HEALTH AND STRESS

The Newsletter of
The American Institute of Stress

Number 8 1996

NINTH INTERNATIONAL MONTREUX CONGRESS ON STRESS
February 16-21, 1997
Honoring Richard H. Rahe, M.D., 1997 Hans Selye Award Recipient

CALL FOR PAPERS

Sessions on Stress and Health, Evolution of the Holmes-Rahe Scale, Stress and Subtle Energies, Biological Effects of Weak Electromagnetic Fields, Stress and Children, Stress and Auto Accidents, Stress and the Immune System, Naturopathic Approaches to Stress Reduction, etc.

STRESS AND SLEEP:
Some Startling And Sobering Statistics

KEY WORDS: sleep, memory, insomnia, auto accidents, coronary heart disease, immune system, factor "S", serotonin, melatonin, tryptophan, low energy emission therapy

Over 40 million Americans suffer from some sort of chronic sleep disorder. Another 20 or 30 million have periodic insomnia, and millions more suffer from serious sleep deprivation due to excessively long work hours, rotating shifts, last minute preparations for meetings, examinations, or unexpected events such as the loss of a close family member. Working parents may not get enough sleep because of hectic schedules, or the need to awaken frequently for child care duties.

ALSO INCLUDED IN THIS ISSUE

On any given day, at least one out of four individuals who deny having any difficulty sleeping, report that they are drowsy or not alert because they didn't get enough sleep the night before. Although most of us require 7 or 8 hours of sleep each night, it is estimated that only half of adult Americans achieve this goal. Unfortunately, these deficiencies are often not well recognized.

Stress is the leading cause of intermittent or temporary insomnia. Chronic insomnia is common in almost every patient with deep or persistent depression, which is also often stress related. Just as stress is a major cause of insomnia, lack of sleep is an important source of stress for many individuals. In addition to irritability and fatigue, chronic sleep deprivation can contribute to many disorders. These, in turn, generate additional stress that interferes with sleep, setting up a vicious, self-perpetuating cycle.

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Health and Stress: The Newsletter Of The American Institute Of Stress is published monthly. Annual subscription rate $35.00 (U.S.), $45.00 (Foreign).

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Editor-in-Chief

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Lack Of Sleep - Costly And Lethal

Sleep deprivation costs billions of dollars annually because of accidents, lost productivity, and medical expenses related to its adverse health effects. Had the third mate on the bridge of the Exxon Valdez taken a nap the evening before the grounding, he would have probably responded in time to the warning signals. The price for this one individual's sleep deprivation was two billion dollars in cleanup costs, and possibly ten billion dollars worth of damage to the environment. Stress has been implicated in up to 80% of all industrial accidents, some of which also cause extensive expenses, damage, and deaths. Lack of sleep is a common cause, particularly in shift workers, as illustrated by the Chernobyl and Three Mile Island nuclear disasters.

A recent Gallup poll found that almost half of all adult Americans have difficulty sleeping, an increase of 13% over a similar poll taken just four years ago. One out of three reported having fallen asleep while driving, and 10% admitted having a sleep related accident. According to official statistics, sleep related accidents cause about 100,000 crashes annually, but the actual figure is probably twice as high. In testimony before the National Commission on Sleep Disorders Research, state highway patrol officers estimated that 10 times as many sleep related crashes occur than are reported. At least 14 states do not even include drowsiness as a probable cause on accident reports. One expert described sleep deprivation as "America's largest, deadliest, and costliest health problem, because everyone is ignorant about its impact".

In New York State, sleepiness proved to be a factor in more than 4 out of 5 of those accidents in which vehicles had left the roadway. A survey of 1000 New York State drivers, found that 1 in 14 men had been involved in an auto accident due to drowsiness. More than half of these sleep related crashes occurred between midnight and 7 a.m., usually after someone had been driving alone for more than two hours. On the monotonous New York State Thruway, 30% of fatal crashes are estimated to be sleep related. Job stress appears to be an important factor. Almost 45% of accidents occurred in men who spent more than 50 hours a week at work, compared to only 16% for those putting in 35 hours or less. In another study, one third of rotating shift workers reported crashes or near crashes during the previous year due to drowsiness. Some authorities believe that sleep deprivation is responsible for as many traffic deaths as alcohol.

