Post Traumatic Stress Disorder

By Gene Bruno, MS, MHS – Dean of Academics, Huntington College of Health Sciences

PTSD Defined
Post-traumatic stress disorder (PTSD) is a type of anxiety disorder that may occur after someone has seen or experienced a traumatic event that involved the threat of injury or death. PTSD can occur at any age, and can follow a natural disaster such as a flood or fire, or events such as assault, domestic abuse, prison stay, rape, terrorism and war. For example, the terrorist attacks of September 11, 2001 may have caused PTSD in some people who were involved, in people who saw the disaster, and in people who lost relatives and friends. Likewise, veterans returning home from a war often have PTSD.[1] This article will examine various aspects of PTSD, including conventional medicine treatments and the use of nutraceuticals.

PTSD Prevalence
The lifetime risk for PTSD in the United States is estimated to be up to 8%. It is estimated that about 6-30% or more of trauma survivors develop PTSD, with children and young people being among those at the high end of the range, and women have the twice the risk of PTSD as men.

PTSD Symptoms
There are three main categories of PTSD symptoms. These include: 1) re-experiencing the trauma through intrusive distressing recollections of the event, flashbacks and nightmares; 2) emotional numbness and avoidance of places, people and activities that are reminders of the trauma; and 3) and increased arousal including difficulty sleeping and concentrating, feeling jumpy, and becoming easily irritated and angered. People with PTSD might also feel guilt about the event, including survivor guilt. Typical of anxiety, stress, and tension, additional symptoms may include agitation or excitability, dizziness, fainting, feeling your heart beat in your chest, and headache. Although many of these symptoms of PTSD may be an appropriate initial response to a traumatic event, they are considered part of a disorder when they persist beyond three months.[2]

PTSD Biochemistry
Psychological, genetic, physical, and social factors are involved in PTSD, resulting in changes to the body's response to stress. It affects the stress hormones and neurotransmitters (chemicals that carry information between the nerves).[3] PTSD may also be associated with shrinkage in the brain associated with memory and learning, possibly due to the continued release of the stress hormone cortisol.

Psychotherapy for PTSD
Psychotherapy with a mental health professional is commonly used to help PTSD. This can occur one-on-one or in a group. Types of psychotherapy can help people with PTSD include exposure therapy (helps reduce symptoms by encouraging people to remember the traumatic event and express your feelings about it), cognitive restructuring (helps people make sense of the bad memories), and stress inoculation training (tries to reduce PTSD symptoms by teaching a person how to reduce anxiety). Support from family and friends can be an important part of therapy.[4] Clinical research also shows that relaxation therapy can significantly reduce feelings of anger and guilt in patients with PTSD compared to baseline.[5]

Conventional Medications for PTSD
Symptoms of PTSD, such as anxiety, can be reduced by medicines that act on the nervous system. This includes antidepressant medications known as selective serotonin reuptake inhibitors (SSRIs), and other anti-anxiety and sleep medicines.

<u>SSRIs</u>
SSRIs help to increase the levels of the neurotransmitter serotonin in the brain. This type of antidepressant has also been used to treat panic disorder, obsessive-compulsive disorder (OCD), and generalized anxiety disorder (GAD). Furthermore, in

a published, scientific review of 35 short-term randomized controlled trials of medication therapy for PTSD (4597 participants), a significantly larger proportion of patients responded to medication (59.1%) than to placebo (38.5%). Symptom severity was significantly reduced in 17 trials (2507 participants), with the largest trials showing long-term effectiveness for SSRIs.[6] In addition, the U.S. Food and Drug Administration (FDA) have approved two SSRI medications for treating adults with PTSD: sertraline (Zoloft) and paroxetine (Paxil). Both these medications may help control PTSD symptoms such as sadness, worry, anger, and feeling numb inside—while making it easier to go through psychotherapy.[7]

Sometimes people taking these medications have side effects. The effects can be annoying, but they usually go away. However, medications affect everyone differently. Any side effects or unusual reactions should be reported to a doctor immediately.

