free radicals. These reactive oxygen species are known to cause multiple pathologies including damage to the blood vessels which ultimately leads to atherosclerosis (hardening of the arteries), oxidation of LDL cholesterol, high blood pressure, cancer, cataracts and so on. L-theanine on its own and in conjunction with another amino acid, cysteine, has been shown to quench free radicals in a powerful manner.15,16

Another exciting area of L-theanine research is in the protection of nerve cell (neuron) health.17,18 Damage to these cells is responsible for degenerative diseases such as Alzheimer’s disease (due to the formation of beta amyloid plaque and tendrils) and Parkinson’s disease (resulting from the destruction of dopamine producing cells in the substantia nigra in the brain).
Conclusion

L-theanine is a safe and versatile nutrient naturally found in green tea. There is much research on this exciting nutrient and many publications. Much of the work has been done in Japan where the ingredient was first isolated in the 1940s and is widely used in foods, candy, beverages etc. Taiyo International in Japan has studied this and other green tea constituents very actively and has conducted extensive research to assess the safety, proper dose and applications of this exciting nutrient, in addition to working towards gaining a better understanding of its mechanisms of action. Taiyo alone has several dozen patents ranging from anxiety inhibition, promotion of sleep, treatment of premenstrual symptoms, anti-obesity, smoking as well as the suppression of behaviour problems in pets!. The brand name under which most of the research has been done is Suntheanine™, the world’s most widely studied L-theanine.

References


Gandha 750 ™

An Ayurvedic Solution

Helps with chronic stress and low energy
Adaptogens: Nature’s Stress Relievers

The Adrenal Glands

The adrenal glands are small triangular-shaped glands that sit on top of the kidneys, and they are responsible for producing a number of hormones that regulate various functions in the body. These include the “stress” hormones cortisol (or hydrocortisone) and adrenaline (or epinephrine). Cortisol is released into the blood in response to stress and acts to increase blood sugar levels, suppress the immune system and aids in fat, carbohydrate and protein metabolism. Adrenaline is also released as part of the body’s “fight-or-flight” response, and acts to increase blood pressure, constrict blood vessels and dilate air passages. Basically, the purpose of cortisol and adrenaline is to provide the body with a quick burst of energy to cope with stressful conditions. However, after this response the body is meant to be returned to normal conditions. In our high-stress culture, stress is often chronic, leading to prolonged presence of stress hormones, especially cortisol, in the system. This can have negative effects on the body and can lead to health problems. Some natural substances, called adaptogens, can help restore balance in the body, thereby helping to prevent overstimulation of the adrenal glands.

What are Adaptogens?

The term “adaptogen” was originally coined in 1947 by a pharmacologist named N.V. Lazarov. As originally defined, an adaptogen was a substance that had to:

1. Show some nonspecific effect, such as increasing resistance to physically, chemically, or biologically harmful agents or factors.
2. Have a normalizing influence on a pathologic state
3. Not disturb body function at a normal level.

Adaptogens are essentially naturally occurring metabolic regulators that increase an organism’s ability to adapt to and avoid damage from changing environmental factors or stress. Early research on adaptogens began in Russia during the Second World War, and was part of an effort to find substances that would help to increase the ability of soldiers to cope with situations of stress.

How do Adaptogens Work?

One feature that is important to understand about adaptogens is that they function in a manner that is distinctly different from stimulants. Both stimulants and adaptogens produce an increase in performance, however, with stimulants this effect is short-lived and is followed by a period of decreased performance. Adaptogens, on the other hand, produce a gentle and sustained performance increase, without the subsequent crash. Stimulants are also associated with energy depletion, insomnia and negative side-effects that are not encountered with adaptogens (see Figure 1).

<table>
<thead>
<tr>
<th>Differences Between Stimulants and Adaptogens</th>
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<tr>
<td>Stimulants</td>
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<td>Recovery after exhaustive physical loading</td>
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<td>Energy depletion</td>
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<td>Performance under stress</td>
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<td>Survival under stress</td>
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<td>Quality of arousal</td>
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<td>Insomnia</td>
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<td>Side effects</td>
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<td>DNA/RNA and protein synthesis</td>
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In general, adaptogens work by helping increase the capacity of the body’s stress system to maintain homeostasis (a state of balanced equilibrium) during exposure to stressful conditions. Adaptogens accomplish this by helping the body to remain in a Stage of Resistance (see page 4 and 5), which is often achieved by their ability to normalize levels of stress hormones, thereby preventing an over reactive or chronic response to stressful stimuli. These stimuli can include physical stressors, like cold and physical exertion, or psychological stressors, like work and family situations.

Chronic or excessive stress responses can lead to tissue or organ damage, anxiety, exhaustion, increased blood pressure, a suppressed immune response, improper digestion and even some chronic diseases. By helping the body to reduce the reactivity of the stress response system, adaptogens play a protective role in the body.

Effective Botanical Adaptogens

Many natural substances have been shown to have adaptogenic properties. Some of these include Licorice, Ashwagandha, Siberian ginseng and Rhodiola.