Each of us requires a certain amount of sleep daily, to avoid developing a sleep deficit. It's very much like having to put a certain amount of money in the bank at appropriate intervals to satisfy some obligation. Unfortunately, we don't receive periodic statements informing us of the status of our sleep account, and may be unaware of serious deficiencies because they are camouflaged by various forms of stimulation that keep us awake. In addition, there are few early warning signs that you may be bankrupt, and dozing off at the wheel may come on suddenly, and unexpectedly with disastrous consequences. In a survey of truckers, half admitted having fallen asleep on one or more occasions while driving, and various polls report that 20-25% of U.S. drivers have had a similar experience. However, when truck drivers are involved in fatal accidents, they take an average of 4.1 innocent victims to the grave.

Problems related to traffic accidents and deaths may be even greater in other countries. A session on Stress and Auto Accidents was conducted by French physicians at our 1996 International Montreux Congress on Stress. This is a serious problem in Europe since speed limits are sometimes practically nonexistent, or ignored, and urban areas suffer from perilous traffic congestion and parking predicaments. In Australia, where there are often enormous highway

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distances between possible stops in poorly populated areas, a detailed analysis showed that almost one third of fatal crashes on rural highways were caused by drowsy drivers.

Sleep, Memory, And Brain Function

A recent survey of over 1000 adults revealed that few understood the important role that sleep plays in maintaining normal daily brain functions, especially memory. Almost half were under the impression that sleep allows the brain to rest. Actually, studies show that some parts of the brain are really more active when you are sleeping. At the end of the day, your brain is like a desktop that is cluttered up with details of everything that has transpired. While you are asleep, the brain classifies and prioritizes all this accumulated information, and files it away so that it can be readily retrieved. Studies suggest that this process begins with a retrospective review of the day's events, and traveling back in time, so that by morning, you may be immersed in childhood memories.

In addition to memory, sleep is also critical in maintaining concentrating, learning, and performance skills. The majority of those surveyed admitted that their mental capabilities suffered when they didn't sleep well. In those who said that lack of sleep affected them more mentally than physically, 40% cited increased stress as their greatest problem, and this was particularly true for women. Sleep has also been shown to improve the ability to learn repetitive tasks, like typing, or riding a bike.

Stress can also influence our dreams and memory for various events. At the onset of the Gulf War, Israeli researchers had students fill out special sleep questionnaires to determine how rapidly stressful situations might infiltrate their dreams. By the fifth week, about half the dreams dealt with the conflict in some fashion, and the gas mask had become the most commonly dreamed about war object. Another study of Holocaust survivors, revealed that those who had adjusted best to life in Israel, showed the lowest ability to recall any of their dreams. Many "vehemently denied that they had dreamed", despite the fact that sleep laboratory studies of rapid eye movement (REM) patterns, showed extensive periods of active dreaming. This was interpreted as a way of preventing "the traumatic experiences of their pasts from surfacing and disturbing their sleep".

When you don't get enough sleep, your ability to move information from short term memory to long term storage becomes impaired. For example, Canadian researchers showed that students who slept several hours after cramming for an exam, retained much more information than those who did not. If you need to resolve a problem, or make an important decision, "sleeping on it" really is a good idea.

Sleep And Your Heart

Numerous studies have shown an association between hypertension and chronic insomnia, snoring and sleep apnea. Many heart attack patients also report having experienced insomnia in the period immediately prior to the event. In one study, nearly half reported waking up frequently during the preceding weeks, compared to one out of three of other hospitalized patients, and only one out of four of healthy controls. Dutch researchers first described a syndrome of unusual fatigue and exhaustion in the two weeks preceding an acute heart attack at our 1990 Montreux Congress, and this has now been confirmed by others. This similarly tended to occur more often in individuals with high levels of job stress, further confirming the significant relationship between stress and sleep disorders.

The quality and type of sleep may also be important, since certain sleep states have been found to be associated with severe disturbances in cardiac rhythm, as well as heart attacks. These are particularly apt to occur during the rapid eye movement (REM) phase of sleep, which is associated with dreaming. REM sleep is most frequent in the period immediately before spontaneously waking up in the morning, and is accompanied by a rise in sympathetic nervous system activity and secretion of stress related hormones, resulting in increased blood pressure, heart rate, platelet clumping, and clot formation. This is thought to explain why most heart attacks and strokes occur between 6 and 11 a.m.