Other Medications

Other types of medications which may also be prescribed for PTSD include benzodiazepines and other SSRIs. Benzodiazepines help reduce anxiety, which in turn may help people relax and sleep. In addition to sertraline and paroxetine, the antidepressants fluoxetine (Prozac) and citalopram (Celexa) can help people with PTSD feel less tense or sad.[8]

Nutraceuticals for PTSD

Nutraceuticals which have application for PTSD include those which promote healthy serotonin levels (St. John's Wort and L-tryptophan), as well as those that reduce anxiety and promote relaxation (GABA and L-theanine).

St. John's Wort

St. John's Wort (Hypericum perforatum) has been used as medicine since the middle ages. Its primary mechanism of action seems to be that it functions as an SSRI, increases serotonin levels.[9] Other research also indicated that St. John's Wort may increase some aspects of brain dopamine function in humans.[10] Like serotonin, dopamine is also a neurotransmitter which is often found in inadequate levels in depressed individuals.

The clinical evidence is overwhelming in favor of St. John's Wort Extract as an antidepressant which is suited for the treatment of mild to moderate depression. In one study, after 4-6 weeks, all patients showed a measurable improvement in anxiety, mood, loss of interest, and [11]more than one-half dozen other psychometric measurements.[12] Similar results were seen in other studies.

Research on St. John's Wort extract is so extensive, that it has been endorsed by the German government's 'Commission E' as indicated for impaired consciousness, depressive states, fear, and nervous disturbances.[13] There have been many evaluation studies comparing St. John's Wort to both a placebo, and various anti-depressant pharmaceuticals. Not only have these studies validated St. John's Wort over placebos, they have demonstrated a therapeutic advantage over prescribed drugs in some cases.[14] And, occurrence and severity of side effects with Hypericum extracts are clinically insignificant, especially when compared to those of the pharmaceutical counterparts. For example, in one study comparing Hypericum to fluoxetine (Prosac®) for mild to moderate depression, the researchers concluded, "When treating patients with mild to moderate depression, hypericum should be considered as one of the first treatment options based upon both efficacy and safety, particularly in cases where treatment is a choice between fluoxetine and hypericum."[15] The current dosage recommendation for St. John's Wort is 300 mg of the extract, three times daily, for total of 900 mg.

L-tryptophan

L-tryptophan (LT) is an essential amino acid, which means that it must be consumed from food since the body cannot make it using other amino acids. It is present in virtually all plant and animal proteins. Once the body absorbs LT, it converts it into 5-hyrdoxytryptophan (5-HTP), and ultimately into the neurotransmitter serotonin.

First and foremost, LT is an effective sleep aid. Certainly LT has significant sedative-like properties, although unlike other sedatives it does not appear to impair performance.[16] Specifically, LT is not associated with impairment of visuomotor, cognitive, or memory performance, nor does it elevate threshold for arousal from sleep.[17]

At least 20 years worth of research (including 40 controlled studies)[18] has demonstrated that LT can help induce sleepiness in humans. The weight of the evidence suggests that doses of 1 gram or more is effective. In younger insomniacs, LT is effective in inducing sleep the first night of administration, while in more chronic, well established insomnia or in more severe insomnias, repeated administration of low doses of L-tryptophan over time may be required for therapeutic improvement.[19]

One particular study[20] found that LT may be effective in doses lower than 1 gram. In 15 mild insomniacs 1 gram of LT helped reduce the amount of time it took to fall asleep, although lower doses of 1/4 g and 1/2 g produced a trend in the same direction. Stage IV sleep was significantly increased by 1/4 g of L-tryptophan.

Selective serotonin reuptake inhibitors (SSRIs) are a category of drugs commonly used for the treatment of depression. SSRIs work by blocking serotonin transporters so serotonin remains for a longer time and is more available to brain neurons. So does LT have value in the treatment of depression since it is the precursor to LT? The answer seems to be yes; at least when used in combination with other antidepressant medications.

