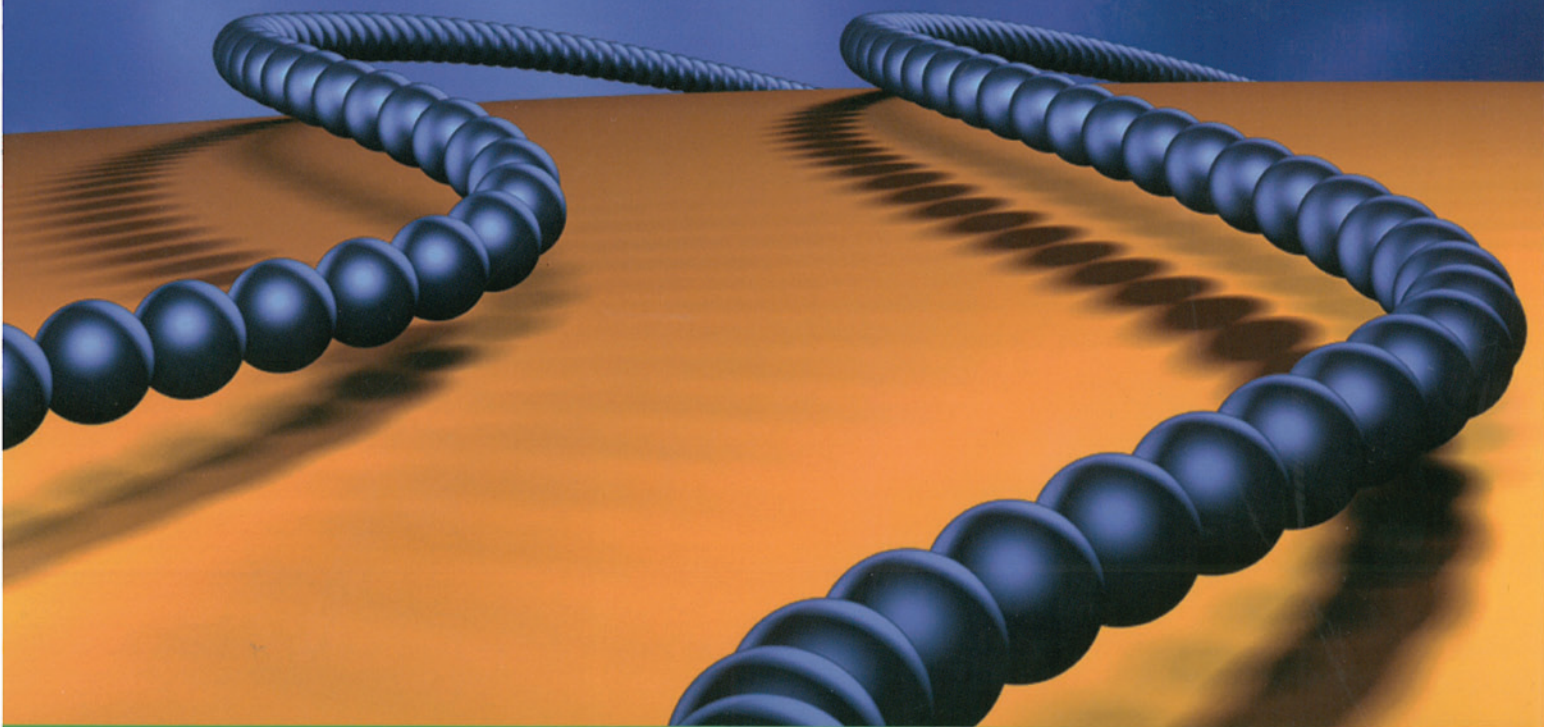


"This book is a must for every household and doctor's office."
-Suzanne Somers

The Road to Perfect Health

Balance Your Gut, Heal Your Body
A modern guide to curing chronic disease



BRENDA WATSON, C.N.C.

with Leonard Smith, M.D., Rick Sponaugle, M.D. and Jamey Jones, B.Sc.

2

Brain & Nervous System

Balance Your Gut, Heal Your Body

The gut-brain connection occurs in two directions—from the brain to the gut, and from the gut to the brain. An example of the brain-to-gut connection is when a person has a “gut feeling,” or when an emotional upset causes a stomach ache or loss of appetite. Most people are familiar with this type of brain-to-gut connection.

The opposite direction, from the gut to the brain, is the subject of this chapter. The gut houses the enteric nervous system, a part of the peripheral nervous system that is made up of 100 million neurons connecting the gut to the brain.

When the gut is in a state of dysbiosis, meaning that there is an imbalance in the ratio of good to bad bacteria, inflammation results. This inflammation destroys the cells lining the intestinal tract, leading to a condition known as increased intestinal permeability, or leaky gut. A leaky gut will allow undigested food particles and toxins (both microbial toxins and environmental toxins) to enter into the bloodstream. The immune system then responds to these particles and toxins as foreign invaders, which is the normal response of the immune system. This response triggers further immune dysregulation and inflammation, which can travel throughout the body manifesting in many different areas, including the brain.

Bringing the gut back into balance by recognizing the underlying contributing factors that create the imbalance in the first place, is the first step to building a healthy foundation upon which optimal brain function can be achieved.

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**Written by Marvin “Rick” Sponaugle, M.D.

ADD/ADHD

*Addiction***

Alzheimer’s Disease

*Anxiety***

Autism

*Depression***

Parkinson’s Disease

ADDICTION

Written by Marvin "Rick" Sponaugle, M.D.

What Is It?

The traditional definition of addiction suggests that addiction involves the compulsion to engage in a behavior resulting in dependency, even when that behavior is harmful to either the person themselves, or to other important aspects of their life. Addiction is often chronic, with common relapse, especially addiction to substances.¹ Behaviors that may become addictive include:

- Drug abuse
- Alcohol abuse
- Cigarette smoking
- Tobacco chewing
- Caffeine consumption
- Over/under-eating
- Sex
- Gambling
- Exercise
- Shopping
- Internet use
- Working
- Risk taking

At Florida Detox and Wellness, however, addiction is not seen as a primary disease, but rather as a symptom, or a



coping mechanism that patients use to bring their brain back into balance. Often patients use their addiction to anesthetize their emotional pain. Unknowingly, they strive to balance their brain chemistry which subsequently balances their brain's electrical function.

This conclusion is drawn from Dr. Sponaugle's treatment of more than 5,500 addicted patients during the last 12 years. Through intense clinical research, Dr. Sponaugle has determined that the craving (chemical or behavioral) is actually of biochemical origin and can be successfully thwarted by targeted, biochemical optimization.

Through the years, patients at Dr. Sponaugle's clinic have clearly demonstrated incredible expertise in the art of self-medication. They intuitively use stimulating drugs to activate their underactive brain regions, or drugs that reduce electrical current in the brain to relax their over-electrified brain regions, all resulting in various chemical dependencies. Most of the addicted patients treated at Florida Detox suffer with a combination of underactive and overactive brain regions.

What Causes It?

The single most common inherited cause of addiction seen at Florida Detox is a deficiency of the brain chemical dopamine in the prefrontal cortex of the brain.² This produces the symptoms of ADHD. The prefrontal cortex is the brain region located just above the eyes. It is responsible for keeping the brain focused on the task at hand, modulating mood swings in the emotional center, personality expression, decision making and moderating correct social behavior. The basic activity of this brain region is considered to be orchestration of thoughts and actions in accordance with internal goals. When this area of the brain is underactive, a person will seek to stimulate it, often with substances or behaviors.

The second-most common cause of inherited addiction seen at Florida Detox is an underdeveloped pleasure center (nucleus accumbens).³ The term used to describe the underactive pleasure center is “reward deficiency syndrome” (RDS). The reward circuitry in this region of the brain controls a person’s ability to experience pleasure and enjoy good things.

These people may exhibit symptoms of atypical depression (see the Depression section), and seek to rebalance their brains with stimulating substances or behaviors that produce a dopamine surge in their pleasure center.

Yet in other patients an overactive brain is the underlying feature, driving a craving to “turn down excessive voltage” in their brain with drugs that are calming by nature. Excessive production of excitatory brain chemicals like dopamine, histamine, glutamate, phenyl-ethyl amine, epinephrine and norepinephrine cause the brain to become over-electrified. These brain chemicals stimulate electrical energy in all brain cells.

At a relatively low level of excessive electrical activation, patients may report a mild anxiety disorder usually accompanied by insomnia. If more severe, they typically describe a crippling and continuous panic mode and suffer panic attacks. In the most severe cases, they can develop symptoms that mimic bipolar disorder, with brain scans that match the accepted bipolar pattern. Patients who suffer excessive levels of electrifying brain chemicals, if not properly diagnosed, will abuse alcohol, OxyContin





(pain medication) and/or Xanax (benzodiazapines) to calm their over-electrified brains.

Serotonin deficiency combined with taurine deficiency is the most common cause of anxiety-induced addiction seen at Dr. Sponaugle's clinic. Serotonin and taurine are both calming brain chemicals. A deficiency in serotonin causes two specific brain regions to become overactive. Overactivity in the deep limbic system (the emotional center of the brain) results in melancholic depression and is discussed in detail in the Depression section. Overactivity in the anterior cingulate gyrus (the worry center of the brain) presents as an obsessive-compulsive worrying-type of anxiety and is discussed in detail in the Anxiety section.

Gut Imbalance

Dr. Sponaugle's clinical research has proven that addiction is more frequently caused by toxins from the gut than from any other single causation.⁴ A dysfunctional, leaky intestinal tract will distort the delicate biochemical balance of the brain. Homeostasis, or balance, between the immune system, the hormonal system and the nervous system begins in, and is critically dependent on, a healthy intestine.

One example of gut involvement in addiction is seen in alcoholics. Because ethyl alcohol is a favorite food of the yeast *Candida*, in a very short time alcoholics develop an imbalanced gut microflora, overrun by *Candida* yeast and toxic bacteria. Alcoholics are notorious for harboring the most toxic gram-negative bacteria, *Klebsiella*, in their gut. The toxin produced by *Klebsiella* disables the conversion of the amino acid tryptophan into 5-HTP, the first step in

serotonin production. Inhibition of this step, which occurs in the small intestine, leads to serotonin deficiency. The more serotonin deficiency alcoholics develop from their drinking, the more overactive their brains become in both the anterior cingulate gyrus (worry center) and deep limbic system (emotional center).

Frequently, women who suffer emotional pain from childhood are able to manage discomfort without drugs and/or alcohol until unsuspectingly developing serotonin deficiency. All too often, the deficiency presents secondary to excessive antibiotics which create a toxic gut. The resultant overactive emotional center amplifies the sensation of her original emotional pain.

The emotional pain becomes unbearable without the numbing effect of perhaps an opiate or alcohol. Fortunately, through repairing her toxic gut, she will begin to restore serotonin levels, and her brain will become more relaxed allowing her to heal the emotional pain more effectively with counseling.

If the alcoholic happens to suffer an allergy to the wheat or barley in beer, or to the corn and potatoes in vodka, continuous allergic reactions result. This constant state of allergic response causes elevation of glutamate, a brain chemical that is well documented for its serious role in excitoneurotoxicity, the premature destruction of brain cells.⁵

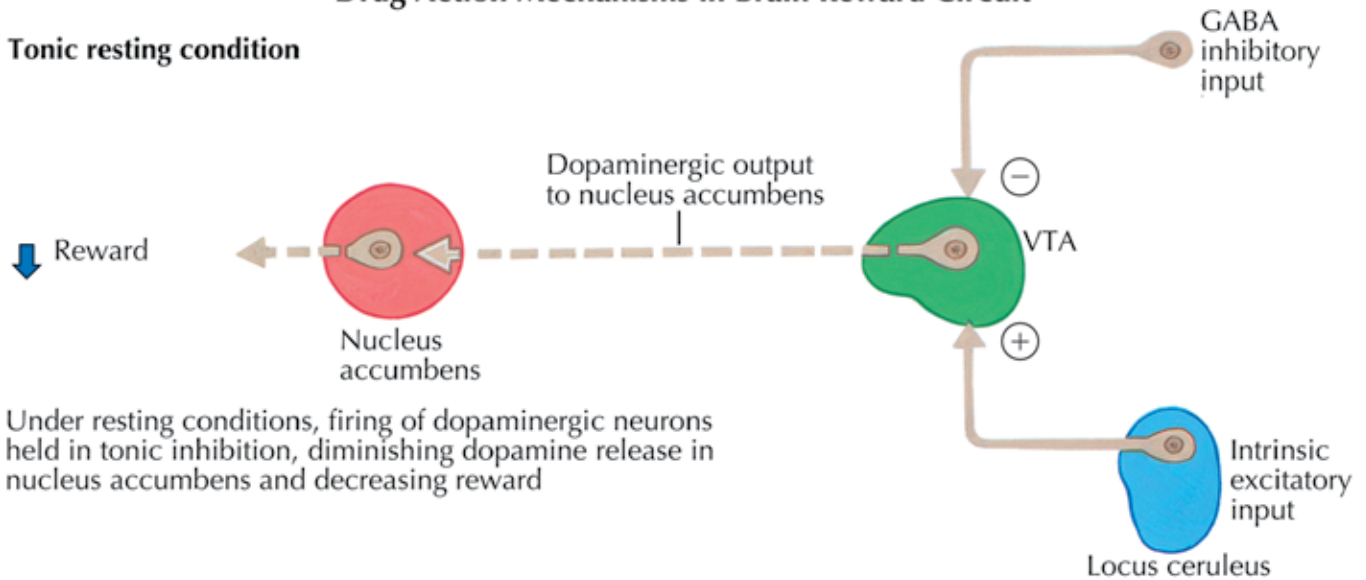
All the while, the alcoholic is developing multiple hormonal, vitamin, and mineral deficiencies. These create more depression and more anxiety which, of course, result in more addiction.

As the alcohol consumption increases, the person quickly develops severe leaky gut syndrome in conjunction with excessive histamine production, as evidenced in the bright red flush of the face. The excessive histamine also activates dopamine receptors in the brain.⁶ Unlike the initial pleasant dopamine hit with the first drink, the histamine activation creates excessive electrical current throughout the brain and body.

The excess electrical current derived from serotonin deficiency, taurine deficiency and excessive histamine activation keeps the alcoholic in an over-electrified state

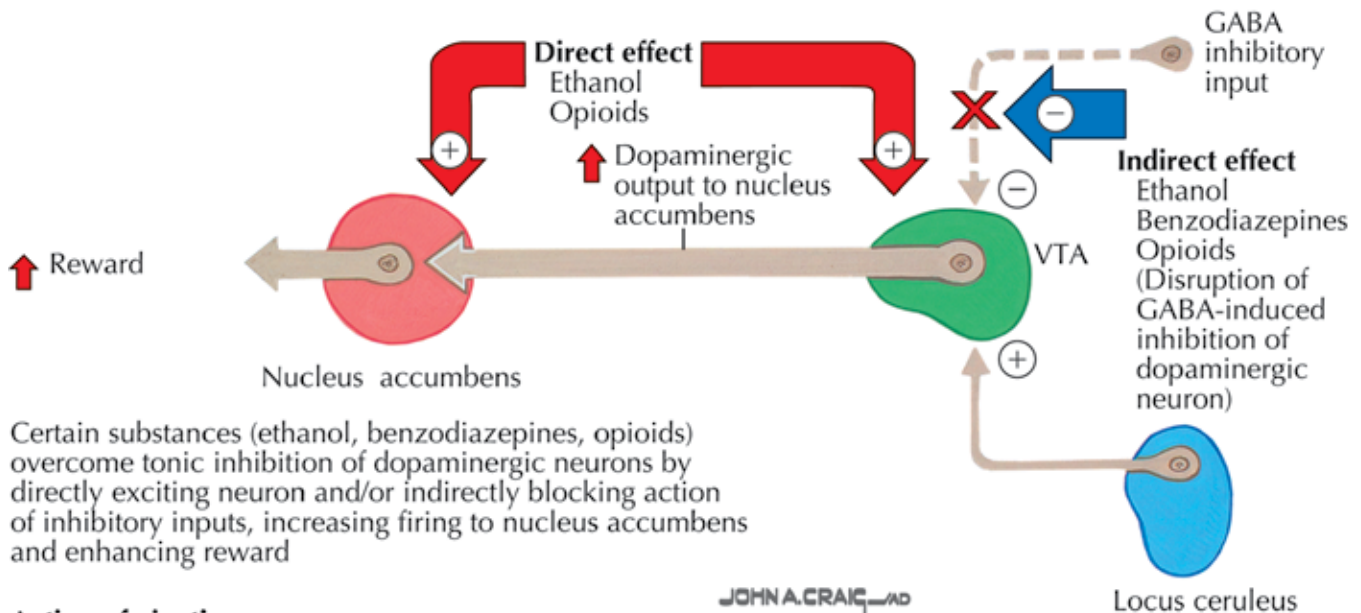
Drug Action Mechanisms in Brain Reward Circuit

Tonic resting condition



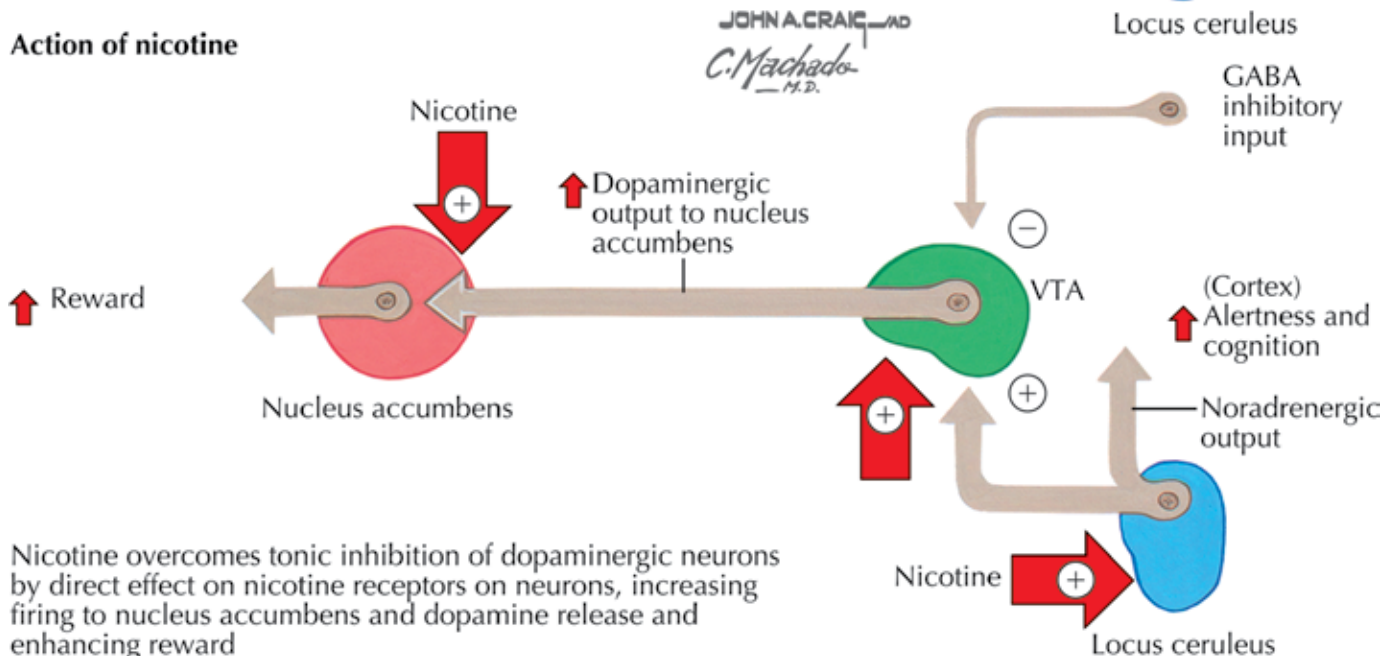
Under resting conditions, firing of dopaminergic neurons held in tonic inhibition, diminishing dopamine release in nucleus accumbens and decreasing reward

Action of alcohol, sedative/hypnotics, and opioids



Certain substances (ethanol, benzodiazepines, opioids) overcome tonic inhibition of dopaminergic neurons by directly exciting neuron and/or indirectly blocking action of inhibitory inputs, increasing firing to nucleus accumbens and enhancing reward

Action of nicotine



Nicotine overcomes tonic inhibition of dopaminergic neurons by direct effect on nicotine receptors on neurons, increasing firing to nucleus accumbens and dopamine release and enhancing reward

JOHN A. CRAIG, M.D.
C. Machado, M.D.

that feels like a constant alcohol-withdrawal pattern. The need to drink becomes more intense as the excess electrical current causes increased anxiety and insomnia.