The Immune System And Sleep

For years, bed rest and sleep were prescribed as part of the treatment for almost every illness. It's also common folk wisdom that lack of sleep causes a "run down" condition that makes you more susceptible to colds and a variety of diseases. Research findings now support this. In one recent study, when healthy

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subjects who usually required 6-8 hours of sleep daily were deprived of four hours every day for a few days, natural killer cell levels, an important immune defense component, fell by as much as 50 percent. If laboratory animals are prevented from sleeping, they all die due to bacterial infections from usually harmless organisms, with which they are normally in constant contact. Stress also causes a depression of immune system function, and the combination of sleep deprivation and stress can be particularly pernicious.

The desire to sleep appears to result from the accumulation of certain chemicals during the day, which cause drowsiness when they reach a certain concentration. Over 50 years ago, researchers found that normal dogs would fall asleep for several hours after they received an infusion of spinal fluid from other dogs that had been sleep deprived. Similarly, cats became abnormally sleepy when given spinal fluid from goats that had been kept awake for 48 hours, but not from normal goats. Subsequently, a substance known as "Factor S" was isolated, that could extend periods of deep, refreshing, delta wave sleep when injected into normal animals.

Factor S has now been identified in humans, and found to contain two amino acids usually present only in the cell walls of bacteria. It is believed that sleep factors in humans are derived from bacterial products absorbed through the gut. During the day, immune cells called macrophages, digest bacteria in the gut, causing the release of small proteins from their cell walls, which escape into the circulation. Support for this theory comes from the observation that when injected into laboratory animals, they cause deep sleep. In addition, infants have no bacteria in their gut until they are about three weeks old, which is also the time that deep, delta rhythm sleep can first be demonstrated.

Macrophages also stimulate the release of immune system components known as cytokines, which similarly cause deep sleep when injected into laboratory animals. Cytokines such as tumor necrosis factor, interferons, and interleukins, are produced in large amounts during infections and other diseases which evoke strong immune system responses. This may explain why individuals with high fevers are so often extremely sleepy or drowsy during the day, even after a good night's sleep. Tumor necrosis factor appears to be particularly associated with deep sleep, and some believe that disturbances in its normal pattern of production may be responsible for the complaints of drowsiness and weariness seen in patients with cancer, AIDS, and chronic fatigue syndrome. It may be significant that stress is also associated with an acceleration of these disorders, although this may involve other immune and neuroendocrine mechanisms.

Serotonin, Melatonin, And Naturopathic Approaches

Insomnia is often improved by meditation, exercise, listening to music or certain rhythmic sounds, and other stress reduction strategies. The chronic insomnia associated with depression usually dramatically disappears when the condition responds to treatment. Both chronic depression and insomnia tend to be associated with low levels of serotonin, a brain neurotransmitter linked to a variety of emotional disorders and stress related complaints. Most of the newer antidepressant medications, like Prozac and Zoloft, work by boosting serotonin levels. In addition to daily sleep-wake cycles, serotonin abnormalities are also prominent in conditions that tend to recur on a monthly or seasonal basis, such as premenstrual syndrome, and seasonal affective disorder. These disturbances in body rhythms are similarly associated with depression and sleep difficulties, are aggravated by stress, and frequently improve with antidepressants and stress reduction measures.

Serotonin is the building block for melatonin, which can be very effective for insomnia, especially in elderly individuals where levels tend to be low. Serotonin is not effective when administered orally, but levels can be boosted by increasing the intake of its precursor, tryptophan. Tryptophan supplements were popular sleep aids several years ago, but were pulled off the market because of contamination problems during the manufacturing process. Milk and turkey are rich in tryptophan, which may explain why people tend to get drowsy after a big Thanksgiving dinner, or why a glass of warm milk is often advised to promote sleep. Naturopathic stress reduction preparations including chamomile, valerian, and passion flower are frequently used for insomnia. There are also a variety of homeopathic self-hypnosis, and biofeedback approaches.

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Some Practical Tips

Getting a proper amount of sleep can be crucial for maintaining memory capabilities and capacities. It's important to insure that you have quiet, dark surroundings, as well as a comfortable mattress, and to avoid stimulants before retiring. Most insomniacs have difficulty in falling asleep, and several techniques can be effective in alleviating this.