In a randomized, double-blind, placebo-controlled trial[21], 30 patients with major depressive disorder were treated for over 8 weeks with 20 mg of fluoxetine (Prozac) per day and either tryptophan (2 to 4 grams per day) or a placebo. The results were a significantly greater decrease in depression scores in the tryptophan/fluoxetine group than in the placebo/fluoxetine group. Since 4 grams of LT seemed to cause some daytime drowsiness, 2 grams of LT appeared to be the optimal amount. The authors concluded that "Combining 20 mg of fluoxetine with 2 g of tryptophan daily at the outset of treatment for major depressive disorder appears to be a safe protocol that may have both a rapid antidepressant effect and a protective effect on slow-wave sleep." [Note: Due to the risk of serotonin syndrome (a rare, but potentially life-threatening adverse drug reaction from excess serotonergic activity at central nervous system and peripheral serotonin receptors), do not take LT with an SSRI medication without the prior approval from your physician.]

GABA

In the central nervous system, GABA (gamma-aminobutyric acid) is the primary inhibitory neurotransmitter. It exerts anticonvulsant, sedative, and anxiolytic effects at the cellular level.[22] [23] Orally, people have used GABA supplements for relieving common, everyday anxiety, elevating mood, relieving premenstrual symptoms, and helping to improve attention and concentration.[24] A number of physicians have reported beneficial effects in stress and anxiety with GABA supplementation.[25]

PharmaGABA™ is a natural form of GABA manufactured from probiotic bacteria.[26] Unlike synthetic GABA, PharmaGABA™ appears to cross the blood-brain barrier and increase brain alpha waves and decrease beta waves to promote relaxation. In fact, the effect of orally administrated PharmaGABA™ on relaxation and immunity during stress has been investigated in humans. Two studies were conducted.[27] The first evaluated the effect of PharmaGABA™ intake by 13 subjects on their brain waves. Electroencephalograms (EEG) were obtained after 3 tests on each volunteer as follows: water intake only, PharmaGABA™, or L-theanine. After 60 minutes of administration, PharmaGABA™ significantly increased alpha waves and decreased beta waves compared to water only or L-theanine. These findings denote that PharmaGABA™ not only induces relaxation but also reduces anxiety.

The second study was conducted to see the role of relaxant and anxiolytic effects of PharmaGABA™ intake on immunity in stressed volunteers. Eight acrophobic subjects were divided into 2 groups (placebo and PharmaGABA™). All subjects were crossing a suspended bridge as a stressful stimulus. Immunoglobulin A (IgA) levels in their saliva were monitored during bridge crossing. Placebo group showed marked decrease of their IgA levels, while PharmaGABA™ group showed significantly higher levels. In conclusion, PharmaGABA™ could work effectively as a natural relaxant and its effects could be seen within 1 hour of its administration to induce relaxation and diminish anxiety (it may have actually worked sooner, but saliva was only tested after 1 hour). Moreover, PharmaGABA™ administration could enhance immunity under stress conditions.

L-theanine

Asian cultures have often used teas for relaxation effects. The relaxing effect is caused by the presence of a neurologically active amino acid, l-theanine (gamma-ethyl-amino-L-glutamic acid). Tea has the reputation of having less caffeine than coffee but it is the L-theanine in the tea that lessens the stimulant effect of caffeine on the human nervous system. In the brain, L-theanine increases both serotonin and dopamine production[28], and possibly GABA as well.[29] Evidence from human electroencephalograph (EEG) studies show that it also significantly increases brain activity in the alpha frequency band which indicates that it relaxes the mind without inducing drowsiness. Alpha activity is also known to play an important role in critical aspects of attention. Research indicates that L-theanine has a significant effect on improving mental alertness while promoting relaxation.[30] According to Mason, two small human studies[31] showed that within 30-40 min of consuming 50 or 200 mg of L-theanine there is an increase of alpha wave activity/electrical signals produced by the brain. The perceived relaxation effect in the subjects coincided with the detection of alpha waves. This shows that L-theanine fosters a state of alert relaxation, which is consistent with the fact that anxious people have fewer or smaller alpha waves.