**Glycyrrhiza glabra - Licorice**

Licorice (Glycyrrhiza glabra) is the source of the phytochemical glycyrrhizin, which is partly converted in the intestine to the more active glycyrrhetic acid. Both glycyrrhizin and glycyrrhetic acid can activate the receptors for key adrenal hormones (mineralocorticoids and glucocorticoids) involved in mobilizing your energy reserves in response to stress. Glycyrrhetic acid also helps your body to keep these hormones in their more active forms, by inhibiting the enzymes (5-beta-reductase and 11-beta-hydroxysteroid dehydrogenase) that degrade adrenal hormones into less active forms. Some individuals cannot take licorice supplements containing glycyrrhizin, because this molecule can sometimes act to increase blood pressure. It is therefore advised that individuals with hypertension not take licorice containing glycyrrhizin. Deglycyrrhizinated licorice supplements are available; and while these are highly effective for the treatment of ulcers and heartburn, these would not have an adaptogenic effect, since the glycyrrhizin itself is the active ingredient in this situation. For the majority of individuals, 200 mg of glycyrrhizin from licorice is a safe and effective dose to help maximize the availability of the adrenal hormones necessary for the adaptogenic response. Licorice extracts are even monographed by Health Canada’s Natural Health Product Directorate (NHPD), further attesting to their safety and efficacy.

**Withania somnifera - Ashwagandha**

Ashwagandha (Withania somnifera) is also known as “Indian Ginseng” although it is not actually a type of ginseng at all. This plant has a long history of traditional use in Ayurvedic medicine, and has been used for centuries to help calm the nervous system. Ashwagandha has been shown in animal and human clinical trials to be helpful for anxiety, inflammation and neurological disorders. Ashwagandha is a well known adaptogens, and provides powerful support against overwhelming stress. Ashwagandha appears to work by helping to calm the nervous system, reducing its overactive response to stress or alarm. For example, when there is an excess of a certain hormone, like stress-hormones, the active components of ashwagandha can occupy cell membrane receptor sites so the actual hormone cannot attach and exert its effect. In this fashion, the herb can regulate the stress response.
Several studies show that Ashwagandha is superior to Panax ginseng at helping animals and humans to cope with stressful situations, such as forced swimming in cold water. Ashwagandha has broader effects as well. In one double-blind trial, 101 healthy men aged 50 to 59 were evaluated for various aging parameters over the course of a year. Increased red blood cell levels, greater libido, and lower erythrocyte sedimentation rate (a measure of chronic inflammation) were observed in the men taking ashwagandha. Ashwagandha also helps to prevent both over-activation and suppression of the immune system, strengthening the immune system in individuals taking immunosuppressive drugs while also helping to protect the body from chronic inflammation. Like licorice, ashwagandha is also monographed in Canada by the NHPD.

Eleutherococcus senticosus - “Siberian ginseng”

Eleutherococcus senticosus, or "Siberian ginseng," is another misnomer: like ashwagandha, it is not a ginseng species at all. Despite this, its adaptogenic properties are, if anything, better documented than those of regular Panax ginseng. Eleutherococcus also lacks the side effects observed in some users of Panax ginseng, which overexcites some people and can ironically even cause them stress. "Siberian ginseng" also has a more global beneficial effect on the immune system than Panax ginseng, and its phytochemistry - and resulting benefits - is more reliable than its Panax namesake.

The adaptogenic effects of Eleutherococcus have been clearly demonstrated in both animal and human trials. In animal studies, this herb has been shown to reduce adrenal hypertrophy, to prevent vitamin C depletion in the adrenal glands and to reduce fatigue during stressful conditions. In humans, Eleutherococcus has been shown to have anti-stress effects and also helps to reduce chronic fatigue. It has beneficial effects on the immune system as well. Human studies have demonstrated that Eleutherococcus improves some immune system parameters more effectively than Echinacea, and helps to reduce the symptoms of upper respiratory tract infections.

In one clinical study, 45 volunteers received either Eleutherococcus or a placebo for 30 days. Before and after supplementation the subjects’ stress response was tested. Individuals who took the Eleutherococcus supplement showed a 40% reduction in heart-rate in response to a stressor. Furthermore, in women, the supplement reduced blood-pressure increases in response to cognitive tests by 60%. The results of this study clearly demonstrate the ability of Eleutherococcus to support the body’s ability to cope with stress.

Rhodiola rosea

Rhodiola rosea is a very well-studied and effective adaptogen. Also known as "Arctic Root" or "Roseroof," Rhodiola is an herb with a long history of use in the traditional medicine of Siberia. Its adaptogenic properties have been extensively studied in animals exposed to a wide range of stressors by scientists in the former Soviet Union. Clinical trials in humans have provided further support for the ability of standardized Rhodiola extracts to enhance the body's physical and mental work capacity and productivity under conditions of stress. Users find that Rhodiola is highly effective at helping with the psychological impact of stress, even as it enhances physical and mental endurance.