Alcohol activates the GABA receptor, the same brain receptor that is activated by Xanax. This activation can result in pleasure and calm for the alcoholic.

The more serotonin deficiency symptoms the alcoholic develops, the more they must drink to obtain the GABA calming effect of alcohol. The more alcohol they drink to calm the brain, the more severe the serotonin deficiency becomes. This typifies the desperate and heartbreaking downward spiral of alcoholism.

Food allergies or sensitivities may also play a role in addiction. In one clinic, a study of alcoholic patients found that 73 percent had food allergies, most often to



wheat or dairy.⁷ Wheat and dairy proteins, when not broken down properly, can contribute to leaky gut, enter the bloodstream and travel to the brain where they act as opiate-like compounds. This can alter brain function and can lead to addictive cravings. As a result of the opioid effects of these compounds in the brain, serotonin, dopamine and norepinephrine levels in the brain become depressed.⁸

Hormonal Imbalance

Hormonal imbalance in female patients is one of the most common, yet rarely diagnosed, causes of addiction in middle-aged women. The female hormones are very potent modulators of the brain chemicals dopamine, serotonin and GABA. When a woman's hormones are out of balance, so is the electrical activity in her brain.

As a stimulating brain chemical, dopamine activates electrical energy in brain neurons. Conversely, serotonin is a relaxing brain chemical. It decreases electrical voltage in the brain by various mechanisms. Serotonin prevents the release of dopamine from dopamine storage units. It also prevents the release of the stimulating brain chemical norepinephrine from the brain's A5 nucleus, the factory that manufactures 90 percent of the brain's norepinephrine. Serotonin also enhances the activity of the brain's primary relaxing brain chemical, GABA.

Serotonin activity is essential for enjoying a relaxed and happy brain. The next concept is monumentally important for females, yet few physicians in America have been educated in this area. The female hormone estradiol, a form of estrogen, must remain above a certain level in the female brain or the serotonin receptors are closed and resist activation by the serotonin molecule.

When estradiol levels fall below 60-80 pg/dL, serotonin receptivity is greatly compromised.⁹ This occurs in many females every month in the premenstrual phase of their cycle. Premenstrual symptoms are also the typical symptoms associated with serotonin deficiency. To clarify, a woman's serotonin levels can be absolutely normal and she will still suffer symptoms of serotonin deficiency. Her serotonin cannot activate the closed receptors, and the woman will experience depression, anxiety and insomnia.



Additionally, decreased estradiol results in increased norepinephrine which also increases anxiety.¹⁰ An estrogen deficient woman will use any tool available to calm her overactive brain regions. She will feel much less anxious when she self-medicates with OxyContin, Xanax or alcohol.

Another of the many biochemical functions of estradiol is that it enhances the enzyme that produces dopamine, and inhibits an enzyme that breaks down dopamine. At normal or increased levels, estrogen produces a stimulatory effect through its action of increasing dopamine production. This natural stimulation is designed to be counteracted by the calming GABA effect of progesterone, another female hormone.

Progesterone readily converts into allopregnanolone, which activates the brain's relaxing GABA receptor similar to Xanax and Valium. Proper balance between progesterone and estrogen in female patients is crucial. These hormones literally control the electrical current in a woman's brain.

The average age of menopause in American women is 51, however, approximately eight years prior to estrogen dropout, the ovaries stop producing progesterone. This can cause tremendous anxiety and insomnia which may lead to subsequent addiction. Approximately half of the middle-aged females who come to Sponaugle Wellness Center became addicted because of the anxiety and

insomnia derived from hormonal imbalance. The hormonal imbalance may not be the only factor of causation, however, it is often the so-called "straw that broke the camel's back."

For more detailed information regarding the physiology and biochemistry of female hormones, please consult Dr. Sponaugle's explanation in the Anxiety and Depression sections in this book.

Stress

Stress is also involved in addiction. Stress alters the reward system of the brain. Under a normal stressful condition the brain is able to respond to the stress by altering its chemistry and then returning to normal. During chronic stress, or after a traumatic event, the brain does not have the capability to return to normal, thus brain chemistry is altered which can lead to addictive tendencies, or reward deficiency. This is seen in the high number of female addicts who have been sexually abused. Stress can increase the risk of addiction, while addiction increases stress.

What Are the Signs and Symptoms?

When normal brain chemistry is altered, symptoms develop which can lead to self-medication for relief. The medication is either a drug, alcohol, food or behavior. This self-medicating brings the individual back to normal. Desire to achieve this normalcy becomes addictive.¹¹

The symptoms experienced by those who crave an addictive substance are similar to those experienced when withdrawal from that substance is experienced. Withdrawal occurs when the substance is no longer available. These symptoms include:

- Anxiety
- Restlessness
- Emptiness
- Cravings
- Depression
- Heightened sensitivity
- Inability to concentrate
- Memory problems
- Discomfort

Some signs that an individual may be suffering from addiction include:¹²

- Feeling the need for the substance or behavior regularly
- Failing repeated attempts to stop using the substance or the behavior
- Taking risks that involve the risk or behavior
- Major changes in behavior

How Is It Diagnosed?

Most of the addicted patients treated at Florida Detox and Wellness suffer with a combination of underactive and overactive brain regions. For this reason, a comprehensive treatment model that includes analysis of more than 60 brain chemicals, hormones, enzymes, toxins and vitamins has been developed by Dr. Sponaugle.

Extensive testing allows for the assessment of each patient to determine the root causes of their addictive behaviors. Analyzing brain chemical imbalance, hormonal imbalance and nutritional deficiencies as well as metabolic pathways affected by toxins in the gut is essential. In many cases, the possibilities of exposure to mold and industrial toxins must be evaluated as well.

If an alcoholic goes to an addiction treatment center that does not perform extensive testing and restoration of more than 60 biochemical aberrations caused by their dependency, he or she has little chance of avoiding relapse. The brain and body will remain out of balance, seeking substances or activities that quell the imbalance.

What Is the Standard Medical Treatment?

Recovery rates for conventional treatment of drug addiction are only about 20 percent and have not changed much in the past few decades. Most treatment programs focus on one or two aspects of drug addiction rather than looking at the whole picture, which includes the following aspects:¹³

- Physical
- Psychological
- Behavioral
- Social
- Spiritual

The first step in the treatment of drug addiction is detox. There are basically four main types of detox, the first two being the methods most often used in conventional medicine:¹⁴

- Social detox
- Medical detox
- Nutritional detox
- Rapid detox

Social detox is essentially the cold-turkey method and does not involve medical intervention. This method is the most uncomfortable, and can even be dangerous if the individual experiences side effects of withdrawal such as seizures and hallucinations. When these serious side effects do occur, the individual is taken to a medical facility and receives medical detox.

Medical detox involves the use of medication that is similar to the abused drug. The dose of the medication is gradually decreased as the symptoms of withdrawal subside. This method is more comfortable than social detox, but the individual still has to withdraw from the replacement medication, which can prove difficult. This method involves replacing one drug with another, often for long periods of time, or even indefinitely.

Nutritional detox takes into account the individual's nutritional status and aims to replenish nutrients that help balance brain and body chemistry that has become unbalanced. The use of intravenous amino acids, vitamins





and minerals may effectively help to detox individuals who might have failed using other detox methods.

Rapid detox involves the use of IV sedation with other medications, depending on the individual, to detoxify the body so that physical withdrawal symptoms are not experienced. Some rapid detox programs are not administered correctly, however, and are not safe. At Florida Detox, Dr. Sponaugle designed a rapid detox method that has a proven safety record of treating 5,500 patients over the last 12 years. Dr. Sponaugle's protocol prevents any of the typical adrenaline surge that is normally associated with drug and alcohol detoxification. This allows his patients to avoid tremors, twitching, muscle spasms, racing heart or stomach cramps. When norepinephrine levels are carefully controlled, rapid detox is a safe and effective detox method. An important aspect of Dr. Sponaugle's program is the assessment and balancing of hormone and neurotransmitter levels. This enables the long-term recovery process to be more effective. Relapse rates at Dr. Sponaugle's treatment center are nine percent for drug and alcohol treatment, compared to national relapse rates of 90 percent.

After the initial detox, the recovery process must continue. This involves addressing the physical, psychological, behavioral, social and/or spiritual aspects of life. However,

at most addiction treatment centers all of these disciplines are not addressed. Most often the physical (biochemical) aspect is neglected.

Twelve-step programs, such as Alcoholics Anonymous (AA), exist as a social, spiritual and behavioral support. These programs primarily focus on spiritual and character development. However, without biochemical interventions, they rarely are enough to fully treat the individual's needs. Neurobiologists do speculate that these programs likely encourage positive biological changes in the brain,¹⁵ but, patients may relapse before these effects take place.

Counseling addresses the psychological, behavioral and sometimes spiritual aspects of treatment. There are many different methods and programs that vary depending on what type of addiction is being treated.

Behavioral addictions, such as gambling, food or sex addictions, and even obsessive-compulsive disorder (OCD) are usually treated with counseling. However, these behaviors share the same basis as substance addictions, therefore, it is equally important to consider brain imbalances in these cases. One recent study found the very same brain imbalances in food addiction as is found in cocaine addiction.¹⁶ Due to the similarity of behavioral addictions with substance addiction, (both seek reward or involve reward deficiency), nutritional treatment may also be beneficial for those with behavior addictions.



Additional Comments by Dr. Sponaugle

Detoxification from drugs and alcohol is an obvious first step in addiction treatment. Traditional detox has allowed alcoholic and drug-addicted patients to suffer days of tremors, twitching, muscle spasms, tachycardia (racing heart), severe anxiety, panic attacks and many other signs of excess electrical current flowing throughout the body and the brain.

The excessive electrical current derived from detoxification of opiates, alcohol or benzodiazepines is the result of a massive surge of adrenaline, specifically norepinephrine, from the A5 nucleus in the brain.

In order to better understand why the chemically dependent person continues to be subjected to barbaric detox protocols, two realities must be considered. First is the underlying prejudice in the medical community toward the chemically dependent person. Secondly, psychiatrists have historically run rehab centers and controlled detox methods. While psychiatrists are bright physicians, they lack the cardiac care expertise to design a detox protocol that provides the ultimate control of withdrawal-induced adrenaline surges. Only recently are we seeing the advent of safer and more painless detox protocols.

Younger physicians appear to harbor less prejudice toward addicted patients. They are exposed to more recent neuroscience research that proves biochemical addiction concepts we have embraced for a decade at Florida Detox and Wellness Institute.

In 2005 we began correlating SPECT brain imaging with brain chemistry analysis, hormonal imbalance, nutritional deficiencies and the personality profiles that match the craving tendencies for specific classes of drugs and alcohol. The patients remain the best teachers! There are things you can only learn from an addicted patient's heart.

A study of alcoholic patients suggests a mechanism, called kindling, by which the severity of detox attempts



in which surging adrenaline levels are not properly controlled.¹⁷

This study and others are increasing awareness that patients should not take detoxification lightly. A detox of choice would have patients undergo a safe medical detoxification.

At Florida Detox, the surging adrenaline levels are counteracted with intravenous medications so that blood pressure and heart rate do not change throughout the detox. Unfortunately, most medical detoxification protocols are less scientific. The patient often "shakes and bakes" through the process of detoxification.

A salient point, regardless of detox method, is that detoxification is only the first step. After having treated thousands of addicted patients, I believe strongly that detoxification without extensive evaluation and

restoration of multiple biochemical imbalances is of little value, and, most likely, a waste of time and resources. We must change the brain of the addicted individuals if we expect a change in their addictive behavior.

Low relapse rates require restoring the patient's brain to optimal health in an accelerated time frame. When we remove the patient's medication, whether it is OxyContin, cocaine or alcohol, we must work quickly to make his or her brain feel as good without the substance as it did on the drugs and/or alcohol.

There is little opportunity to offer patients a healthy brain without restoring the body to good health. The process is multi-faceted. However, it always begins in the gastrointestinal tract—called the second brain by many neuroscientists. No other organ in the body has as much ability to nourish the brain, or destroy it.

A more detailed explanation of treatment protocols is offered in "Dr. Sponaugle's Comments" found in the Anxiety and Depression sections. Specific protocols are unique to each individual, and vary depending on their brain profile, hormone and nutritional deficiencies. Relapse is perhaps the saddest part of addiction. However, it is mainly when we fail to diagnose and treat the true cause of the patient's craving (their brain chemistry) that they will repeatedly relapse. Relapse does not have to be part of recovery as is espoused in many models of models of addiction treatment. Historically speaking, addiction treatment has failed miserably in relapse prevention. Talk therapy does not address and, therefore, cannot change the myriad biochemical deficiencies and imbalances that frequently are the root cause of drug and alcohol craving.

Addiction treatment that relies solely on talk therapy relies on the premise that, we can coach patient to "white knuckle" through his craving one day at a time.

At Florida Detox and Wellness, we work on the premise that we can actually stop the biochemical craving. Any drug or activity that produces a specific biochemical

effect in the brain to feel normal will be the drug or activity that the patient will constantly crave!

When we diagnose the biochemical imbalances in the brain, we can then use a biochemical model of treatment to literally stop the craving. This approach has proven to produce much lower relapse rates than attempting to coach patients to ignore their overwhelming biochemical cravings.



Nerve synapse: the space between two nerves

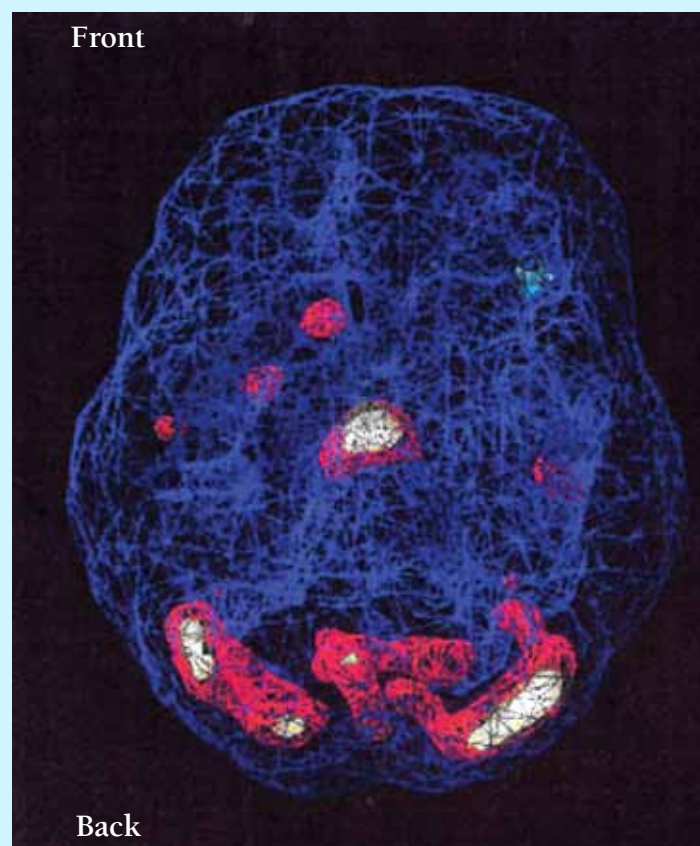
Case Study with Dr. Sponaugle

Jennifer presented as an intelligent 54-year-old nurse and wife of a hospital administrator who began drinking excessive amounts of wine four years previously. Prior to turning 50, Jennifer drank only one glass of wine with evening meals. When Jennifer entered my clinic, she had very recently returned from spending 28 days and \$46,000 in an Arizona treatment center.

Jennifer had relapsed to alcohol just four days after

returning to Florida. As you might imagine, her husband was furious. This particular rehab center had just incorporated brain imaging into their treatment protocols. I have utilized SPECT brain imaging at Florida Detox since 2005.