In a double-blind placebo-controlled study, sixteen healthy volunteers received 200 mg L-theanine, a pharmaceutical anxiolytic or placebo. The results showed that L-theanine induced feelings of tranquility in the volunteers.[32]

In a double-blind, placebo-controlled study, twelve participants underwent four separate trials: one in which they took L-theanine at the start of an

experimental, stress-inducing procedure, one in which they took L-theanine midway, and two control trials in which they either took a placebo or nothing. The results showed that L-theanine intake resulted in a reduction in physiological indicators of stress, compared to the placebo or control condition. Moreover, analyses of heart rate variability indicated that reductions in heart rate were likely attributable to a reduction of sympathetic nervous activation, suggesting that L-theanine had anti-stress effects via the inhibition of cortical neuron excitation.[33]

Nutraceutical	Dosage
St. John's Wort extract	900 mg daily
L-Tryptophan	1000-2000 mg daily
PharmaGABA™	100-200 mg daily
L-Theanine	100-200 mg daily
B-Complex*	50-100 mg daily
Vitamin C*	500-1000 mg daily
Magnesium*	300-700 mg daily

*B-Complex, Vitamin C and Magnesium are general nutrients that are used up rapidly during stress and should be replenished.

References

[1] Post-traumatic stress disorder. PubMed Health. U.S. National Library of Medicine. Last reviewed: March 5, 2011. Retrieved August 30, 2011 from http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001923/.
[2] Post-traumatic stress disorder. PubMed Health. U.S. National Library of Medicine. Last reviewed: March 5, 2011. Retrieved August 30, 2011 from http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001923/.
[3] Post-traumatic stress disorder. PubMed Health. U.S. National Library of Medicine. Last reviewed: March 5, 2011. Retrieved August 30, 2011 from http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0001923/.
[4] Post-Traumatic Stress Disorder (PTSD): Psychotherapy. The National Institute of Mental Health (NIMH). Retrieved August 30, 2011 from http://www.nimh.nih.gov/health/publications/post-traumatic-stress-disorder-ptsd/psychotherapy.shtml.
[5] Stapleton JA, Taylor S, Asmundson GJ. Effects of three PTSD treatments on anger and guilt: exposure therapy, eye movement desensitization and reprocessing, and relaxation training. J Trauma Stress 2006;19:19-28.
[6] Stein DJ, Ipser JC, Seedat S. Pharmacotherapy for post traumatic stress disorder (PTSD). Cochrane Database Syst Rev. 2006, Issue 1. DOI: 10.1002/14651858.CD002795.pub2.
[7] Post-Traumatic Stress Disorder (PTSD): Medications. The National Institute of Mental Health (NIMH). Retrieved August 30, 2011 from http://www.nimh.nih.gov/health/publications/post-traumatic-stress-disorder-ptsd/medications.shtml.
[8] Post-Traumatic Stress Disorder (PTSD): Other medications. The National Institute of Mental Health (NIMH). Retrieved August 30, 2011 from http://www.nimh.nih.gov/health/publications/post-traumatic-stress-disorder-ptsd/other-medications.shtml.
[9] Muller W, Rossol R. Effects of hypericum extract on the expression of serotonin receptors. J Geriatr Psychiatry Neurol 1994; 7(suppl): S63-4.
[10] Franklin M, Chi J, McGavin C. Neuroendocrine evidence for dopaminergic actions of hypericum extract (LI 160) in healthy volunteers. Biol Psychiatry 1999; 46(4):581-4.
[11] Singer A, Wonnemann M, Müller WE. Hyperforin, a major antidepressant constituent of St. John's Wort, inhibits serotonin uptake by elevating free intracellular Na+1. J Pharmacol Exp Ther 1999; 290(3):1363-8.