Standardized rhodiola extracts have been studied in numerous groups of individuals that are consistently exposed to high levels of physical or mental stress; these groups include students, military cadets and physicians. In one trial, 161 military cadets performing a 24-hour military exercise were randomized to receive either Rhodiola supplements or
a dummy pill. It was found that the cadets taking the Rhodiola supplement experienced an anti-fatigue effect, and experienced marginally better performance than they did before the military exercise began! Cadets taking the placebo, on the other hand experienced a 10% reduction in performance.\textsuperscript{16}

Standardized rhodiola supplements have also been put to the test in physicians during two-week stretches on night duty and in students during final exams. These trials have provided further support for the herb's general anti-fatigue effect, showing that it can help to improve tests of physical fitness, mental fatigue and neuromotor function under stress.\textsuperscript{17,18}

References
9. Withania somnifera. NHPD Monograph.

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**Rhodiola**

- Enables the body to make the best use of its energy
- Enhances physical and mental performance
- Supports a healthy immune system
- Helps prevent burnout

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**The Stress Buster**
Stress Vulnerability Self-Test

In modern society, most of us can't avoid stress. But we can learn to behave in ways that lessen its effects. Researchers have identified a number of factors that affect one's vulnerability to stress - among them are eating and sleeping habits, caffeine and alcohol intake, and how we express our emotions.

The following questionnaire is designed to help you discover your vulnerability quotient and to pinpoint trouble spots.

- Rate each item from 1 (always) to 5 (never), according to how much of the time the statement is true of you.
- Be sure to mark each item, even if it does not apply to you - for example, if you don't smoke, circle 1 next to item six.

<table>
<thead>
<tr>
<th></th>
<th>1 (always)</th>
<th>2</th>
<th>3 (sometimes)</th>
<th>4</th>
<th>5 (never)</th>
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<tbody>
<tr>
<td>1. I eat at least one hot, balanced meal a day.</td>
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<td>2. I get 7 to 8 hours of sleep at least four nights a week.</td>
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<td>3. I give and receive affection regularly.</td>
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<td>4. I have at least one relative within 50 miles on whom I can rely.</td>
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<td>5. I exercise to the point of perspiration at least twice a week.</td>
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<td>6. I limit myself to less than half a pack of cigarettes a day.</td>
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<td>7. I drink fewer than five alcoholic drinks a week.</td>
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<td>8. I am the appropriate weight for my height.</td>
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<td>9. I have an income adequate to meet basic expenses.</td>
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<td>10. I get strength from my religious or spiritual beliefs.</td>
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Continued over
11. I regularly attend club or social activities.
   1 (always) 2 3 (sometimes) 4 5 (never)

12. I have a network of friends and acquaintances.
   1 (always) 2 3 (sometimes) 4 5 (never)

13. I have one or more friends to confide in about personal matters.
   1 (always) 2 3 (sometimes) 4 5 (never)

14. I am in good health (including eyesight, hearing, and teeth).
   1 (always) 2 3 (sometimes) 4 5 (never)

15. I am able to speak openly about my feelings when angry or worried.
   1 (always) 2 3 (sometimes) 4 5 (never)

16. I converse regularly with the people I live with about domestic problems – e.g., chores or money.
   1 (always) 2 3 (sometimes) 4 5 (never)

17. I do something for fun at least once a week.
   1 (always) 2 3 (sometimes) 4 5 (never)

18. I am able to organize my time effectively.
   1 (always) 2 3 (sometimes) 4 5 (never)

19. I drink fewer than three cups of coffee (or other caffeine-rich drinks) a day.
   1 (always) 2 3 (sometimes) 4 5 (never)

20. I take some quiet time for myself during the day.
   1 (always) 2 3 (sometimes) 4 5 (never)

**Results:**
To get your score, add up the figures and subtract 20. A score below 10 indicates excellent resistance to stress. A score over 30 indicates some vulnerability to stress; you are seriously vulnerable if your score is over 50.

You can make yourself less vulnerable by reviewing the items on which you scored three or higher and trying to modify them. Notice that nearly all of the items describe situations and behaviors over which you have a great deal of control.

Concentrate first on those that are easiest to change – for example, eating a hot, balanced meal daily and having fun at least once a week – before tackling those that seem difficult.
Ortho Adapt/Ortho Adapt Vegan
- Mobilizes internal energy stores
- Reduces the impact of stressful conditions
- Activates whole-body defenses
- Prevents the body from overreacting to a stressor

Ortho Sleep
- Prevents Insomnia
- Restores restful sleep patterns
- Promotes relaxation and reduces anxiety

Zen Theanine
- Helps maintain a relaxed state of mind
- Anti-stress
- Supports mood
- Supports cognitive function

Gandha 750
- Supports the function of the immune system and liver
- Helps with chronic stress and low energy
- Enhances physical endurance
- Anti-inflammatory

Rhodiola
- Enables the body to make the best use of its energy
- Enhances physical and mental performance
- Supports a healthy immune system
- Helps prevent burnout

GABA
- Promotes relaxation during times of stress
- Reduces Anxiety
- Increases growth hormone levels
- Helps prevent insomnia
Promotes Restful Sleep Naturally

Ortho • Sleep™

• Prevents Insomnia
• Restores restful sleep patterns
• Promotes relaxation and reduces anxiety