Jennifer relapsed to alcohol because she needed the calming GABA effect to relax her over-electrified brain regions. She was placed on a selective serotonin reuptake inhibitor (SSRI) medication by her rehab

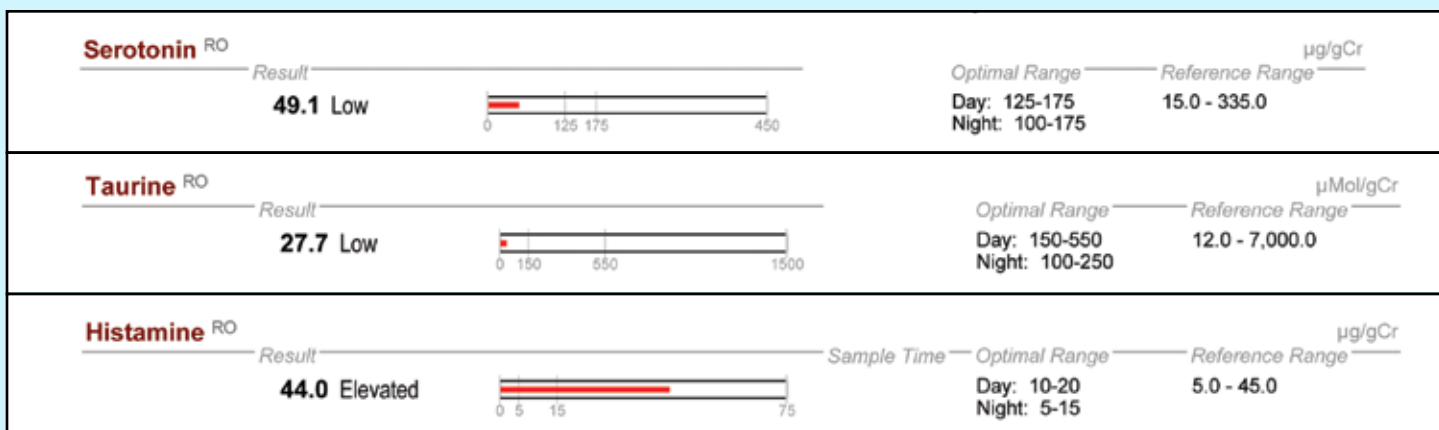


Brain scans: surface and deep

The holes on the surface scan on the left represent underactivity in the prefrontal cortex of Jennifer's brain. The prefrontal cortex is the area above both eyes. Jennifer's personality matched the expected mild, ADHD profile. She had inherited a gene that causes a localized dopamine deficiency in this specific region. Important to note, dopamine is a stimulating brain chemical.

Jennifer's deep scan, the blue scan to the right, demonstrates good symmetrical activity in her cerebellum. The red and white on the bottom of her scan is normal. However, we also notice a severely overactive deep limbic system. This is represented by the white and red oval in the middle of her brain. This is caused by her serotonin deficiency.

Jennifer also has an overactive basal ganglia or dopamine factory on her right side. This can be a normal presentation, or it can be derived from excessive dopamine activity. In Jennifer's case, her dopamine levels were normal. The overactive basal ganglia was caused by excessive histamine from her leaky gut syndrome. Histamine activates dopamine brain receptors. Excessive histamine production creates anxiety and insomnia via the same mechanism as excessive dopamine production.



Jennifer's neurotransmitter analysis revealed a classic pattern for a toxic alcoholic gut syndrome. She had severe deficiencies of serotonin and taurine, two calming brain chemicals. She also demonstrated excessive levels of histamine, a stimulating brain chemical.

doctors in Arizona. However, they failed to realize that her menopausal estradiol levels were not sufficient to open her serotonin receptors. In other words, no matter how much serotonin Jennifer made, she couldn't use it. Until Jennifer's estradiol levels were raised to 80 pg/dL her serotonin receptors would not work properly. This hormonal deficiency left her with an extremely overactive limbic system.

Furthermore, SSRI drugs have poor efficacy in the brain of patients with an alcoholic, toxic gut syndrome. Jennifer's alcoholic gut could not convert tryptophan to 5-hydroxy tryptophan (5-HTP) which is converted in the brain to serotonin.

If Jennifer's rehab doctors would have given her quality 5-HTP, which bypasses the gut step of making serotonin, her brain's serotonin factories would have begun manufacturing serotonin immediately. This treatment combined with biochemical estradiol replacement would have relaxed her overactive emotional center before she left Arizona and she would not have needed the alcohol to relax her brain.

Because Jennifer's rehab doctors failed to comprehend the gut-brain connection and the estradiol/serotonin connection they failed to correct myriad causes of her anxiety causing her to relapse to her old anxiety medication, alcohol.

Jennifer is doing, in her own words, "amazing!" She has been alcohol-free now for more than 15 months at this writing. She experiences absolutely no craving for alcohol. She has worked very diligently to detoxify her gut with a Candida Cleanse, probiotics and a formula containing L-glutamine, gamma oryzanol and soothing herbs to help heal her intestine. We have optimized her hormones and balanced her brain chemistry, including her treatment for ADHD. Her husband is a happy man!



Not actual patient

Case Study with Dr. Sponaugle

Susan, a 21 year old female, first came to see me with her mother. When I met Susan, she was drinking two liters of vodka per day, consuming 1000 mg of OxyContin per day, and averaging 20 mg of Xanax per day.

Susan's history revealed that, between the ages of 12 and 21, she had attended eight \$30,000 drug rehabilitation programs. Her family had already spent well over \$240,000 on her addiction treatment. Sadly, the addiction centers Susan had attended did not recognize the biochemical aspects of her chemical dependency.

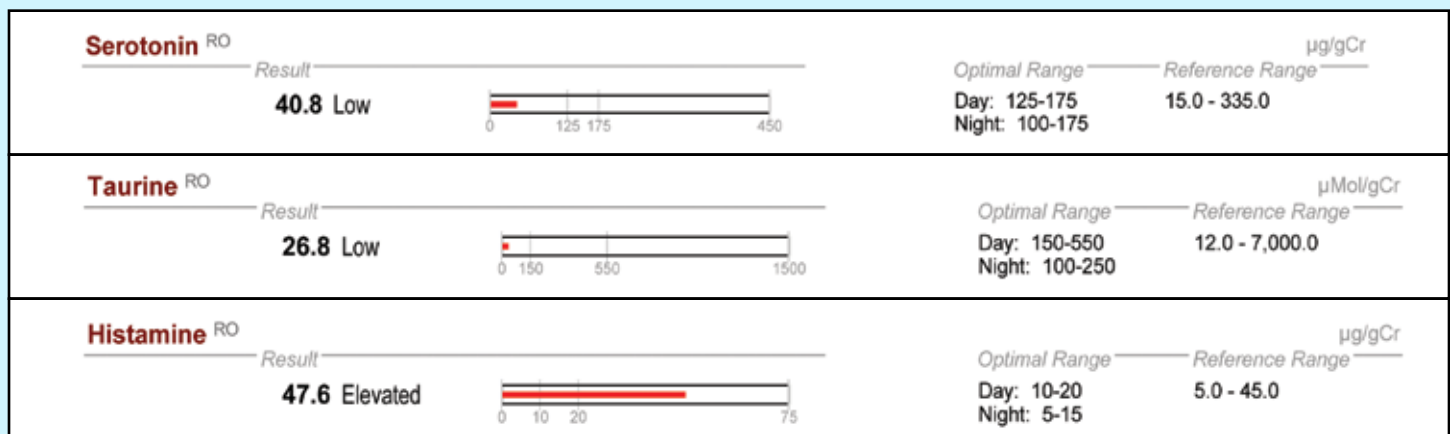
The only diagnoses Susan received from the multiple treatment centers were drug addict and alcoholic. Susan told me she began drinking at age 12, initially raiding the family's liquor cabinet to "calm her anxious brain." Upon further questioning, Susan denied having any anxiety issues prior to age 12.

While reviewing Susan's history, I discovered a significant chronological correlation—Susan had also begun her menses at age 12. Even more significant is the fact that Susan had severely painful menstrual periods that always lasted six to seven days and were much heavier than those of her girlfriends. Susan's mother said, "We had to take Susan twice a year for intravenous infusions of iron



because her periods left her severely low in iron." I love mothers, they are the best diagnosticians. I immediately knew the initiating cause of Susan's alcohol craving. Susan had the classic presentation of progesterone deficiency which unfortunately remains unrecognized by many gynecologists. Her ovaries were producing normal levels of estrogen with a deficiency of progesterone.

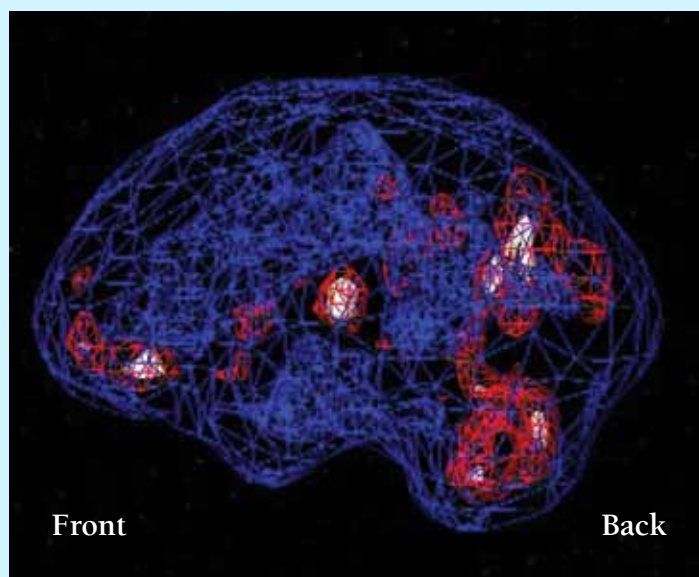
This common hormonal imbalance causes generalized anxiety in many females, and regularly occurs in women during midlife. The ovaries normally decrease their progesterone production eight years before they stop producing estrogen. In Susan's case, she had a genetic predisposition for progesterone deficiency, symptomatically revealed from the onset of her menses.



Susan's serotonin deficiency was derived from *Candida* and *Klebsiella* toxins which had disabled the serotonin factories in her small intestine. Her taurine deficiency was secondary to excessive production of beta alanine by *Candida* overgrowth. Beta alanine prevents kidney reabsorption of taurine, hence, this relaxing brain chemical is wasted in the urine, dragging two other relaxing biochemicals with it, magnesium and potassium.

Estrogen (specifically estradiol) increases electrical activity in the brain because it increases dopamine production, and dopamine is an excitatory brain chemical. Estradiol enhances tyrosine hydroxylase, which converts the tyrosine from food into dopamine. Furthermore, estradiol inhibits the action of monoamine oxidase, the enzyme that breaks down dopamine. Unlike estradiol, which has a stimulating effect on the brain's electrical current, progesterone has a relaxing effect. Progesterone converts to another hormone, allopregnanolone. Allopregnanolone activates the very same brain receptor, the GABA receptor, as does Xanax and Valium. Susan's brain had the stimulating dopamine effect from her healthy estradiol levels but not the calming GABA effect of progesterone.

Susan began her addiction journey by imbibing the most readily available calming drug she could find at age 12—alcohol. Alcohol also activates the GABA receptor, like Valium and progesterone. After Susan drank alcohol



Susan's brain scan demonstrates two specific brain regions that had become overactive from serotonin deficiency. The red oval in the middle of her brain scan is her overactive emotional center which was causing depression, moodiness and irritability. The curved red region in the frontal area of her brain scan is her overactive anterior cingulate which made her suffer with obsessive-compulsive worrying. Other spotted red areas above Susan's emotional center are caused by excessive histamine levels.



for several years, she developed the classic toxic yeast overgrowth in her gastrointestinal tract, that I see in all of my alcoholic patients. By the time Susan entered my clinic, she had secondarily developed deficiencies of several calming brain chemicals: serotonin, taurine and magnesium. Her leaky gut syndrome resulted in excessive histamine levels which were amplifying electrical activity throughout her brain, thus causing more anxiety.

In summary, primarily as a result of Susan's toxic gut syndrome, the generalized overactive red areas on Susan's brain scan are derived from:

- excessive histamine production
- taurine deficiency
- magnesium deficiency
- progesterone deficiency

Susan responded well to initial detoxification of Xanax, OxyContin and alcohol. These drugs served ultimately to worsen her anxiety secondary to increasing gut dysfunction. We optimized Susan's hormonal levels and balanced her brain chemistry. We performed an aggressive gastrointestinal detoxification with natural supplements designed to kill unwanted pathological organisms in her GI tract and heal her leaky gut syndrome. Susan currently has three years without relapse and is well on her way to enjoying a wonderful future.



Brenda's Bottom Line

Dr. Sponaugle lives in my hometown. I was referred to him by a friend who told me that he was very knowledgeable about female hormone issues. At the time, I did not realize that his main focus was on treating addiction. Dr. Sponaugle was able to balance my hormones over a period of a few months. During this time, I learned more about Dr. Sponaugle's brilliant work. He is truly a cutting-edge pioneer in his field of medicine. Psychiatrists who are dealing with similar patients as Dr. Sponaugle have some knowledge regarding brain neurotransmission, but Dr. Sponaugle is ahead of the game with his holistic approach that involves looking at many different areas of the body.

“Gut issues, especially Candida overgrowth, can lead to depression, anxiety and even addiction.”

It occurred to me, back then, that there was one component missing in the treatment of Dr. Sponaugle's patients. Through my experience, I know that gut issues, especially Candida overgrowth, can lead to depression, anxiety and even addiction. So I asked Dr. Sponaugle to look at some of my work. I brought him my book *Gut Solutions*. After reading it, he began to use some of my products in conjunction with the treatment of his patients. He primarily used the Candida Cleanse, the L-glutamine powder and probiotics to eliminate the Candida overgrowth, heal the gut lining, and repopulate the gut with beneficial bacteria.

We developed a great relationship and, over time, he found that adding the gut component to his treatment program was effective at reducing the time it took to balance the brain chemicals in his patients. I've talked to many of his patients and have had a working relationship with them for more than three years now. The gut-brain connection is an important one, so it is

best to find a doctor who understands this and knows how to treat addiction by looking at the body as a whole. The following recommendations will help you on your way.

Recommended Testing

- Neurotransmitter profile (See the Appendix.)
- Hormone testing

Diet

- Follow the Fiber 35 Eating Plan found in the Appendix of this book.
- If Candida overgrowth is present, follow the Candida Diet found in the Appendix.
- Limit or eliminate processed sugars and refined carbohydrates. Opt for high-fiber whole grains instead.
- Include plenty of fruits and vegetables into the diet.
- Reduce consumption of saturated fat and eliminate trans fats from the diet.

Lifestyle

- Regular physical activity is helpful for reducing cravings.
- If overweight, lose weight.
- Reduce toxin exposure.
- Spend time outdoors.
- Get enough sleep.

Complementary Mind/Body Therapies

- Stress reduction therapies such as yoga, biofeedback, massage, and meditation can be helpful to relieve stress.
- Acupuncture may be helpful for people dealing with addiction.
- Colon hydrotherapy should be considered as a way to eliminate excess toxins.

Recommended Nutraceuticals	Dosage	Benefit	Comments
Critical Phase For physical detox contact Florida Detox and Wellness. (See the Appendix.)			
L-Glutamine Powder with Gamma Oryzanol	5 grams (5000 mg) daily on empty stomach with water	Helps repair digestive tract lining, reduce inflammation and known to help reduce cravings.	Best if taken in loose powder form.
Smoker's Cleanse	Use as directed	Supports lung health, detoxification and relaxation and helps to control cravings.	Three-part formula with ingredients like NAC, L-glutamine, GABA, kava kava and chamomile.
Liver Detox	See Appendix	Encourages detoxification involving the liver.	Should contain milk thistle seed extract containing silymarin, phosphatidylcholine selenium and herbs.
Candida Cleanse	See Appendix	Helps eliminate Candida overgrowth.	Look for ingredients such as uva ursi, caprylic acid, undecylenic acid, barberry, garlic, neem, grapefruit and olive leaf extracts.
Helpful			
Multivitamin/mineral Formula	High potency	Help replenish deficiencies and support brain function.	Be sure vitamins are in their natural forms.
Daily Maintenance			
Critical Liver Support Formula	Use as directed	Enhances liver detoxification.	Should include milk thistle seed extract containing silymarin, N-acetyl-cysteine, alpha lipoic acid and L-glutathione.
Probiotics	50 billion culture count daily	Protects the intestinal lining, helps improve immune and digestive function.	Look for high amounts of bifidobacteria, the main bacteria in the colon.
Omega Oils	Use as directed	Provides anti-inflammatory GLA and other EFAs to improve symptoms associated with addiction.	Best combination is flax, fish and borage oils.
Fiber	4-5 grams twice daily	Helps produce healthy bacteria levels and good bowel elimination.	Use in conjunction with a high-fiber diet to obtain 35 grams of fiber daily.
Digestive Enzymes	1-2 capsules with meals	Helps to fully digest foods and absorb nutrients.	If low stomach acid is found, find a formula that contains hydrochloric acid.
Vitamin D₃	At least 1,000 to 2,000 iu daily	Helps heal leaky gut, decrease inflammation, increase overall health.	Research is showing many health complications as a result of low vitamin D levels.

See further explanation of supplements in the Appendix

ANXIETY

Written by Marvin "Rick" Sponaugle, M.D.

What Is It?

Anxiety is essentially excess electrical current flowing through the brain. The human brain is both a chemical and an electrical organ. It consists of billions of electrical cells called neurons. Because various types of anxiety are derived from different brain regions, the symptoms of anxiety will vary. Many patients experience anxiety as excessive worry and apprehension about the future.¹ These patients worry about things that may never happen. They expect the worst from their future and constantly experience a feeling of impending doom. Other patients describe anxiety as edginess, the inability to relax and, in severe cases, pure panic. These patients often state, "I feel like my brain is plugged into an electrical outlet."

Anxiety disorders are the number-one mental health condition in American women. In American men, anxiety disorders are second only to alcohol and drug abuse.² Clinical studies at Florida Detox and Wellness have shown that 90 percent of addicted females and 75 percent of addicted males use drugs and alcohol to self-medicate underlying anxiety disorders.

Since 1980, anxiety and panic disorders have tripled in the U.S. At the same time, addiction has more than tripled. There is an obvious correlation. Patients are using drugs and alcohol to relax their anxious brains.

The American Psychiatric Association has arbitrarily classified five main types of anxiety disorders based on patient symptoms, not causation.³ In this chapter, the five classifications of anxiety from the psychiatric Diagnostic and Statistical Manual (DSM IV) will be discussed, and an attempt made to elucidate the true cause of each. There is much overlap among these various anxiety disorders.