[12] Müldner H, Zöller M. [Antidepressive effect of a Hypericum extract standardized to an active hypericine complex. Biochemical and clinical studies].Arzneimittelforschung 1984; 34(8): 918-20.
[13] Blumenthal M, et al (eds). The Complete German Commission E Monogrpahs: Therapeutic Guide to Herbal Medicines / CD version. Austin, Texas: American Botanical Council; 1998.
[14] Reichert R. Quarterly Review of Natural Medicine 1995; Winter: 275-8.
[15] Scharader E. Equivalence of St John's wort extract (Ze 117) and fluoxetine: a randomized, controlled study in mild-moderate depression. Int Clin Psychopharmacol 2000; 15(2):61-8.
[16] Lieberman HR, Corkin S, Spring BJ, Wurtman RJ, Growdon JH.The effects of dietary neurotransmitter precursors on human behavior. Am J Clin Nutr 1985; 42(2):366-70.
[17] Schneider-Helmert D, Spinweber CL. Evaluation of L-tryptophan for treatment of insomnia: A review. Psychopharmacology 1986; 89:1-7.
[18] Hartmann E. Effects of L-tryptophan on sleepiness and on sleep. J Psychiat Res 1982/83; 17(2): 107-113.
[19] Schneider-Helmert D, Spinweber CL. Evaluation of L-tryptophan for treatment of insomnia: A review. Psychopharmacology 1986; 89:1-7.
[20] Hartmann E, Spinweber CL. Sleep induced by L-tryptophan. Effect of dosages within the normal dietary intake. J Nerv Ment Dis 1979; 167(8):497-9.
[21] Levitan RD, Shen J-H, Jindal R, Driver HS, Kennedy SH, Shapiro CM. Preliminary randomized double-blind placebo controlled trial of tryptophan combined with fluoxetine to treat major depressive disorder: antidepressant and hypnotic effects. J Psychiatry Neurosci 2000; 25(4):337-46.
[22] Kalant H, Roschlau WHE, Eds. Principles of Med. Pharmacology. New York, NY: Oxford Univ Press, 1998.
[23] Bloom FE, Kupfer DJ. Psychopharmacology: The Fourth Generation of Progress. New York, NY: Raven Press, Ltd., 1995.
[24] GABA (gamma-aminobutyric acid) Monograph. Natural Medicines Comprehensive Database, 1995-2005 Therapeutic Research Faculty. Accessed February 15, 2005 from http://www.naturaldatabase.com/(puad1f555zak4fuuonec0juz)/nd/Search.aspx?li=1&st=1&cs=&s=ND&pt=100&sh=3&id=464.
[25] Braverman E, Pfieffer C. The Healing Nutrients Within. In *Facts, Findings and New Research on Amino Acids.* New Canaan, CT: Keats Publishing; 1987.
[26] Yokoyama S, Hiramatsu J, Hayakawa K. Production of gamma-aminobutyric acid from alcohol distillery lees by Lactobacillus brevis IFO-12005. J Biosci Bioeng 2002;93(1):95-7.
[27] Abdou AM, Higashiguchi S, Horie K, Kim M, Hatta H, Yokogoshi H. Relaxation and immunity enhancement effects of gamma-aminobutyric acid (GABA) administration in humans. Biofactors 2006;26(3):201-8.
[28] L-Theanine monograph. *Alternative Medicine Review* 2005;10(2):136-8.
[29] Lu K, Gray MA, Oliver C, et al. The acute effects of L-theanine in comparison with alprazolam on anticipatory anxiety in humans. *Hum Psychopharmacol Clin Exp* 2004;19:457–65.
[30] Nobre AC, Rao A, Owen GN. L-theanine, a natural constituent in tea, and its effect on mental state. *Asia Pac J Clin Nutr* 2008;17 Suppl 1:167-8.
[31] Mason,R. 200 mg of Zen. *Alternative & Complementary Therapies* 2001; 7(2):91-95.
[32] Lu K, Gray MA, Oliver C, et al. The acute effects of L-theanine in comparison with alprazolam on anticipatory anxiety in humans. *Hum Psychopharmacol Clin Exp* 2004;19:457–65.
[33] Kimura K, Ozeki M, Juneja LR, Ohira H. L-Theanine reduces psychological and physiological stress responses. *Biol Psychol* 2007;74(1):39-45.