It's impossible to think of two things at the same time. If you are preoccupied with stressful things that are stimulating or troubling, it's hard to doze off. Conversely, when you are concentrating on something neutral, stressful stimulation is less likely to occur, although this is much easier said than done. One way to illustrate this, is to imagine that you are writing down in a notebook all of your thoughts as soon as they occur. Start by trying to think about nothing else but falling asleep. You will be amazed at how often you are interrupted by the intrusion of other items and events, many of which are of no importance. Similarly, if someone bets you a million dollars that you can't go for a minute without thinking about a pink elephant, you will lose the wager in a few seconds.

Therefore, instead of actively thinking of ways to make yourself fall asleep, monopolize your mind with some task that requires you to be completely preoccupied. Counting sheep is a common example, but there are many other methods which are equally efficacious. One popular procedure is to breathe in and out deeply for 20 times, and then hold your breath as long as possible after the 21st inspiration. Keep repeating this drill, and by the third or fourth time, you will become drowsy, due not only to the repetitive monotony of this routine, but possibly changes in body chemistry. Rhythmic deep breathing while mentally repeating some word or phrase with each expiration is preferred by others.

Progressive muscular relaxation may be even more effective, since it also reduces physical as well as emotional tension. This is accomplished by trying to completely relax various muscle groups starting from the scalp, and working your way down to your eyelids, face, jaw, the neck, torso, and upper and lower extremities down to the toes. Try to sustain the feeling for each muscle group for at least 30 seconds, repeating the procedure if you sense there may still be some increased tension in any area, particularly the neck.

Listening to soothing music, or relatively inexpensive devices that offer a repertoire of repetitive natural sounds, such as the soft patter of raindrops, or the rise and fall of waves as they reach the shore, are also popular.

Subtle Energy Therapies

Feeble electrical forces have been utilized to induce sleep, as well as general anesthesia, for several decades in Russia and Europe. At our 1989 Congress, M. T. Haslam presented a review of 10 years of beneficial Electrosleep therapy in England, demonstrating that it produced an increase in EEG alpha rhythms similar to patterns seen during deep meditation. We have also had several papers dealing with the use of other cranioelectrical stimulation techniques suggesting unusual potential for this approach. Saul Liss and Norman Shealy showed that their approach increases serotonin levels, and is also effective for the treatment of depression and jet lag. The Shealy RelaxMate induces a state of deep relaxation by means of synchronized stroboscopic photic stimulation, that can be enhanced by simultaneously listening to various musical tapes.

The most effective treatment for insomnia appears to be the Symtonic device, which uses a low emission energy to create a weak magnetic field in the region of the hypothalamus. Double blind studies at leading sleep laboratories confirm that its application for only 15-20 minutes, three or four times weekly, significantly decreases the time it takes to fall asleep, and also increases total sleep time. It appears to act in a fashion similar to benzodiazepine drugs like Valium, but without any side effects, rebound, resistance, or addictive tendencies. Symtonic was developed with the assistance of Biotonus Clinic, where it underwent early clinical trials. Our 1997 Congress, co-sponsored by Biotonus Clinic, will again feature an update on the use of Symtonic in insomnia and anxiety, as well as other cutting edge advances in stress, sleep, and immune function research.

Paul J. Rosch, M.D., F.A.C.P.
Editor

All men whilst they are awake are in one common world: but each of them, when he is asleep, is in a world of his own.

Plutarch

No Pain, No Gain?

During the running and jogging craze of the 70s, conventional wisdom held that the more vigorously you exercised, the greater your rewards would be with respect to physical fitness, protection from heart attacks, and stimulating the immune system. This prevalent belief in "no pain, no gain", was readily illustrated by the agonized expressions on the faces of many joggers, as they struggled through their daily grind. Presumably, the greatest benefits were achieved by those elite marathoners who usually ran 20 or 30 miles, several days a week, or even more. This was also most likely to elicit the coveted "runners high", a state of euphoria, freedom from stress and pain, and spiritual enlightenment, presumably resulting from a rush of endorphins. That such a Nirvana-like state could be achieved, is attested to by the observation that many marathoners continued to run on broken bones, because they did not feel the pain that would normally have caused them to curtail their activities.