Generalized Anxiety Disorder (GAD)

Generalized anxiety disorder (GAD) is essentially what the name implies, a generalized term. As described by the American Psychiatric Association, generalized anxiety is

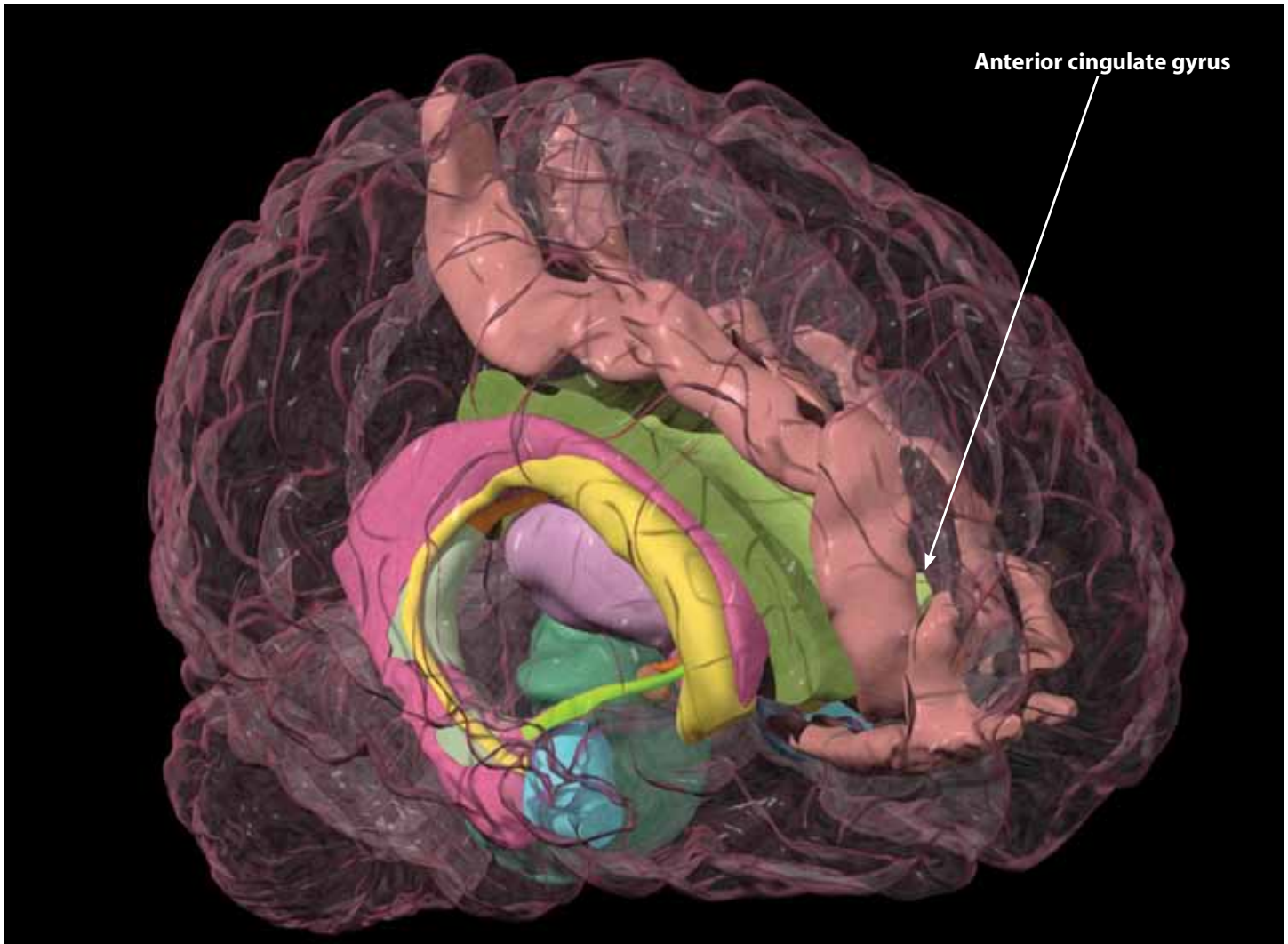


characterized by chronic anxiety, excessive worry, brain and body tension.⁴ Most often there is no emotional or social cause for it. Accordingly, patients with GAD become overwhelmed with everyday events and find relaxation almost impossible.

Truthfully, the symptoms of GAD, as stated by the American Psychiatric Association, are derived from a combination of obsessive-compulsive anxiety along with the anxiety experienced by patients when they suffer excessive electrical activity in their brain.

Obsessive-Compulsive Disorder (OCD)

Obsessive-compulsive disorder is an anxiety disorder in which recurrent, unwanted thoughts and/or behaviors are prevalent.⁵ The obsessive-compulsive disorder (OCD)-type of worry is derived from a brain region called the anterior cingulate gyrus. PET brain scan studies have



been performed on patients with obsessive-compulsive symptoms. They visualized OCD patients with over-activity in their anterior cingulate gyrus, and sometimes in the basal ganglia, the brain's dopamine factories.^{6,7} Dopamine is a stimulating brain chemical. Excessive dopamine production from overactive basal ganglia causes too much electrical activity throughout the brain. Dopamine functions in many ways, but is very involved in the pleasure/reward pathway, and in memory and motor control.

Dr. Daniel Amen, founder of the Amen Clinics, has performed extensive SPECT (single photon emission computed tomography) brain scan research studies in which he has also documented that OCD patients typically have an over-active anterior cingulate gyrus.⁸ Dr. Rick Sponaugle, founder of Florida Detox and Wellness, has used Dr. Amen's SPECT scan imaging since 2005 to assist

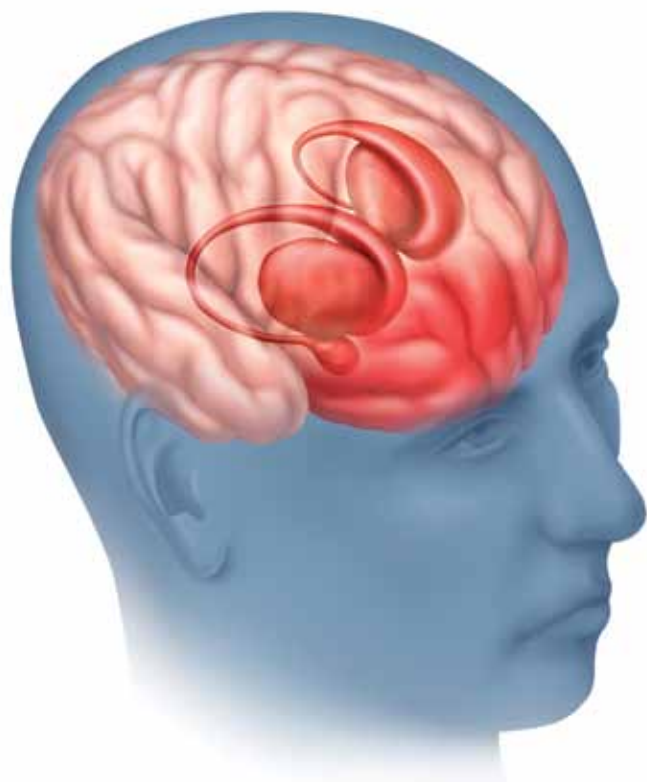
in the evaluation of addicted and non-addicted anxiety disorder patients. Additionally, Dr. Sponaugle's clinical research confirms and further corroborates the specific brain chemical and hormonal imbalances that result in these brain regions becoming overactive.

Normally, the anterior cingulate gyrus assists our brain with forgiving, forgetting and moving on. However, those patients who suffer over-activity in their anterior cingulate are unable to forgive or forget, and they have a tendency to hold grudges. They become hyper-focused on the negative aspects of their life. They develop stubborn personalities and become set in their ways. Frequently these people develop a serotonin deficiency stemming from the intestine. Serotonin deficiency is more common with age. Serotonin deficiency is the primary biochemical cause of an overactive anterior cingulate gyrus.

Because these patients cannot register the positive events in their life, they begin to assume that nothing good can or will happen. Therefore, they worry excessively about their future. Patients with obsessive-compulsive anxiety worry themselves to sleep and wake up worried. When the obsessive-compulsive anxiety worsens, patients are many times officially diagnosed with obsessive compulsive disorder (OCD). Often these patients find relief when performing repetitive processes or behaviors.

Tension in the brain and in the muscles, particularly in the shoulders and neck, as described by patients with anxiety, is normally derived from excessive electrical activity throughout nerves in the brain and body. **This excessive electrical activity is also the underlying source of fibromyalgia.**

The cause of this excessive electrical voltage is an imbalance of neurotransmitters, the messenger chemicals that travel between nerves, along with an imbalance of the body's hormones that modulate and control the activity of brain neurotransmitters.



Artwork of the two basal ganglia (dark pink) of the brain's limbic system seen in a man's head

Panic Disorder

Panic disorder involves feelings of terror that can occur suddenly and often unexpectedly.⁹ These feelings can be accompanied by intense physical symptoms such as tachycardia (racing heart rate), nausea and sweating. These patients frequently develop a surge of panic when thinking about certain people or considering future events, such as work. Panic disorder is essentially a more severe level of excessive electrical current running throughout the brain.

Dr. Sponaugle has diagnosed many patients suffering panic disorder with excessive accumulation of fatty toxins in their brain. This causes excessive production of the excitatory brain chemicals—PEA (phenyl-ethyl-amine) and glutamate. Glutamate is the most powerful electrifying chemical in the brain. Patients who suffer excessive glutamate levels have so much excessive electrical current in their brain that they literally “fry” brain cells. Brain scientists throughout the world are in agreement that excessive glutamate activity in the brain is the primary cause of premature dementia and early Alzheimer's disease.¹⁰ Patients with excessive glutamate activity in their brains feel like “a walking panic attack.”

Post Traumatic Stress Disorder (PTSD)

Post traumatic stress disorder (PTSD) is a type of anxiety that develops after a negative event or chronic negative scenarios in which serious physical harm has occurred or was threatened.¹¹ Dramatic events such as violence, disasters, accidents or belligerent work colleagues can trigger PTSD.

Patients with PTSD demonstrate overactive basal ganglia (dopamine factories) on SPECT and PET brain scans. Excessive dopamine production from overactive dopamine factories causes excessive electrical current throughout the brain. Current theory is that the traumatic event or sequence of traumatic events thrusts the patient into a continuous state of what is known as “fight or flight.” This high-voltage state makes these patients appear edgy and jumpy. They frequently have a pronounced startle reflex.

The human brain is essentially fully developed by age 13, except for the frontal lobes, which don't fully mature until



Deep limbic system

the age of 25. For this reason, children are more vulnerable to developing excessive basal ganglia activity from traumatic experiences than adults.

Social Anxiety

Social anxiety or social phobia describes patients who suffer excessive fear, heightened anxiety and self-consciousness in social situations.¹² Patients with social phobia suffer a chronic fear of being watched or judged by others which results in avoidance of social situations.

Social anxiety is derived from an overactive deep limbic system, the emotional center of the brain that becomes overactive from serotonin deficiency. Patients diagnosed with autism and Asperger's syndrome demonstrate the most severe form of social anxiety—so severe in fact—that they cannot give others eye contact. They engage in conversation while looking down at their feet. Dr. Sponaugle has diagnosed severe serotonin deficiency in every autistic and Asperger syndrome patient he has treated.

The deep limbic system is approximately the size of a walnut and resides within the midbrain. Interestingly, women structurally have a larger emotional center than men. This makes women more sensitive to emotional issues, thus, women are naturally better at nurturing children than men. When men develop a severely overactive limbic system from serotonin deficiency, they become more sensitive to emotional pain like females.

The reason serotonin deficiency causes this specific brain region to become overactive is that the majority of the brain neurons in the deep limbic system are GABA nerves. GABA is a relaxing brain chemical that turns down the electrical voltage in brain neurons. Serotonin actually enhances GABA's ability to activate brain receptors. When serotonin is deficient, GABA relaxation is compromised in the deep limbic system to a greater degree than other brain regions.

Other symptoms of an overactive deep limbic system include moodiness, irritability, hopelessness, low self-esteem, decreased motivation, excessive guilt, negativity, the tendency to be easily offended, and depression.

Depression that is derived from serotonin deficiency is also caused by an overactive deep limbic system. This type of depression has been arbitrarily labeled melancholic depression. One can understand why psychiatrists suggest that depression and anxiety frequently coexist in certain patients. Depression and anxiety derived from an overactive deep limbic system always coexist.

What Causes It?

Serotonin Deficiency

Serotonin is a calming brain chemical. Serotonin deficiency is the most common cause of anxiety in Americans. Two chemical reactions are required for the production of serotonin. First, the amino acid tryptophan found in food is converted into 5-hydroxy tryptophan (5-HTP) in the small intestine. The second step occurs in the brain where 5-HTP is converted to serotonin.

Fully 99 percent of serotonin deficient patients treated at Florida Detox and Wellness suffer serotonin deficiency



from their inability to perform the first step in the gut. When the gut is overgrown with excessive Candida yeast and toxic bacteria, like Klebsiella, their toxins disable factories in the lining of the small intestine and thus prevent the conversion of tryptophan to 5-HTP. Only one percent of Dr. Sponaugle's patients suffer serotonin deficiency due to malfunction of brain serotonin factories. Those people have an issue with the second step, most often caused by excessive ecstasy abuse, exposure to toluene toxins (paint thinners, some nail polish/removers) and organic solvent toxins like benzene (common in gasoline).

GABA Deficiency

GABA is the most powerful relaxing brain chemical. The body constantly converts the amino acid glutamine into glutamate, the brain's most powerful stimulating brain chemical. Glutamate is then continuously converted into GABA.

When patients suffer with gluten sensitivity, they develop severe intestinal permeability or leaky gut syndrome. They constantly leak undigested proteins from their gut into their bloodstream. Some of these proteins resemble glutamic acid decarboxylase, the enzyme responsible for conversion of glutamate into GABA. Subsequently, they develop a deficiency of glutamic acid decarboxylase resulting in excessive levels of the stimulating brain chemical glutamate and a deficiency of relaxing brain chemical GABA.

Taurine Deficiency

Taurine is another calming brain chemical. It enhances GABA activity in the brain. When patients suffer excessive Candida overgrowth in their intestine, taurine is wasted in the kidneys and excreted in the urine. The toxic Candida yeast produces excessive levels of a substance called beta alanine. This protein competes for reabsorption with taurine in the kidneys. Beta alanine is reabsorbed and taurine is excreted into the urine. This can contribute to anxiety and insomnia.

Estradiol Deficiency

Estradiol, the most powerful form of estrogen, enhances serotonin receptivity.¹³ In the female brain, serotonin receptors remain closed when estradiol levels fall below 60-80 pg per deciliter. Thus, serotonin can't quiet brain neurons. When females develop temporary estrogen drop out in the postpartum period or during menopause, they suffer symptoms of serotonin deficiency including depression and obsessive-compulsive worry.

Women who suffer Candida overgrowth in their gut have an imbalanced gut microflora that produces both fungal and bacterial toxins (mycotoxins and endotoxins) enter the bloodstream and affect other systems of the body. Microbial toxins have been found to interfere with hormone function.^{14,15} At Florida Detox and Wellness, many women with prematurely low estradiol levels also have an underlying Candida overgrowth.

Progesterone Deficiency

Progesterone is a calming hormone. Progesterone converts to another hormone, allopregnanolone, which also activates the GABA receptor. Again, GABA is the most powerful relaxing brain chemical.

Progesterone production in American females diminishes on average eight years before estrogen production. Healthy women begin to experience progesterone drop out around the age of 40. Women who suffer intestinal Candida overgrowth develop premature progesterone drop out. The Candida mycotoxins that suppress pituitary production of the hormone FSH, and that premature estradiol deficiency



Illustration of neurons

also decreases pituitary output of LH (luteinizing hormone), the hormone that stimulates ovarian production of progesterone. Dr Sponaugle has diagnosed menopausal progesterone production in many 25-year-old women who suffered toxic gut syndrome.

Histamine Excess

Histamine is an inflammatory chemical as well as a brain chemical,¹⁶ not a well recognized fact within the medical community. Histamine's chemical structure is nearly identical to dopamine, and it actually activates the dopamine receptors in the brain. Patients who develop leaky gut syndrome also develop excessive histamine levels in their brain. Histamine is released from mast cells every time an antibody attacks protein that leaks from the gut into the bloodstream.

Patients with leaky gut syndrome typically develop multiple and often severe food allergies. They leak larger than normal undigested food particles from their gut into the bloodstream, then their immune system runs in over-drive attacking the foreign invaders. Patients with leaky

gut always present with excessive histamine levels.

The histamine flush, a red flush across the lower neck and upper chest, is so common in American women that their physicians think it is normal. They call it dermatographia. Because traditional medical physicians have minimal knowledge of leaky gut syndrome, they fail to realize that the red flush is actually an indicator of excessive histamine production, a clear visual cue that the patient suffers excessive inflammation throughout the body and brain.

Dr. Sponaugle has discovered that patients with the most excessive histamine production present not only with anxiety, but also bipolar-like symptoms. These patients have over-electrified brain scans that match bipolar patterns. It is interesting that the American Psychiatric Association has recently suggested the age of onset for bipolar disorder has decreased from the early 30's into the early 20's. Each new generation suffers more exposure to higher levels of antibiotics at an earlier age secondary to agricultural antibiotics in food and city water. This increased exposure is causing more toxic gut issues in younger children.



Dopamine Excess

Dopamine is a powerful stimulating brain chemical. The brain's pleasure center, the nucleus accumbens, runs on dopamine, thus, dopamine deficiency can cause depression. However, excessive production of dopamine causes too much electrical stimulation throughout the brain and, hence, subsequent anxiety. In even more severe cases, bipolar disorder and schizoid symptoms can occur.

Dopamine is produced in the basal ganglia of the brain. Some patients inherit overactive basal ganglia and suffer an edgy type of anxiety as small children. They feel “like a deer in headlights” when asked to present their paper in front of the class—one of Dr. Sponaugle’s favorite diagnostic questions. A childhood filled with repeated emotional trauma can cause the basal ganglia to become overactive as well, producing too much dopamine and PTSD anxiety.

Dopamine naturally converts to norepinephrine, which then converts to epinephrine (pure adrenaline). These three brain chemicals are known as catecholamines. The enzyme dopamine hydroxylase converts dopamine into norepinephrine in absence of copper deficiency

and vitamin C deficiency. Copper deficiency can occur secondary to excessive zinc intake, or malabsorption of copper.

Intense emotional or physical stress can stimulate excessive norepinephrine production from the A5 nucleus brain factory. This prevents downstream conversion of dopamine into norepinephrine with resultant excessive dopamine activity in the brain.

Glutamate Excess

Glutamate is the most powerful of all the stimulating brain chemicals. Even a mild elevation in glutamate levels can cause tremendous anxiety. When the brain accumulates excessive fatty toxins, glutamate production increases to toxic levels. Excessive glutamate activity in the brain actually causes electrical destruction of brain neurons. This phenomenon is called ‘excitotoxicity’. Common causes are indoor mold toxins, bacterial toxins, Lyme disease toxins, yeast toxins and industrial organic solvent toxins.

Over 70,000 synthetic chemicals have been created since 1930 and the top 100 are known to be brain toxic.

Glutamate production surges within the brain when it is saturated with these fatty toxins. Subsequently, the toxic brain feels a continuous power surge.

The most common cause of excessive glutamate production in Dr. Sponaugle's practice is toxicity from indoor molds. Trichothecene, the noxious black mold toxin known to flourish in manmade environments, is now recognized as seriously toxic to the human brain.¹⁷ Sadly, most psychiatrists in America are unaware of the fact that mold toxins can cause severe elevation of glutamate levels that result in bipolar and even schizoid symptoms. Dr. Sponaugle has correlated these neurotransmitter and mold toxin levels in hundreds of patients. Additionally, the most overactive SPECT brain scans seen by Dr. Sponaugle belong to mold toxic patients. Many have succumbed to addiction in their desperate attempt to turn down their excessive brain voltage.

Norepinephrine and Epinephrine Excess

Norepinephrine is a powerful stimulating brain chemical that activates electrical energy in brain neurons. Intense emotional and physical stress results in excessive production of norepinephrine by the A5 nucleus, the brain factory that produces 90 percent of norepinephrine.

Epinephrine is pure adrenaline and it stimulates electrical energy in nerves throughout the brain and body. Fully 90 percent of epinephrine is made in the adrenal glands which sit on top of the kidneys. Intense emotional or physical stress results in the brain's pituitary gland overstimulating the adrenal glands, which then produce excessive levels of adrenaline causing anxiety.

Hyperthyroidism

Every cell in the human body depends on thyroid hormone to activate its mitochondria or energy factories. Thyroid hormone also enhances the ability of the catecholamines (dopamine, norepinephrine and epinephrine) to activate their respective receptors throughout the body and in the brain. When excessive levels of thyroid hormone are circulating through the brain, normal levels of dopamine, norepinephrine, and epinephrine produce excessive electrical activity and subsequent anxiety.

Magnesium Deficiency

When calcium enters the calcium channel of brain neurons, electrical current is produced. Magnesium competes with calcium at the calcium channel on the brain neurons. Magnesium reduces electrical activity in the brain by preventing calcium from entering the brain neuron, thereby decreasing electricity.

Statistically 68 to 80 percent of Americans suffer magnesium deficiency,¹⁸ much of which is caused by excessive Candida overgrowth in their gut. Excessive Candida causes taurine wasting by the kidneys. Taurine combines with magnesium forming a salt, magnesium taurate, and then the two are excreted together in the urine.

Potassium Deficiency

Potassium competes with sodium at the sodium channel on brain neurons thus preventing sodium molecules from entering the brain neurons. Sodium entry into the sodium channel produces electrical current. Potassium deficiency allows excessive sodium channel activity causing an overactive, over-electrified, anxious brain.



Inflammation

Caffeine also induces anxiety. When one drinks too much coffee, anxiety-like symptoms appear. Doctors will usually ask if a patient consumes caffeine when evaluating anxiety disorders. Caffeine-induced anxiety has been shown to increase the amount of kynurenine in healthy patients.¹⁹ Kynurenine is an amino acid produced from tryptophan and, when present at high levels, means that the body is converting tryptophan into kynurenine instead of serotonin. Excessive caffeine consumption causes serotonin deficiency and an OCD-type of anxiety.

High amounts of kynurenine are also seen in people who suffer excessive inflammation, which is present in people with anxiety.²⁰ Interestingly, inflammation in the mouth, as with periodontal disease, has also been associated with anxiety.²¹ Periodontal disease occurs when there is an excess of pathogenic bacteria in the mouth, the toxins from these bacteria can cause excessive glutamate production and subsequent anxiety. This is just one more example of how digestive function is connected to brain function.

Environmental Toxins

Pesticide and heavy metal exposure have been shown to induce anxiety behaviors.^{22,23} The neurotoxic effects of environmental toxins have been recognized for quite a while. With the exposure to thousands of toxins that people face daily, their cumulative effect is taking its toll. As these toxins build up and are stored in the body, health gradually declines. Anxiety is yet one more condition which may result from this toxic accumulation.

What Are the Signs and Symptoms?

There are many symptoms of anxiety, and they vary for each anxiety disorder. However, many of the symptoms overlap. Some of these include:

- Nervousness
- Panic
- Excessive worry
- Heart pounding
- Negative self-talk
- Mistaken beliefs
- Muscle tension
- Headaches



Caffeine may induce anxiety.

- Nausea
- Terror
- Insomnia
- Fear or phobia
- Avoidance behaviors
- Excessive shyness
- Nervous habits like nail biting
- Pessimism about the future

How Is It Diagnosed?

To effectively diagnose anxiety disorders, physicians must have a thorough understanding of neuroscience, including brain chemistry and brain physiology. Physicians must understand that a majority of biochemical imbalances in the brain are caused by issues in other parts of the body.

Physicians must be willing to spend adequate time with their patients in an effort to differentiate organic and

biological causes of anxiety disorders versus emotional and social/environmental causes.

Because of the historic lack of brain science, physicians and non-medical practitioners have automatically assumed that many anxiety disorders were caused by social and/or emotional issues. With the advent of brain imaging, brain science has exploded in the last 10 years. The exciting knowledge physicians can obtain from neuroscience publications gives them better ability to diagnose the true causation of anxiety disorders.

It has become more apparent with recent advances in neuroscience that physicians should first rule out neurobiological disorders as a cause of anxiety before assuming the patient's anxiety is "all in their head."

The presence of the patient's family is particularly important in evaluation and chronological correlation of events that can subsequently cause anxiety. In difficult cases, brain imaging may assist the diagnosis, especially if head trauma is suspected. Head trauma to the temporal lobes frequently causes panic and anxiety that occurs spontaneously and, seemingly, for no reason.

Proper diagnosis requires a thorough physical examination followed by an extensive evaluation of hormones and brain chemicals. The greatest advantage understanding brain function and physiology gives the diagnostician is the ability to ask the right questions of patients and their families. Patients will reveal the diagnosis if asked the right questions.

What Are the Standard Medical Treatments?

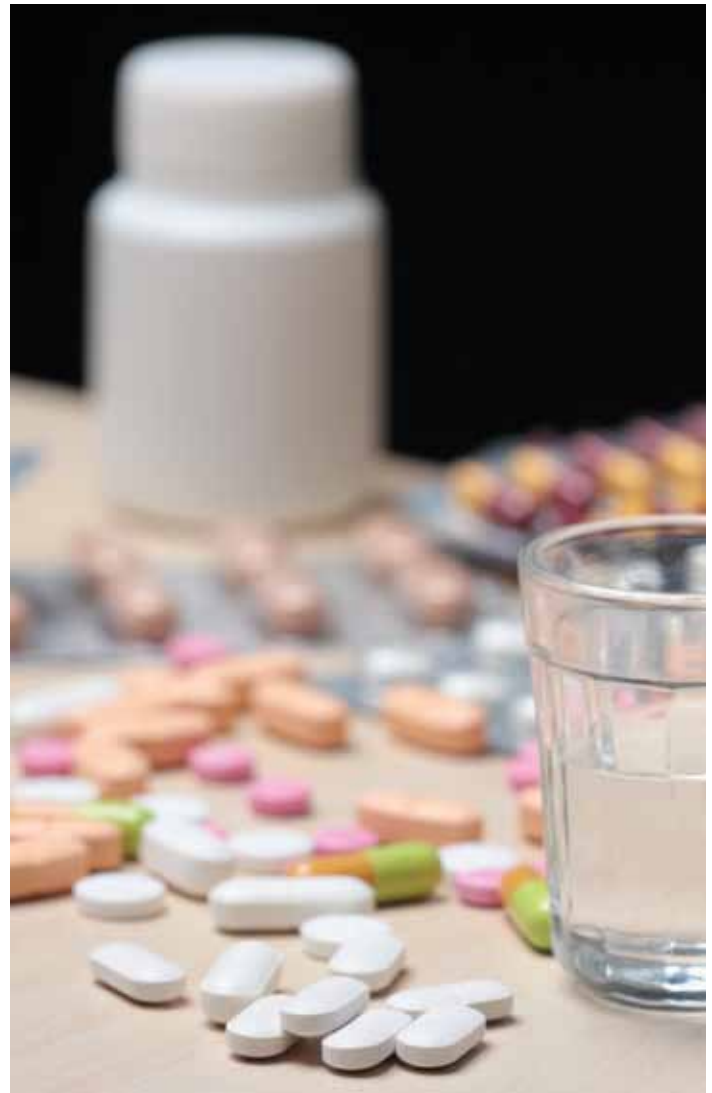
The primary medications prescribed for anxiety disorders are antidepressants, anti-anxiety drugs and beta blockers.²⁴

Antidepressants used include SSRIs (selective serotonin reuptake inhibitors), tricyclic antidepressants, and MAO inhibitors. Antidepressants are often used to treat panic attacks, social phobia and obsessive-compulsive disorder. SSRIs are the most prescribed of the antidepressants. These drugs come with unpleasant side effects, however, and have a paradoxical effect in some patients.²⁵ People will respond well to SSRIs if their serotonin levels are deficient, but since other neurotransmitters may be involved, SSRIs will not be effective for everyone.

Anti-anxiety drugs, or benzodiazepines, were traditionally used to treat anxiety, but due to their likelihood of becoming addictive, they are not usually the first option. These drugs work by activating the GABA receptor. When they are given, it is only for a short time period so as to avoid dependence and withdrawal symptoms.²⁶

Beta blockers are used for the physical symptoms of anxiety, but do not treat the internal symptoms. These medications are most useful for predicted anxiety-provoking situations like public speaking. Beta blockers can cause side effects that affect heart and lung function.

Psychotherapy, specifically cognitive behavioral therapy, has been shown to be very effective in treating anxiety disorders.²⁷ In cognitive behavioral therapy, the individual learns how to recognize and change thought patterns and behaviors that manifest as anxiety.²⁸





Additional Comments by Dr. Sponaugle

Obviously, the treatment for anxiety disorders should be chosen based on causation. In the past, psychiatrists, psychologists and mental health counselors automatically assumed that most anxiety disorders were derived from the patient's inability to cope with life's stressors, or were sequelae of negative emotional events.

Those physicians who choose to become more empowered in the field of brain science have much more expertise in differentiating the actual cause of anxiety and, subsequently, the appropriate treatment regimen. We have determined that there are myriad neurobiological causes of anxiety that can be effectively treated in patients who have coexisting anxiety derived from emotional pain. In fact, when we optimize the patient's brain function by correcting the neurobiological and biochemical causes of brain dysfunction, patients receive much more benefit from counseling and cognitive behavioral therapy.

Physical exercise should be a first line treatment for all anxiety disorders. Exercise releases multiple anti-anxiety chemicals including endorphins. Exercise pumps more blood into our brain, which increases the delivery of oxygen and nutrients needed to heal damaged brain cells. The increased cerebral blood flow derived from exercise also helps flush out or remove the many man-made brain toxins.

Our great grandmothers and grandfathers performed strenuous physical work outside in an abundance of sunshine and fresh air. They exercised 12 hours a day for survival. Today we sit behind a desk all day in a stuffy office, ridden with indoor toxins, unable to exercise until the end of the day when we are just too tired. On the way to that stuffy office, we play out the movie "Fast and Furious" while driving down an eight-lane highway, all the while developing stress-induced anxiety as we attempt not to get run over by the guy in the next lane. Why are we so astonished that the prevalence

of anxiety and subsequently addiction in America has tripled since 1980?

Treatment for situational anxiety derived from losing one's home or going through a divorce, as well as other anxieties derived from emotional distress such as PTSD (post traumatic stress disorder) should be treated with quality counseling, cognitive behavioral therapy, eye movement desensitization, yoga and potentially, hypnosis. Remember, these same patients also have many biochemical issues that exacerbate or amplify their anxiety symptoms. Therefore these patients also must receive a comprehensive treatment regimen designed to optimize brain chemistry and correct neurobiological disorders; the same program we use to correct anxiety disorders caused by imbalance of hormones, brain chemicals and gut dysfunction.

Gastrointestinal dysbiosis with intestinal permeability, or leaky gut syndrome, is the most common undiagnosed causes of anxiety disorders in Americans. Unfortunately, undisclosed antibiotic levels in our city water and food supply destroy the normal flora (good bacteria) in unsuspecting Americans. Therefore, accurate diagnosis and treatment of toxic gut syndrome will greatly ameliorate or completely eliminate anxiety in a majority of patients.

Fixing a toxic gut will correct serotonin deficiency, taurine deficiency, magnesium deficiency, potassium deficiency, histamine excess and sometimes the more rare GABA deficiency coupled with glutamate excess.

At Florida Detox and Wellness we begin fixing our patient's toxic gut syndromes with cleansing herbals and colonics to rid the gut's excessive accumulation of waste products. We have had great success with the Total Body Cleansing products. We follow gut cleansing with a Candida Cleanse—an herbal regimen that kills toxic Candida yeast and deleterious bacteria like Klebsiella. (See the Appendix for more information on cleansing.)

Because the gut uses the amino acid glutamine to heal the leaking intestinal lining, we prescribe a powdered supplement with L-glutamine, gamma oryzanol, marshmallow and ginger, all of which are natural ingredients that promote healing of intestinal cells. We place all patients on a daily regimen of quality probiotics—for life. America is now a country where the food and even the city water is laden with antibiotics. Therefore, ingesting daily probiotics is now a necessity in order to replace the healthy gut bacteria that are destroyed on a daily basis.

Serotonergic medications, such as Lexapro and Cymbalta, simply to displace serotonin molecules from inside the brain cell storage units out to the nerve synapse where the serotonin becomes active. Four years ago, I was one of the top five Lexapro prescribing doctors in Tampa Bay. This was before I stepped back from “Big Pharma” driven medicine, and more thoroughly studied the physiology and biochemistry involved in the manufacturing process and distribution of serotonin in our body and brain.

The problem with the serotonergic medications (SSRIs) is that they do not assist the patient in making more serotonin. Their utility in the treatment of a serotonin deficient brain treats only the symptoms of serotonin deficiency. This is temporarily effective until the serotonin storage units are emptied.

These medications never treat the true cause of serotonin deficiency which is usually the patient’s inability to convert tryptophan into 5-hydroxy tryptophan (5-HTP) in the small intestine. We utilize a pharmaceutical grade 5-HTP product that bypasses the gut step of serotonin production. In severe cases of serotonin deficiency, like Johnny, the NASCAR driver, (see his case study) we use intravenous 5-HTP.

We use a pharmaceutical grade magnesium taurate to correct magnesium and taurine deficiencies. Severely elevated histamine levels respond well to vitamin C, vitamin B6 and SAMe supplementation. In severe cases, we utilize intravenous vitamin C and glutathione to accelerate reduction of excessive histamine activity, and more aggressively remove brain toxins.

Lyme disease and mold toxicity are the two most common causes of excessive brain toxicity in my patients. We have diagnosed more than 60 cases of Lyme disease out of 600 addicted patients we treated last year. These patients had become addicted to OxyContin and Xanax attempting to treat the anxiety caused by the Lyme spirochete (bacterium).

The Lyme spirochete toxin causes serotonin deficiency, histamine excess and elevation of glutamate. Obviously, treatment for this type of anxiety requires killing the offending pathogenic bug and any other co-infections, as well as aggressive removal of toxins from the infected patient’s brain. Western antibiotics do not adequately kill the Lyme bacterium if the patient has been infected longer than one year. We utilize high-dose intravenous vitamin C and other herbals such as Andrographis to successfully kill late-stage Lyme disease.

Mold toxicity is endemic in the Southeastern United States and is under-diagnosed throughout America. Most American physicians are unaware that the toxins created by various indoor molds result in a tremendous elevation of the excitatory brain chemicals glutamate, phenylethylamine and histamine. Excessive activity of these stimulating brain chemicals causes severe anxiety, insomnia and even bipolar symptoms. Mold toxicity is a common cause of addiction as patients utilize Xanax-like drugs, OxyContin-like drugs or alcohol to quiet excessive electrical activity in their brains.

Treatment of anxiety derived from mold toxins includes oral and intravenous medications to remove mold toxins from the patient’s brain and body. Until all toxins can be removed, the excessive glutamate, PEA and histamine levels must be counteracted to decrease the brain’s electrical current to more normal levels. We utilize intravenous theanine and oral theanine to block glutamate activity at the NMDA receptor and N-acetylcysteine to facilitate increased production of glutathione, which accelerates toxin remove and glutamate metabolism.

PEA levels typically do not return to normal until the mold toxins are removed. Currently, we utilize Lyrica, temporarily, to block the excessive voltage derived from excessive PEA levels. Histamine reduction is achieved by reducing gut toxicity, healing leaky gut, and uncovering underlying food sensitivities.

Case Study with Dr. Sponaugle

Johnny is a NASCAR driver who came to Florida Detox last winter because he was fighting depression and underperforming on the race track. Just a few years earlier, Johnny was the guy up front, always pushing the limit - it came to him naturally. However lately, Johnny was struggling to keep his sponsors. He was simply trying not to be "the last guy around the track."

I had treated Johnny's mother in my anti-aging and brain wellness program. She was so happy with the results of her total brain-body optimization program, she suggested Johnny come to see me for help.

She and the rest of the family assumed that Johnny's depression and anxiety were caused by his diminished performance of late. Actually, it was a change in his brain chemistry that caused his poor performance!

Johnny had always been a happy-go-lucky guy who had the world by the tail. Over the last year, he began to experience depression and anxiety. Johnny no longer enjoyed racing around the track; a secret he was afraid to tell his girlfriend and parents.





I initially suspected that Johnny had developed depression from a head injury, specifically a temporal

lobe hit. When I inquired if he had recently crashed into the wall or flipped his race car, Johnny confirmed that he had cracked three helmets in the last couple of years.