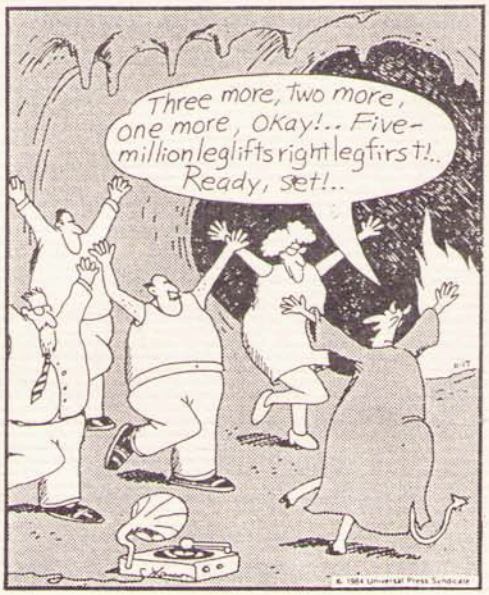
In recent years, however, it has become apparent that too much exercise generates billions of free radicals, that might contribute to cancer, cardiovascular disease, and a host of age related signs and symptoms. Jim Fixx, the guru of jogging, died of a massive heart attack while running alone in rural New England, and George Sheehan, a prominent physician advocate, recently reported having far advanced prostate cancer, and there is an apparent increase, rather than decrease in cancer and heart attack in elite runners. Even Kenneth Cooper, who coined the term aerobics, has recently warned about the potential dangers of over exercising. To examine this, a meta-analysis of the relevant literature was performed to clarify contradictory opinions about the effects of exercise on immune system. Reports were limited to those which included immune system evaluations obtained from pre and post exercise blood tests in elite athletes engaged in strenuous activities. Seventeen studies met these criteria, although the parameters were not the same in all. Part of the problem is that there are many different components of immune system function, including different types of immunoglobulins, complement, natural killer and suppressor cells, interleukin levels, responses to mitogenic stimuli, etc. It is likely that the same stressor, in this case exercise, could cause some of these to change in directions suggestive of improved immune resistance, while others might move in the opposite direction, or show little alteration.

The meta-analysis seemed to confirm this. In general, there were significant increases in the white blood cell count, especially in monocytes and neutrophiles. There were no significant changes in various CD cell counts or percentages, immunoglobulins, tumor necrosis factor, or complement C. On the other hand, lymphocyte proliferation following stimulation was decreased, and many might feel that this represents the most relevant parameter for predicting susceptibility to infection and possibly cancer. This study does suggest that more exercise may not always be better, and that too much may have significant drawbacks. In addition, measurement of immune parameters may be useful in determining precautions for avoiding an infection in athletes, following an exercise event.

Psychosomatic Medicine, 58:80, 1996

It is a sign of a dull nature to occupy oneself deeply in matters that concern the body; for instance, to be over much occupied about exercise, about eating and drinking, about easing oneself, about sexual intercourse.

Epictetus



Mental Stress Tests To Predict Heart Attacks?

Conventional stress tests are based on standardized, progressive physical exercise protocols, during which patients are carefully monitored. Testing is terminated if the patient experiences chest distress, or there is objective evidence of serious ischemia. Different types of mental stress tests have also been utilized to predict the likelihood of a heart attack, and there is growing evidence that this approach may yield superior results.

In one study, 130 patients with clinical evidence of coronary heart disease were monitored while undergoing exercise testing, as well as during various stressful challenges, including mental arithmetic under time pressure, tracing reverse images in a mirror, two public speaking tasks, and an interview designed to provoke Type A behavior. Over the following two years, major cardiac events occurred in 28 patients, including 6 heart attacks and 2 cases of sudden death. Seventeen underwent angioplasty, and 9 required bypass surgery. A significant correlation was found between one or more of these events with mental stress test findings, but not with exercise testing.

In another, 79 patients with a history of a prior positive exercise stress test but who were symptom free, underwent mental stress testing and a standard bicycle exercise test. During the three year follow-up period, 30 experienced a cardiac event, and mental stress testing was again shown to have better predictive powers. In those who exhibited evidence of ischemia due to arithmetic mental stress, 50% had a subsequent coronary event, compared to only 31% of patients who showed no change.

A very recent report also found mental stress superior to physical stress testing in 126 patients, using sophisticated nuclear imaging studies of heart wall function. Over the next five years, 27 percent of the patients who responded adversely to mental stress tests had suffered a cardiac event, and only 12 percent with positive tests were symptom free. In all of the above studies, public speaking and mental arithmetic tasks proved most likely to produce abnormal responses. According to*The New York Times,* "reactions to mental stress may be a much better indicater of who will suffer heart problems, than running on a treadmill".