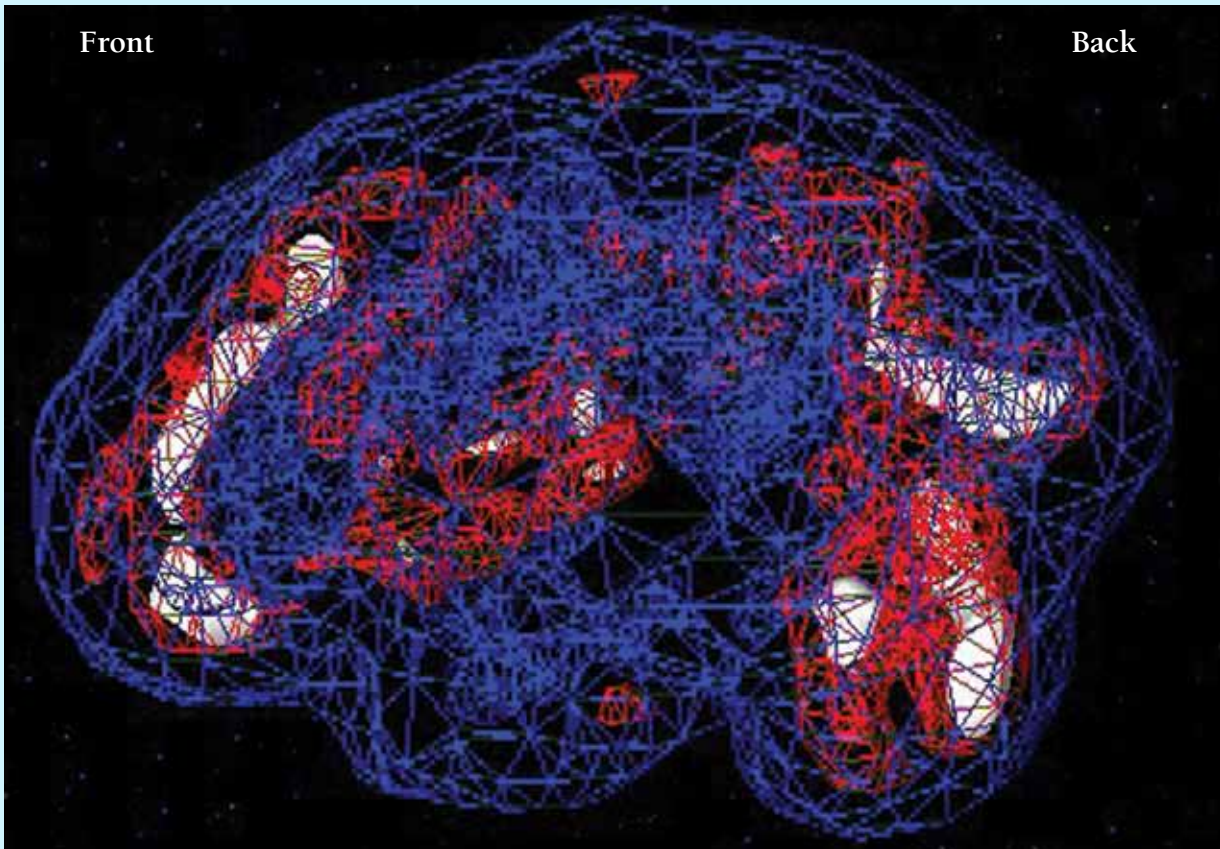
Upon evaluation of Johnny's brain scan, I was surprised to see very little evidence of trauma. I told him that angels must have cushioned the blows to his head! I was, however, puzzled to see the most overheated anterior cingulate gyrus in my five years of reading SPECT brain scans! In fact, my friend Dr. Daniel Amen called me to say Johnny had the hottest cingulate he had ever seen. Dr. Amen has read 57,000 brain scans.

This explained why Johnny could no longer "go for it," being unable to execute aggressive driving maneuvers. His severely overactive anterior cingulate was creating excessive worry. His brain profile had become the opposite needed for taking risks in a race car. Johnny's severe serotonin deficiency matched his SPECT scan, excessive activity in both his anterior cingulate and his deep limbic system.

I had seen Johnny's classic brain chemistry pattern in thousands of patients with gastrointestinal dysbiosis and intestinal permeability or leaky gut syndrome. My even greater concern was Johnny's elevated glutamate. I knew it meant he had an excessive accumulation of brain toxins.

Glutamate ^{RO} Report: 419350 Result: 64.1 Elevated 	Sample Time Optimal Range Day: 15-35 Night: 10-25 Reference Range 3.0 - 125.0 μMol/gCr
Serotonin ^{RO} Result: 35.5 Low 	Optimal Range Day: 125-175 Night: 100-175 Reference Range 15.0 - 335.0 μg/gCr
Taurine ^{RO} Result: 19.7 Low 	Optimal Range Day: 150-550 Night: 100-250 Reference Range 12.0 - 7,000.0 μMol/gCr
Histamine ^{RO} Result: 46.0 Elevated 	Optimal Range Day: 10-20 Night: 5-15 Reference Range 5.0 - 45.0 μg/gCr

Johnny's brain chemical analysis revealed a severe serotonin deficiency, one of the lowest serotonin levels I have seen in this practice. Johnny's serotonin level was 35.5, normal serotonin levels range from 200 – 400. Johnny also suffered excessive activity throughout his brain from deficiency of taurine and excessive histamine production.



On Johnny's brain scan, one can easily see his severely overactive anterior cingulate gyrus, the red and white hot curved region in the front of Johnny's brain. The scan demonstrates an overactive deep limbic system which is also derived from serotonin and taurine deficiency. There are generalized overactive (red) areas scattered throughout Johnny's scan representing excessive brain activity derived from elevated histamine and glutamate, both stimulating brain chemicals.

Approximately two years ago, a dermatologist began treating Johnny with repeated antibiotic prescriptions for a skin infection. When Johnny's doctor prescribed him continuous antibiotics, they destroyed the healthy bacteria in his gut. Toxins from pathogenic bacteria and toxic yeast shut down his gut serotonin factories causing his severely overactive worry center.

The rounds of antibiotics explained most of his issues - except his toxic glutamate level. Fortunately, Johnny's father decided to come down to Florida to "check me out." I learned the answer from him.

When I began asking questions about mold, jet fuel and brain toxins in general, Johnny's father mentioned that, for a while, they were having trouble with a leaking fuel line that passes through the race car above Johnny's head. Johnny had literally been breathing jet fuel!

Johnny tested positive for benzene, an organic solvent toxin. Those leaky fuel lines had caused excessive accumulation of brain toxins, as evidenced by the excess glutamate on Johnny's brain chemistry profile and

his globally overactive brain scan. This elevation of glutamate added to the gut toxins had essentially hot-wired Johnny's brain.

When Johnny's anterior cingulate gyrus overheated, he began to second guess every dangerous maneuver on the track. Johnny could no longer consider passing another driver on the outside of a turn with the wall staring him in the face. In Johnny's case, because of his lucrative career, a toxic gut and jet fuel toxins could have cost him millions of dollars.

Within four days of aggressive intravenous and oral treatment, Johnny was no longer depressed, and his anxiety level had decreased by 80 percent. Within two weeks, Johnny had no anxiety or depression. He was ready for Daytona. My intravenous detoxification treatment works much faster than oral regimens in restoring balance of brain chemistry and removing toxins. However, it is Brenda Watson's regimen for gut cleansing, detoxification and healing that ultimately corrected a major cause of Johnny's depression and anxiety.

Case Study with Dr. Sponaugle

Sara is a 26-year-old from St. Louis who presented to Florida Detox with a diagnosis of refractory depression and panic disorder. She had been treated by psychiatrists from multiple university medical centers over the last 10 years, yet her depression and panic/anxiety became more severe each year. Even shock therapy (three times weekly!) failed to decrease her suicidal thoughts.

Refractory depression is a term used by psychiatrists when a patient's depression is unresponsive to their treatment regimen. Sara's treatment regimen over many years had consisted of myriad serotonin enhancing SSRI, bipolar and anti-psychotic medications.

During my first visit with Sara, I immediately recognized her impressive red flush and asked her if she had been prescribed multiple doses of antibiotics. She replied, "Oh my gosh, how did you know that?" I explained that her dramatic red flush was caused by excessive levels of circulating histamine, and that I suspected she had developed a leaky gut syndrome from multiple antibiotic prescriptions.

Sara's medical history subsequently revealed that she had received more than 30 antibiotic prescriptions



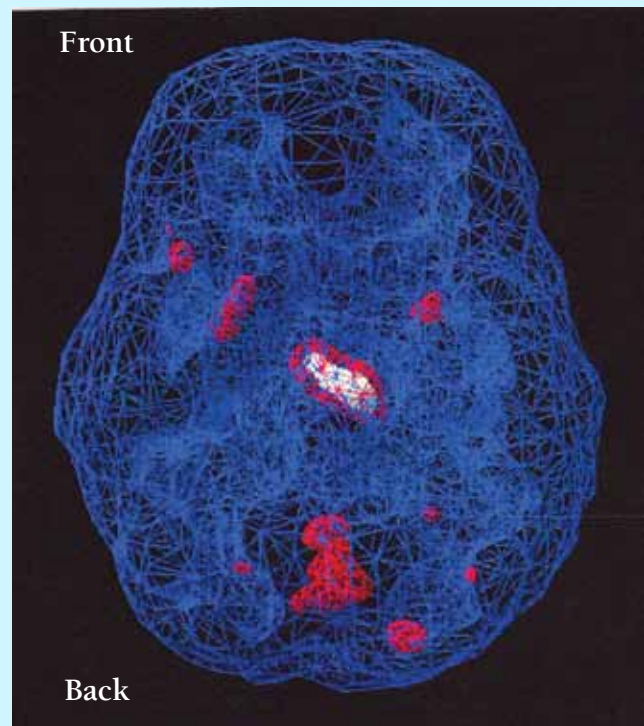
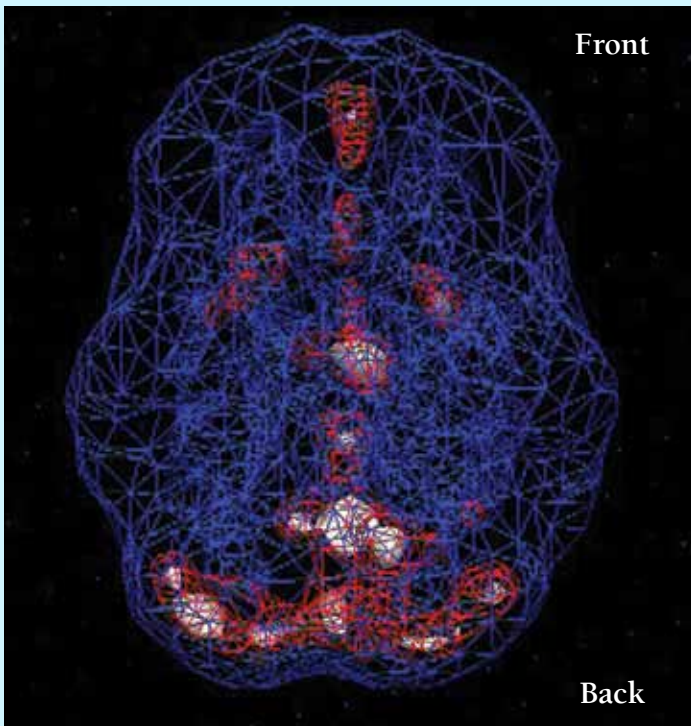
Not actual patient

during her childhood for recurrent strep throat, and ear infections. Her first suicide attempt was at age 16.

By age 17, Sara began experiencing chronic urinary tract infections, which meant additional antibiotics. By age 23, Sara had developed severe panic disorder in addition to suicidal depression. She had been through several Baker Act proceedings for her repeated suicidal attempts, and could not be left alone for more than a few minutes at the time we met.

<p>Serotonin ^{RO}</p> <p>Result: 54.1 Low</p>	<p>Optimal Range: Day: 125-175, Night: 100-175</p> <p>Reference Range: 15.0 - 335.0</p> <p>Unit: $\mu\text{g/gCr}$</p>
<p>Taurine ^{RO}</p> <p>Result: 28.1 Low</p>	<p>Optimal Range: Day: 150-550, Night: 100-250</p> <p>Reference Range: 12.0 - 7,000.0</p> <p>Unit: $\mu\text{Mol/gCr}$</p>
<p>Histamine ^{RO}</p> <p>Result: 41.7 Elevated</p>	<p>Optimal Range: Day: 10-20, Night: 5-15</p> <p>Reference Range: 5.0 - 45.0</p> <p>Unit: $\mu\text{g/gCr}$</p>

Sara's neurotransmitter analysis revealed a common pattern for a toxic gut overgrown with yeast. She had severe deficiencies of serotonin and taurine, two calming brain chemicals. When we see low taurine, we recognize that *Candida* overgrowth is causing increased beta alanine which prevents kidney reabsorption of taurine. Sadly, this relaxing brain chemical is wasted in the urine, dragging with it two other relaxing chemicals—magnesium and potassium. Sara also demonstrated excessive levels of histamine, a stimulating brain chemical very commonly noted in conjunction with leaky gut.



On the left is a normal cerebellum; on the right, a cerebellum attacked by anti-gliadin antibodies due to gluten sensitivity.

Neurological testing at a prestigious Boston medical center had recently revealed that Sara had some loss of fine motor function, but the university neurologist could not explain the cause. To differentiate damage to the basal ganglia versus the cerebellum, I asked Sara to reach out and touch my hand with her finger. She had an intentional tremor, which meant it was a cerebellum problem.

I asked Sara's mother if Sara bumped in to her when they walked through the mall. Sara's mother said, "Oh my, she does that constantly. She's always stepping on my feet."

Sara had already developed significant damage to her cerebellum at the young age of 26 and I suspected it was because she had developed antibodies to her cerebellum from her antibiotic-induced leaky gut syndrome. Further testing revealed anti-gliadin antibodies and SPECT imaging revealed a severely underactive cerebellum. (See scans above.)

Before industrialized "advances," the structure of gluten in wheat was very different than the bioengineered

wheat of today. The gliadin molecule that comes out of today's wheat actually looks like the purkinje cell in the cerebellum. The cerebellum is the area in the brain that controls movement and balance. As Sara passed gliadin into her bloodstream, as a result of her leaky gut, her immune system properly created antibodies to gliadin. Unfortunately, Sara now had antibodies to her own cerebellum, resulting in destruction of cerebellar tissue and her symptoms of dyscoordination.

Successful treatment for Sara began with detoxification of her gut and balancing of her brain chemistry. Using Brenda Watson's intestinal products to detoxify and heal her leaky gut, and my protocol for a biochemical makeover that optimizes over 65 brain chemicals, hormones, nutritional deficiencies and immune co-factors. Sara is now rediscovering a happy life. She no longer suffers depression or panic disorder. Over time, as Sara's gut heals, we are looking for her coordination to return. With a joyful heart, I can now relate that Sarah has picked her wedding date and has returned to her previous work as a florist.



Brenda's Bottom Line

I first came to Dr. Sponaugle on referral from a friend of mine who knew that Dr. Sponaugle was very knowledgeable about female hormones. Over time we developed a great symbiotic relationship, each of us able to learn from the other. He was able to help me balance my hormones and understand more about how the brain interacted with different areas of the body. And I was able to show him how the digestive system was yet another area of the body that should be addressed when dealing with the conditions that he treated.

“It can take some time and investigation to get to the bottom of your health condition, but if you start at the base—healthy digestion—then you have a strong foundation from which to build your health.”

Later, when I developed pain and inflammation in my hands, I went to another doctor who told me that it was arthritis, and that I was just getting old. On my own, I discovered that I had a gluten sensitivity, so I began a strict gluten-free diet to help minimize the inflammation in my system. At this time, Dr. Sponaugle suggested digging deeper (something that he is great at), and looking at my immune system. He ran some tests, and, as it turned out, I had Lyme disease. No other doctor would have connected the dots as Dr. Sponaugle did and found this underlying condition.

At the time, my hormones and gut also became unbalanced. Dr. Sponaugle worked with me to rebalance the hormones and treat the Lyme disease using natural methods like IV vitamin C. I worked on rebalancing my gut and maintaining a gluten-free diet. Now, the pain and inflammation is gone.

The take home message is that it can take some time and investigation to get to the bottom of your health condition, but if you start at the base—healthy digestion—then you have a strong foundation from which to build your health. The following recommendations will help you take back your health.

Recommended Testing

- Food sensitivity test (See the Appendix.)
- Neurotransmitter profile (See the Appendix.)
- Hormone testing

Diet

- Follow the Fiber 35 Eating Plan found in the Appendix of this book.
- Include plenty of fruits and vegetables, whole grains, nuts, fish and poultry in the diet to help prevent anxiety.
- Reduce consumption of saturated fat and eliminate trans fats from the diet.
- Avoid caffeine, which can be over-stimulating.

Lifestyle

- Regular physical activity can help to alleviate anxiety.
- If overweight, lose weight, especially if abdominal fat is present.
- Reduce toxin exposure.
- Avoid tobacco and alcohol, which can be detrimental to brain function.

Complementary Mind/Body Therapies

- Stress reduction therapies such as yoga, biofeedback, massage, and meditation can be helpful to relieve stress.
- Acupuncture may be helpful for people with anxiety.
- Colon hydrotherapy is beneficial to remove toxins.

Recommended Nutraceuticals	Dosage	Benefit	Comments
Critical Phase For treatment contact Florida Detox and Wellness. (See the Appendix.)			
Probiotics	200 billion culture count daily for two weeks	Protects the intestinal lining, binds toxins, helps improve immune and digestive function and reduce inflammation.	Look for high amounts of bifidobacteria, the main bacteria in the colon.
Calm Formula	Use as directed	Improves feelings of calmness.	Should include ingredients like GABA, L-theanine, valerian, lemon balm, magnesium.
Steps of Cleansing	See Appendix	Helps support the body's seven channels of elimination, eliminates microbial invaders and provides targeted detoxification.	Look for high-quality cleansing and detox formulas.
Helpful			
Multivitamin/mineral Formula	High potency	Vitamins and minerals support brain function.	Be sure vitamins are in their natural forms.
Daily Maintenance			
Probiotics	50 billion culture count daily after critical phase	Protects the intestinal lining, binds toxins, helps improve immune and digestive function and reduce inflammation.	Look for high amounts of bifidobacteria, the main bacteria in the colon.
Omega-3 Fatty Acids	At least 2 grams daily	Helps support healthy brain function.	Get a concentrated, enteric coated, high dose EPA/DHA formulation.
Fiber	4-5 grams twice daily	Helps produce healthy bacteria levels and good bowel elimination.	Use in conjunction with a high-fiber diet to obtain 35 grams of fiber daily.
Digestive Enzymes	1-2 capsules with meals	Helpful to fully digest foods and absorb nutrients important for brain function.	If low stomach acid is found, find a formula that contains hydrochloric acid.
Vitamin D₃	At least 1,000 to 2,000 iu daily	Helps heal leaky gut, decrease inflammation, increase overall health.	Research is showing many health conditions are associated with low vitamin D levels.

See further explanation of supplements in the Appendix

DEPRESSION

Written by Marvin "Rick" Sponaugle, M.D.

What Is It?

The American Psychiatric Association has created a text called the Diagnostic and Statistical Manual of Mental Disorders (DSM IV) in their attempt to define and classify depressive disorders. Many psychiatrists and addiction specialists who specialize in psychological disorders do not agree with all of the definitions or classifications in the DSM IV, however.

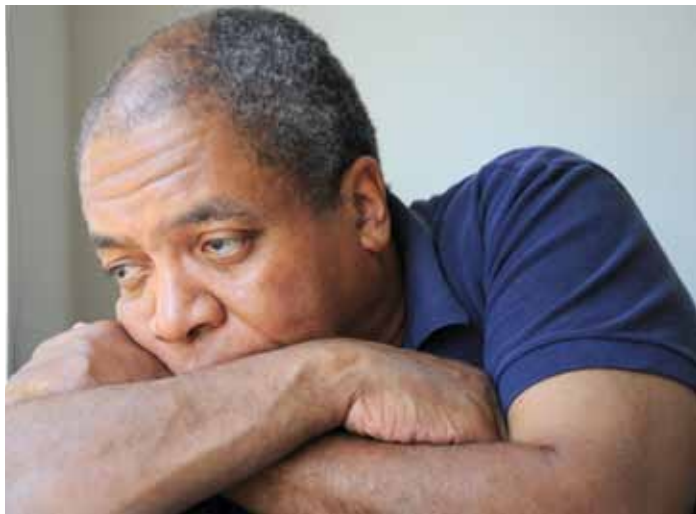
As stated in the DSM IV, depression is defined as persistent sadness, which lasts two or more weeks and interferes with daily life and normal functioning. Major depressive disorder is the technical term for this type of depression, which is diagnosed by the following specific criteria.¹

- Depressed mood (irritable mood in children and adolescents) most of the day, nearly every day, as indicated by either subjective account or observation by others
- Markedly diminished interest or pleasure in all, or almost all, activities most of the day, nearly every day
- Significant weight loss or weight gain when not dieting, or decrease or increase in appetite nearly every day (in children, consider failure to make expected weight gains)
- Insomnia or excessive sleep nearly every day
- Psychomotor agitation or retardation nearly every day
- Fatigue or loss of energy nearly every day
- Feelings of worthlessness or excessive or inappropriate guilt nearly every day
- Diminished ability to think or concentrate, or indecisiveness, nearly every day



Did You Know

Studies demonstrate that major depression affects approximately eight percent of men and 15 percent of women in America.² For more than 75 percent of these people, depression is a recurrent, lifelong illness. The prevalence of depressive disorders is increasing exponentially. Depression is expected to become the second leading cause of worldwide disability by the year 2020.³



- Recurrent thoughts of death, recurrent suicidal ideation without a specific plan, a suicide attempt, or a specific plan for committing suicide

The DSM IV lists two major types of depression—melancholic depression and atypical depression. Recent advances in neuroscience, including the utility of brain imaging, provide a more accurate explanation of the brain physiology involved in specific brain regions that are causative for each of these two types of depression.

Melancholic Depression

At Florida Detox and Wellness, the symptoms of melancholic depression have been correlated with both SPECT (single photon emission computed tomography) brain imaging and brain chemistry (neurotransmitter) testing. The neurotransmitter testing of patients with melancholic depression consistently reveals the significant deficiencies of two calming brain chemicals – serotonin and taurine. A less frequently found cause of melancholic depression is GABA deficiency (another calming brain chemical) with coexisting glutamate excess (a stimulating brain chemical).

SPECT brain scans in patients with melancholic depression performed by Dr. Daniel Amen (www.amenclinics.com) for Florida Detox demonstrate the same findings as university PET (positron emission tomography) scans—an overactive

deep limbic system, the brain's emotional center. Looking at the underlying brain chemistry with neurotransmitter testing allows better explanation of what chemical aberration produces the abnormal brain scan seen in these depressed individuals.

The deep limbic system is saturated with GABA neurons, named for the potent calming brain chemical GABA that activates them. The brain chemicals serotonin and taurine are also considered calming because they enhance the ability of GABA to activate GABA brain receptors. Calming in the brain means decreased electrical stimulation—turning down the voltage. It is important for the GABA nerves in the emotional center to be activated in order to feel emotionally calm and peaceful. With serotonin and taurine deficiency and subsequent decreased GABA activity, the deep limbic system becomes over-electrified and, subsequently, a person commonly experiences symptoms of depression.

Serotonin also inhibits the activity of two stimulating brain chemicals, dopamine and histamine. Both dopamine and histamine activate the same dopamine receptors in the brain. They turn up the voltage in the brain overall. With substantial serotonin activity, the brain experiences over-stimulation. With knowledge of brain physiology, it is possible to understand yet another mechanism by which serotonin deficiency can result in an overactive deep limbic system and symptoms of depression.

Atypical Depression

At Dr. Sponaugle's clinic, a large number of patients suffering with symptoms of atypical depression have been treated for addiction. After asking many questions of patients addicted to dopamine-enhancing drugs like cocaine and opiate pain medication, Dr. Sponaugle uncovered the real cause of their addiction.

The majority of these patients suffer from an inherited brain disorder called reward deficiency syndrome (RDS). Since 1990, researchers led by Dr. Kenneth Blum have been gathering data to explain RDS.⁴ Today, it is known that their underactive pleasure center is derived from a particular gene—the DRD2 A1 gene. This gene produces a deficiency of dopamine D2 receptors, the so-called “happy receptors” in the brain's pleasure center. Known

as the nucleus accumbens, the brain's reward center is housed inside the midbrain region called the mesolimbic dopamine system.

The reward circuitry in this region of the brain controls a person's ability to experience pleasure and enjoy good things. When dopamine activates the specific D2 receptor in the brain, pleasure is experienced. Patients with RDS experience less activity in their brain's pleasure center than normal people, even when they produce normal levels of dopamine. Many of these patients are prescribed serotonin enhancing medications (SSRIs), which actually exacerbate their depression. Unknowing psychiatrists frequently misdiagnose these patients.

Seasonal Affective Disorder (SAD)

This syndrome is a seasonal variant of depression that is derived from abnormally low dopamine activity in the nucleus accumbens, or pleasure center of the brain. This depression experienced by patients in northern latitudes during the winter months occurs when their exposure to sunshine is markedly decreased.



Nerve synapse: the space between two nerves

What Causes It?

Melancholic Depression

Gut Imbalance/Candida Overgrowth

Since the widespread use of penicillin began about 65 years ago, antibiotics have been added to poultry and cattle feed. Antibiotics are ingested through poultry, milk, and, increasingly, in city water which is not filtered for antibiotics that enter the waterways. Antibiotic levels found in food and water have reached the critical threshold necessary to slowly destroy the normal flora or healthy bacteria inside the intestine.

Destruction of the healthy bacteria in the intestine allows excessive overgrowth of toxic Candida yeast and toxic bacteria.⁵ These pathogenic bugs create toxins that disable the brain's pituitary gland⁶ shutting down production of healthy levels of the natural antidepressant hormones estradiol, testosterone and DHEA. Clinical research at Florida Detox and Wellness reveals that patients presenting with biomarkers of Candida overgrowth frequently suffer a serotonin deficiency that can be ameliorated through supplementation with 5-HTP, suggesting toxic disruption of the initial step of tryptophan conversion in the small intestine. The same intestinal overgrowth of toxic Candida yeast causes deficiency of the brain chemical taurine in people with melancholic depression.

Inflammation

The innate immune system is involved in the process of inflammation by producing many different molecules



Did You Know

"Understanding there does not need to be an infection in the gastrointestinal tract, merely a loss of microbial balance or an ongoing stressful experience, to keep releasing depression-inducing chemicals to the brain suggests that correcting this or harnessing the gastrointestinal tract's immune system may lend itself to a treatment for immune induced depressive behaviour."

-Michael Ash BSc DO ND Dip ION The Stressed Gut The Depressed Brain [axis]



Deep limbic system

called cytokines, some of which are pro-inflammatory and others anti-inflammatory. Pro-inflammatory cytokines induce depression by their impact on three different systems: the 5-HT system, which produces serotonin; the noradrenergic system, which produces epinephrine (adrenaline) and norepinephrine; and the HPA system, which produces cortisol, the stress hormone.⁷ In the 5-HT system, inflammatory cytokines deplete tryptophan, the primary precursor to serotonin. This means that when inflammation is present, tryptophan is depleted and serotonin is not produced.

Where does this inflammatory immune response begin? Quite often, in the gut. The gastrointestinal tract is where much immune activation begins. The GI tract encounters far more foreign invaders on a daily basis than the internal (systemic) immune system encounters in an entire lifetime.⁸ This is a vital function of the GI tract and plays a role in the gut-brain connection. The body transfers immunological information from the GI tract to the brain via the vagal nerve, a large nerve that extends from the brain to the intestines,⁹ as well as via the bloodstream. So the health of the gut is essential in regulating immune response and, thus, depression.

One trigger of these pro-inflammatory cytokines in the gut comes from lipopolysaccharides (bacterial endotoxins) that are produced by pathogenic bacteria.^{10,11} The gut inflammation that ensues creates increased intestinal permeability, or leaky gut, which allows the endotoxins, as well as other dietary and environmental toxins, to pass through the gut wall and into the bloodstream triggering further inflammation that can travel anywhere in the body. In depression, the inflammation manifests in the brain.¹²

Nutrient Deficiency

Other acquired causes of serotonin deficiency derived from the gut include malabsorption and subsequent deficiency of vitamin D, vitamin B6, vitamin C and magnesium. Magnesium is a necessary cofactor for the chemical conversion of tryptophan to 5-HTP in the small intestine. Vitamins D, C, and B6 are necessary cofactors for the brain conversion of 5-HTP into serotonin. Any of these deficiencies can result in melancholic depression.

Environmental Toxins

Brain toxicity derived from exposure to industrial solvents like toluene in paint thinners¹³ and volatile organic solvents such as benzene in gasoline, diesel fuel, and other industrial chemicals¹⁴ also disable brain serotonin factories, which leads to melancholic depression.

Prenatal exposure to the toxin bisphenol A (BPA) has been shown to increase depression-like behavior.¹⁵ BPA is found in the lining of food cans and in most hard plastics. It is a known hormone disruptor and should be avoided when possible.

Hormonal Imbalance

In the female brain, the serotonin receptors do not effectively receive serotonin when blood estradiol (a form of estrogen) levels fall below 60 to 80 pg/dL.¹⁶ Female patients with normal serotonin levels but low estradiol levels frequently suffer melancholic depression. Postpartum depression occurs in over 30 percent of females when the ovaries temporarily stop producing strong levels of estradiol. This is the reason the symptoms of postpartum depression mimic the symptoms of melancholic depression.

Interestingly, the premenstrual period, usually 4 to 5 days before menses begins, correlates with the lowest estradiol output in the monthly cycle. Many women have insufficient estradiol during this time period inhibiting the ability of serotonin to work effectively. This is why premenstrual psychological symptoms mimic many of the symptoms of melancholic depression.

Similarly, postmenopausal women are also found to have decreased serotonin activity as a result of the estradiol depletion that occurs after menopause.¹⁷

Emotional Experiences

Other non-biochemical causes of melancholic depression include a lack of parental nurturing during childhood, and repeated disappointments or continuous failures and



negative experiences in adulthood. The deep limbic system stores the emotional component of memories. When the majority of memories are bad, the limbic system sets a more negative tone that is then reflected in personality.

Dr. Daniel Amen has performed SPECT brain imaging of the limbic system in patients before and after they were asked to focus on either negative or positive aspects of their life. Directing their focus to positive aspects was recognized on the brain scan as being calming to the deep limbic system—and the patient reported being happier. Directing their focus to the negative aspects clearly revealed over-activity of the deep limbic system—and the patient reported feeling more depressed. This illustrates the power of thought, which can be utilized in treatment protocols.

Atypical Depression

Gut Imbalance/Candida Overgrowth

A common cause of atypical depression, which is rarely diagnosed by the average psychiatrist, is the accumulation of microbial toxins—most commonly *Klebsiella* bacterial toxins, *Candida* mycotoxins produced from *Candida* overgrowth, mold toxins derived from water damage inside the home, and toxins produced by the bacteria that causes Lyme disease. These toxins disable the brain's pituitary gland shutting down the production of natural antidepressant hormones and disrupting normal transmission between brain cells.¹⁸

Microbial toxins readily accumulate in the brain, which is approximately 65 percent fat, mostly made up of the beneficial omega-3 and omega-6 fatty acids. The microbial toxins are also fatty acids, and readily displace the good fats from brain tissue. This inhibits the ability of dopamine to attach to its D2 receptor decreasing D2 dopamine activity in the pleasure center.

Accumulation of toxins in the brain also causes atypical depression because the toxins disable the production of norepinephrine in the A5 nucleus. Depletion of norepinephrine triggers the conversion of dopamine into norepinephrine, thus depleting dopamine with resultant decrease in D2 “happy receptor” activity. If this cycle continues, both dopamine and norepinephrine



The gut-brain connection has now been scientifically established.

become depleted. Deficiency of norepinephrine causes lethargy, chronic fatigue and decreased focus, all common symptoms of atypical depression and all associated with gut imbalance and excessive accumulation of brain toxins.

Hormonal Imbalance

Gut imbalance, with resulting production of microbial toxins, also greatly affects hormonal balance. Many different aspects of hormonal imbalance can lead to atypical depression. Yeast mycotoxins and bacterial endotoxins derived from a dysfunctional gut, contribute to the development of thyroid dysfunction (hypothyroidism) by suppressing the output of thyroid-stimulating hormone from the pituitary gland in the brain. Deficiency of thyroid hormone causes decreased dopamine activity in the pleasure center, because dopamine receptivity is dependent on thyroid for activation.

Yeast mycotoxins and bacterial endotoxins also suppress the pituitary output of the hormone FSH which stimulates the ovaries to produce estradiol, a form of estrogen.

In women, estradiol improves dopamine function by both enhancing the conversion of tyrosine into dopamine and also preventing the breakdown of dopamine by inhibiting the enzyme monoamine oxidase (MAO). When estradiol is low, dopamine levels will fall and the pleasure center undergoes decreased activation.

Gut toxins also suppress the pituitary output of growth hormone and melanocyte stimulating hormone (MSH) deficiencies of which cause depression. These same toxins suppress pituitary output of the hormone ACTH (adrenocorticotrophic hormone). Without proper levels of ACTH, the adrenal glands become underactive with resultant deficiency of cortisol, DHEA and epinephrine (pure adrenaline), all factors associated with depression. DHEA and MSH are also necessary for production of endorphins, our natural opiates. Endorphins stimulate the release of dopamine in the brain's pleasure center.

Optimizing hormonal function, as well as gut function, is important when treating patients with depression.

Nutrient Deficiency

Nutrient deficiency, which may develop from poor diet and many different digestive issues, can lead to the development of depression. One way in which this occurs is by affecting thyroid hormone function, which, as described previously, can lead to decreased dopamine activity and, thus, atypical depression.

The majority of thyroid hormone in the body is converted from the inactive T4 form to the active T3 form. It has recently been determined that T3 makes the D2 dopamine receptor more sensitive to dopamine.¹⁹ The process of T3 conversion to T4 is dependent on many different nutrients, most notably vitamin D, vitamin B6, magnesium, iron and selenium. If these nutrients are deficient, this important conversion cannot take place, thus, dopamine activity in the pleasure center will be compromised.

In addition, deficiencies in vitamin D, B6 and iron result in decreased dopamine production because they are needed for the conversion of the amino acid tyrosine (derived from protein in the diet) into dopamine. Vitamin D is also necessary for the production of estradiol, the importance of which was previously mentioned. Additionally, vitamin

D is necessary for the production of natural opiates called endorphins. Endorphins stimulate the release of dopamine in the pleasure center.

Heavy Metal Toxins

Heavy metal exposure may contribute to the development of atypical depression. The heavy metals arsenic and mercury also indirectly decrease dopamine D2 activity because they interfere with the normal function of selenium, a necessary nutrient for conversion of inactive T4 to active T3 thyroid hormone.

Gluten Sensitivity

Gluten sensitivity is another factor that should be considered with depression. Gluteomorphins or gliadorphins, opiate-like peptides, produced from the improper digestion of wheat gluten in the gut, enter the blood stream (through a leaky gut) and travel throughout the body ultimately reaching the brain.²⁰ Neurological



Gluten sensitivity can contribute to depression.



disorders or findings have been found in up to 51 percent of patients with celiac disease, the most severe form of gluten sensitivity.²¹ Depression and anxiety were both found to be common features among those with celiac disease.²² Additionally, adherence to a gluten-free diet was found to improve depressive symptoms in celiac patients.²³ This is yet another example of the gut-brain connection. (See the Gluten Sensitivity section for more information on this widespread condition.)

Genetic Predisposition

As previously discussed, some people inherit the DRD2 A1 gene that produces a decreased number of D2 receptors in the pleasure center as compared to normal individuals. These people experience atypical depression.

Another inherited gene that may increase the likelihood that a person develops atypical depression involves the production of an over-active COMT enzyme, the enzyme

responsible for breaking down dopamine at the nerve synapse (the space between two neurons in the brain). When this enzyme is overactive, dopamine is broken down before it can activate the dopamine D2 receptor in the pleasure center. Other inherited genes involved cause excessive production of the MAO enzyme. MAO breaks down dopamine inside brain cells; excessive MAO causes dopamine deficiency.

Vitamin D Deficiency

Seasonal affective disorder experienced by patients in northern latitudes during the winter months occurs when their exposure to sunshine is markedly decreased. Natural sunshine converts cholesterol in the skin to vitamin D, which enhances the conversion of tyrosine into dopamine, and, therefore, dopamine production is reduced when there is less sunshine-induced vitamin D production.

What Are the Signs and Symptoms?

Melancholic Depression

Symptoms of melancholic depression are described in the psychiatric community as:^{24,25}

- Lost reactivity to events
- Dread about the future
- Decrease in appetite
- Anxiety
- Insomnia
- Weight loss
- Excessive guilt
- Worsening of depression in the morning

Patients with melancholic depression at Florida Detox and Wellness clearly describe an inability to enjoy recreational or other activities that once brought them pleasure. Patients also develop moodiness. They become more irritable and more easily agitated. They constantly fight feelings of hopelessness and excessive guilt. They suffer from chronic low self-esteem coupled with low motivation which leaves them feeling overwhelmed as they approach the tasks and expectations of each day.

Patients with melancholic depression slowly become more isolated. Patients who previously enjoyed socializing and were considered social butterflies develop an adversity

to social situations. They become more awkward as their overactive emotional center (deep limbic region of the brain) makes them more sensitive and more easily offended by things other people say. They often mistake positive comments made by others as negative or even an outright insult.

In the most severe cases, patients develop social anxiety resulting in lifestyle changes. They begin choosing quiet weekends at home instead of socializing with their friends and families. Due to the fact that this change is insidious, they initially assume they are simply becoming more mature. However, as the depression worsens, they have difficulty making it through their workday which requires them to interact with the other employees. They fake a smile at work, only to come home and hide out in their bedroom.