Psychosomatic Medicine, 58:71, 58:68, 1996
The New York Times-June 6, 1996

Scents And Sex

A study on the sexual arousal properties of various scents was reported on at the recent annual meeting of the American Psychosomatic Society. Penile blood flow was measured in thirty-one healthy male volunteers as they inhaled different odors through a mask. Most induced some degree of improvement, but combinations of lavender and pumpkin pie, donut and black licorice, and pumpkin pie and licorice produced the greatest increases in blood flow. Individuals who reported the greatest sexual satisfaction on a screening questionnaire responded strongly to strawberry. Those claiming to be the most sexually active in the group, got their greatest rise from lavender, cola, and oriental spice. Older men seemed to be particularly turned on by vanilla, which is not surprising, since vanillin extract has long been used in perfumes. The mechanism of action is not clear. Some scents may have a direct stimulating action on specific brain structures. It is also possible that there may be a Pavlovian type of conditioning effect associated with certain odors, according to the neurologist who conducted the study. Musk scent is added to some perfumes because of presumed aphrodisiac properties, but this may have more to do with pheromones, which are odorless, but can have powerful sexual arousal properties in the animal kingdom.

Internal Medicine News-May 15, 1995

Sex appeal is fifty percent what you've got and fifty percent what people think you've got.

Sophia Loren

I believe that it's better to be looked over than it is to be overlooked.

Mae West

The lovesick, the betrayed, and the jealous all smell alike.

Colette

Book Reviews • Meetings and Items of Interest

Book Review

Sleep Thieves: An Eye-Opening Exploration into the Science and Mysteries of Sleep, Coren, S. Free Press, New York, 1996, 306 pgs. $24.95

In this meaty offering, the author argues that sleep developed over millions of years of evolution as an essential physiologic process necessary to maintain physical and mental health. This is supported by fascinating information on the sleep patterns of species ranging from different kinds of fish, to all sorts of animals. However, since the development of the electric light bulb, human sleep has become shortened and severely disrupted, and we have increasingly become a sleep deprived society, with dangerous consequences. Numerous examples are given to vividly illustrate this, including a study demonstrating that the loss of merely one hour of sleep with the advent of Daylight Savings Time, resulted in a 7% increased risk of driving accidents or fatalities. Conversely, when we gain an hour of sleep in the Fall, these decrease by 7% during the following week.

Why is it hard to fall asleep around 10 a.m., no matter how tired you are? What foods should you eat or avoid before retiring? Why do you still not feel rested after sleeping for hours? Why do some sleeping pills actually make insomnia worse? What is the significance of yawning, and its relationship to stress? How did Leonardo da Vinci learn to get by with only 90 minutes of sleep a day? Does taking an afternoon nap or siesta really provide health benefits? This book is full of answers to these and other intriguing questions.

In addition, there are useful questionnaires to determine whether you are getting the amount of sleep you really require, how to measure your sleep deficit, and if you're more like a lark, or an owl, with regard to whether you function best in the morning, or don't really get into gear until the late evening hours. Common disorders, such as insomnia, snoring, and sleep apnea, as well as strange oddities that affect certain individuals are explained. Useful tips on the best ways to get infants and children to go to sleep are provided, and indeed, everything from the A to ZZZ's of sleep is covered in an authoritative, but attractive fashion.

Meetings and Items of Interest

Sept. 20-22 Aroma '96, Conference and Trade Show, National Association for Holistic Aromatherapy, San Francisco, CA, call (415) 731-4634

Sept. 27-Oct. 6 Office of CME-UCLA School of Medicine and The American Academy of Medical Acupuncture will be sponsoring Unit 3: Clinical Experience, Bethesda, MD, call for info (310) 794-2620

Oct. 3-6 Third World Congress of Psycho-Oncology, New York Vista Hotel, New York, NY, for more information, call the Congress Secretariat in Georgia at (770) 751-7332

Oct. 5-8 International Congress on Stress and Health, Manly Pacific Parkroyal Hotel, Sydney, Australia, contact Shan Wolody at 011-61-2-646-6343 or fax 011-61-2-646-2590

ISSN # 1089-148X

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124 Park Ave., Yonkers, New York 10703

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