Atypical Depression

While it is difficult to work within the arbitrary constraints of the DSM IV manual, the symptoms as described for atypical depression are as follows:

- Fatigue
- Lethargy
- Excessive sleep
- Disconnectedness
- Emotional response to events
- Social avoidance
- Sensitivity to rejection
- Increase in appetite
- Weight gain
- Worsening of depression at night

These symptoms are, for the most part, caused by an underactive reward or pleasure center. These individuals are unable to feel the so called “dopamine hit” in their pleasure center that most people experience when they hug a five-month old baby or a wriggly puppy. They often admit, behind closed doors, that when growing up, they just didn’t get as excited as their sisters or brothers when they got a new bicycle.

They will remember how excited classmates became at their high school graduation. They wanted to feel it too,

but they just couldn’t. They threw their cap with the others, pretending to be just as excited as their friends. These patients will sometimes work diligently to hide their underlying sadness. Their depression does not have the symptoms of melancholic depression which are derived from an overactive limbic system, unless they also suffer serotonin deficiency.

These patients may appear to be “just a quart low” on happiness and not outwardly depressed. They frequently lack motivation because motivation is somewhat dependent on dopamine activity in the reward center. They often appear lethargic and fatigued. They frequently have great difficulty getting out of bed in the morning. Their mothers will remember waking them three or four times in the morning, and that getting them to school on time was a struggle.

How Is It Diagnosed?

Depression is traditionally diagnosed according to the DSM IV criteria as described in the “What is It?” section. Further breakdown of the type of depression is determined according to the more specific symptoms as described in the previous section.



Did You Know

There is some controversy over the financial ties of the reviewers of the Diagnostic and Statistical Manual of Mental Disorders (DSM) to the pharmaceutical industry. The DSM is currently being reviewed and updated, the fifth edition expected to be released in 2012. This is the first time that the American Psychiatric Association has required that all financial contributions from pharmaceutical companies to all members reviewing the DSM be reported. It turns out that about 68 percent of these members receive funding from the drug industry.²⁶ And, of these, four out of five members have financial ties that include holding company stock, serving as consultants or serving on company boards of drug companies. The implications of this are clear. More people will be diagnosed with psychiatric disorders that fit the symptoms that major drug classes treat.

Progressive doctors, like Dr. Sponaugle, use further diagnostic tests which look at what is actually going on biochemically in the body. Since what happens in the mind often reflects what is occurring in the body, these tests can provide insight into what may be triggering or worsening depressive episodes. Some tests that may be used include:

- Adrenal stress test
- Neurotransmitter metabolite test
- Amino acid profile
- High sensitivity C-reactive protein (hs-CRP)
- Celiac profile
- Hormonal testing
- Comprehensive stool analysis (CSA)
- Essential fatty acid red blood count (EFA RBC)
- SPECT scan

Dr. Sponaugle prefers to diagnose brain disorders based on which brain regions are underactive and overactive, and what brain chemical imbalance is causing the symptom.

Dr. Sponaugle feels the DSM IV places too much emphasis on symptom-based arbitrary labels.

SPECT (single photon-emission computed tomography) scans or PET (positron-emission tomography) scans may be used to determine the activity levels of different regions of the brain. In depression, SPECT scans show an increase in activity in the deep limbic area of the brain.²⁷ The deep limbic system can be seen as the filter through which one views life.²⁸ When this brain region becomes overactive, its filter shades events as negative. The deep limbic system also affects motivation and drive, bonding, and social connectedness, all symptoms of melancholic depression. Deep limbic activation is also seen during times of hormonal change in women, which correlates to times when depression is more likely.²⁹ All these factors support the use of SPECT scans in the diagnosis of depression. Functional MRI and PET scans more readily measure pleasure center D2 dopamine activity than SPECT scans.



Depression in Children and Adolescents

In children, major depressive disorder is common. Of children aged 6 to 12, one to two percent are depressed. In adolescents aged 13 to 18, up to 25 percent experience at least one episode of major depression.³⁶ Until they reach puberty, both boys and girls experience depression equally. After puberty, however, girls experience depression twice as often as boys.³⁷ As in adults, depression usually lasts several months and recurs in most patients. Adolescents who experience depression are likely to become adults who experience depression.³⁸

Signs and symptoms of depression in children include:³⁹

- Irritability or anger
- Continuous feelings of sadness, hopelessness
- Social withdrawal
- Increased sensitivity to rejection
- Changes in appetite
- Changes in sleep
- Vocal outbursts or crying

What Is the Standard Medical Treatment?

In traditional medicine, the first line treatment for major depression is antidepressant medication, but only about half of those with moderate to severe depression will improve with this standard drug treatment.³⁰ The most popular of the antidepressant drugs are the selective serotonin reuptake inhibitors (SSRIs) such as fluoxetine (Prozac), citalopram (Celexa), paroxetine (Paxil), and sertraline (Zoloft). SSRIs increase the availability of serotonin in the brain. Worldwide, sales of SSRIs are over \$10 billion per year.³¹ Norepinephrine uptake inhibitors are another medication that increase the available norepinephrine in the brain. Dual-action antidepressants are another form of medication that target more than one neurotransmitter, like serotonin and norepinephrine. Other medications that may be used for depression include MAO inhibitors and tricyclic antidepressants, both of which are more likely to produce adverse side

effects. MAO inhibitors tend to be more effective for atypical depression, while tricyclic antidepressants are not. Additional drugs, depending on the patient, may be added. Mood stabilizers and antipsychotic agents are the most common of these adjunctive drugs.³²

Nonpharmacologic therapies used for depression are often used in conjunction or even in place of medication. These therapies include psychotherapy and electroconvulsive therapy (ECT). Psychotherapy techniques, such as cognitive behavioral therapy, interpersonal therapy and problem-solving therapies, are effective for acute episodes of depression as well as to postpone relapse during treatment of mild to moderate depression.³³ Electroshock therapy is a controversial treatment that involves inducing a seizure via electric shock. It is used for patients who fail to respond to other treatments, who have psychotic features or psychomotor retardation.³⁴ ECT usually consists of six to 12 treatments two or three times a week. Confusion and loss of memory are common side effects of this severe treatment.

- Difficulty concentrating
- Fatigue and low energy
- Physical complaints that do not respond to treatment
- Reduced ability to function during events and activities
- Feelings of worthlessness or guilt
- Impaired thinking or concentration
- Thoughts of death or suicide

Children may experience depression in conjunction with an elevated stress response system just as adults do. One study that looked at depression and cortisol levels in obese children and teenagers found an association between the two.⁴⁰ These findings suggest the importance of screening for depression in obese youth as well as screening for eating disorders in depressed youth.

Currently, the only FDA approved drug for treatment of depression in children and adolescents is fluoxetine, or Prozac. No other drugs have been shown to be effective for treating depression in children.⁴¹ There is controversy over the issue of antidepressant drugs increasing suicide risk in children and adolescents. In 2004, the FDA began requiring that all antidepressants be labeled with a

black-box warning that states, "Antidepressants increase the risk of suicidal thinking and behavior (suicidality) in children and adolescents with major depressive disorder and other psychiatric disorders."⁴² Some argue that the actual rate of suicide has decreased since the introduction of SSRIs and that the inclusion of this class of drugs into the suicide warning is not accurate. They argue that the risk of suicide in untreated children is greater than that of children on antidepressants. This has not been accurately studied, however, so the speculation continues.

"In children, major depressive disorder is common."

Cognitive behavioral therapy and interpersonal therapy have been found to be effective in the treatment of depression in youth, but clinicians who are trained in these methods are unavailable in many communities.⁴³ Cognitive behavioral therapy may also be useful in preventing depression in at-risk adolescents.⁴⁴ These non-drug treatments are more attractive as they do not carry the risks that medications do.



Additional Comments by Dr. Sponaugle

Treatment regimens for melancholic depression are the same as those for obsessive compulsive anxiety, as discussed in my comments in the Anxiety section. Treatment for atypical depression, which is derived from an underactive nucleus accumbens in the brain, follows.

In 2005, the National Institute of Drug Addiction (NIDA) performed PET scan studies on random patients in the Maryland area, and found that many patients demonstrated only half of the expected dopamine D2 activity in their pleasure centers. This landmark find confirmed what I had discovered in my practice—many patients in America suffer significant underactivity in their nucleus accumbens (pleasure center).

There is an incredible void of knowledge throughout the Psychiatric community regarding the physiology of this type of depression. Sadly, that void frequently results in inappropriate treatment for the suffering patient. Ignorance regarding the inter-relationship between serotonin and dopamine has placed many patients in grave danger, and is responsible for all too many suicides.

Too many physicians in America automatically assume that the cause of depression in their patients is serotonin deficiency. Their knee jerk reflex is to prescribe serotonin reuptake inhibiting medications (SSRIs) without first attempting to differentiate other causes. It is critical to differentiate whether the depression is a dopamine or serotonin issue.

Serotonin inhibits or prevents the release of dopamine from brain cell storage units (vesicles). The worst treatment regimen a physician can prescribe for a depressed patient whose depression is derived from an underactive nucleus accumbens (pleasure center), is an SSRI medication. Increasing the patient's serotonin activity will further down-regulate, their already underactive, dopamine D2 activity. The patient will become more depressed and many times report suicidal feelings.

I was recently interviewed by an ABC medical news anchor regarding this very concept. Her interest was in understanding the mechanism by which the SSRI antidepressants can result in patients committing suicide, particularly in the teenage population.

Several of my patients were willing to go public with their stories. They were eager to describe how their psychiatrists had placed them on multiple SSRI medications while attempting to treat their depression, only to have the medicines make them feel suicidal. These patients were passionate about getting the word out to prevent others from suffering the same consequences. When I explained the concept and danger of misdiagnosing a dopamine deficient depression as a serotonin deficient depression, the news anchor, with the camera in my face, asked me how I could be the only doctor who knew this concept, as if it were not true.

The question made me uneasy. I did not want to make a derogatory remark on camera suggesting that perhaps psychiatrists were reading too much Golf magazine and not enough neuroscience. Finally I said, "We have known this since 2002. Perhaps they simply are not staying current with advanced neuroscience concepts."

The news anchor later told me that, before she could run the story, she had to validate the concept with another physician. She had to interview multiple psychiatrists before she found a pediatric psychiatrist who performed two extra years of psychopharmacology after her psychiatric residency. Only this well-educated doctor was aware of this relationship between serotonin and dopamine.

Unfortunately, this explains why I see four or five patients a month from all regions of the country who have been misdiagnosed. They have been told by psychiatrists that they have refractory depression (unresponsive to treatment). They simply were refractory to the SSRI antidepressants, the wrong medications for their dopamine deficiency!

These dopamine-deficient patients are a set-up to become addicted to any drug that releases dopamine from brain cell storage units. Food, sex, alcohol, opiate pain medications, marijuana, cocaine, methamphetamine and nicotine all produce a temporary dopamine hit, one that makes these patients feel more normal.

Responsible treatment for this type of depression, or any other depression, should include evaluation and correction of the many vitamin deficiencies, hormonal deficiencies and brain chemical deficiencies as described under "What Causes It?" in the previous section. At my clinic, we typically evaluate more than 65 biochemicals in our patients.

Timeline summary of treatment for atypical depression is as follows:

- Detoxify the gut with herbal protocols.
- Optimize all specific hormonal and nutritional deficiencies to increase dopamine receptivity.
- If patient still reports symptoms of depression on follow-up, consider treating with dopamine enhancing medication.
- Evaluate and treat patient for toxin accumulation in brain. Treat with a toxin-binding product containing bentonite clay, glucomannan and activated charcoal. Also, evaluate for heavy metal toxicity and severe toxicity in the gut, and detox when appropriate.

Many of our depressed patients use OxyContin or other pain medication to self-medicate their depression, yet not realizing this is what they're doing.³⁵ They subsequently suffer severely toxic guts from years of constipation. It is not unusual for my 30-year-old female patients to admit they have one bowel movement every two weeks. I remind them that a healthy person should have a bowel movement three times a day to remove toxins from their intestine. These toxins are fatty substances, and they tend to accumulate in the brain, which is 65 percent fat. The toxins shut down both pituitary function as well as the A5 nucleus (the factory in the brain that produces 90 percent of our norepinephrine). The toxins ultimately exacerbate any initial depression that may have been causation of their abusing opiates for their dopamine effect.

In these patients, aggressive detoxification of excessive toxin accumulation is a top priority as part of their treatment regimen. Without delay, we use various western and herbal medicines to quickly treat neurotransmitter deficiencies and imbalances. However, we realize and we emphasize to our patients that they must work diligently, implementing the prescribed detoxification regimens. Ultimately those protocols, followed by appropriate maintenance programs, will serve to heal and restore the severe brain chemistry and hormonal deficiencies that caused their atypical depression.

A hyper-active immune system is yet another side effect of opiate-induced constipation with its concurrent severe intestinal permeability, or leaky gut syndrome. An over-stimulated immune system activates the clotting cascade with resultant hypercoagulability (excessive blood clotting). When capillaries become clogged with excessive fibrinogen and other clotting complexes, even young patients develop micro-hypoxia. This prevents delivery of oxygen and nutrients to brain cells (and throughout the body) and causes a toxic intracellular buildup, more brain inflammation, and earlier Alzheimer's disease.

This phenomenon requires treatment with natural anticoagulant therapy to alleviate migraine headaches, brain fog and exacerbation of the patient's depression. Other natural regimens are sometimes required to further balance additional aspects of the upregulated immune system. If these hyper-immune issues are not investigated and treated, the unsuspecting patient remains in a state of inflammation, suffers depression, and relapses to opiate pain medication or other drugs.

Additionally, we have many patients from the northern United States and Canada suffering from seasonal affective disorder (SAD). We have determined that the majority of them suffer a mild genetic decreased D2 activity in their nucleus accumbens. They are, therefore, more sensitive to a reduction in vitamin D levels than other patients who experience the same loss of sunshine. Optimizing dopamine activity with a mild dopamine stimulant, optimizing thyroid and testosterone levels in both males and females, and prescribing natural supplements like SAM-e and vitamin D is very effective in preventing recurrence of SAD symptoms in these patients.

Case Study with Dr. Sponaugle

Melancholic Depression

Kimberly is a 19-year-old female from Virginia who came to see me for severe depression in December of 2009. She was attended by both her father and her mother, which proved extremely helpful during our initial interview. Both parents insisted that just six months ago, before Kimberly left for college, she was the happiest 18-year-old in the state of Virginia.

Kimberly's personality the first day I met her certainly did not match her parent's description of her high school days. She was moody, irritable and argumentative. I actually felt sorry for her parents, especially her mother. If her mother said day, Kimberly said night. If her mother said black, Kimberly said white. Kimberly admitted she had become somewhat of a miserable person, and no longer enjoyed anything, not even playing her beloved sport of volleyball.

In high school, Kimberly lived to play volleyball. In fact, she had won an athletic scholarship to the University of Virginia to play volleyball. One could clearly see that her father still proudly focused on her athletic abilities as he attempted to hang on to good memories of his daughter. Her mother simply wanted to get rid of the "witch" sitting next to her, and get her daughter back.

Kimberly's parents were very disturbed and angry when she came home the previous week for Thanksgiving vacation and they found OxyContin in her suitcase. Their home, in Alexandria, Virginia, is only 20 minutes from the Amen Clinic in Reston, so they took her there to obtain a SPECT scan of her brain. Kimberly's scan revealed a severely overactive deep limbic system and an overactive anterior cingulate gyrus—classic signs of serotonin deficiency. She also had some mild under activity in her prefrontal cortex that increased with concentration. This was caused by a localized dopamine deficiency in the prefrontal cortex.

The psychiatrist who saw Kimberly at the Amen Clinic suggested to Kimberly's parents that they bring her to my clinic for an addiction evaluation. I have referred

patients for SPECT imaging to the Amen Clinics since 2005, and the physicians there are very familiar with my addiction work.

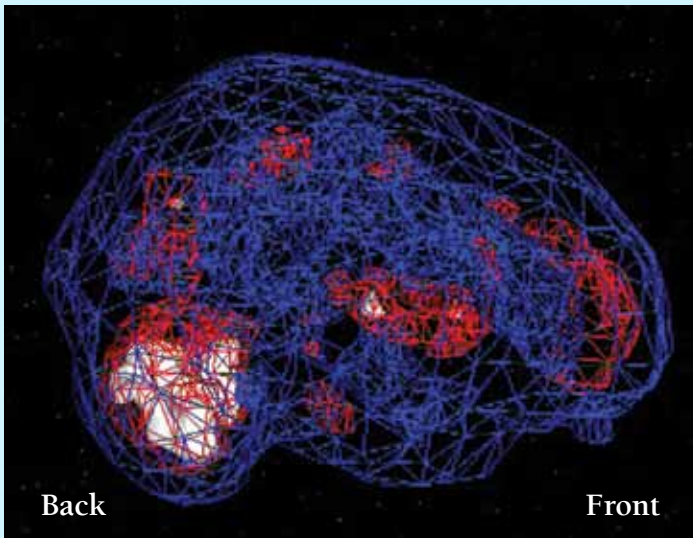
The personality profile I saw in Kimberly was a perfect match for her SPECT brain scan, and I knew she was using OxyContin for two reasons. First, OxyContin and other opiates cause a temporary release of dopamine from brain storage units that would have stimulated her prefrontal cortex and made her feel more normal. Since the prefrontal cortex assists in focus and attention, opiates initially allow an ADHD person to feel as though they can think more clearly and really get things done. Second, OxyContin was relaxing Kimberly's overactive brain regions. OxyContin blocks calcium channels, disallowing calcium to enter brain nerves. Blocking calcium from entering the nerve decreases electrical energy and calms the brain.

After viewing her scans, I found it difficult to believe that Kimberly could have developed such severe serotonin deficiency in just four months of attending college. One possibility was that she had started abusing ecstasy which destroys brain serotonin factories. Another logical explanation for a sudden decrease in serotonin activity would be a sudden estradiol drop out, causing the brain to experience diminished serotonin activity.

Fortunately, Kimberly's hormonal testing came back the following day with normal estradiol levels, and a day later her neurotransmitter testing came back revealing significant serotonin and taurine deficiencies; something I see every day in patients who suffer severe Candida overgrowth in their intestine.

I was relieved that the objective data derived from my testing was beginning to match Kimberly's clinical picture and her brain scan. However, because I believed Kimberly's parents, I was baffled as to how Kimberly's brain chemistry could have become so distorted in just four months of college.

I rolled up my sleeves and began to inquire more about Kimberly's college life. Kimberly's parents had made what seemed like a logical assumption—that



Kimberly's scan revealed a severely overactive deep limbic system (red area toward the center of the brain scan) and an overactive anterior cingulate gyrus (red area on the right of the brain scan)—classic signs of serotonin deficiency.

the stress of college was too much for Kimberly. They were already making plans to bring her back home to a community college.

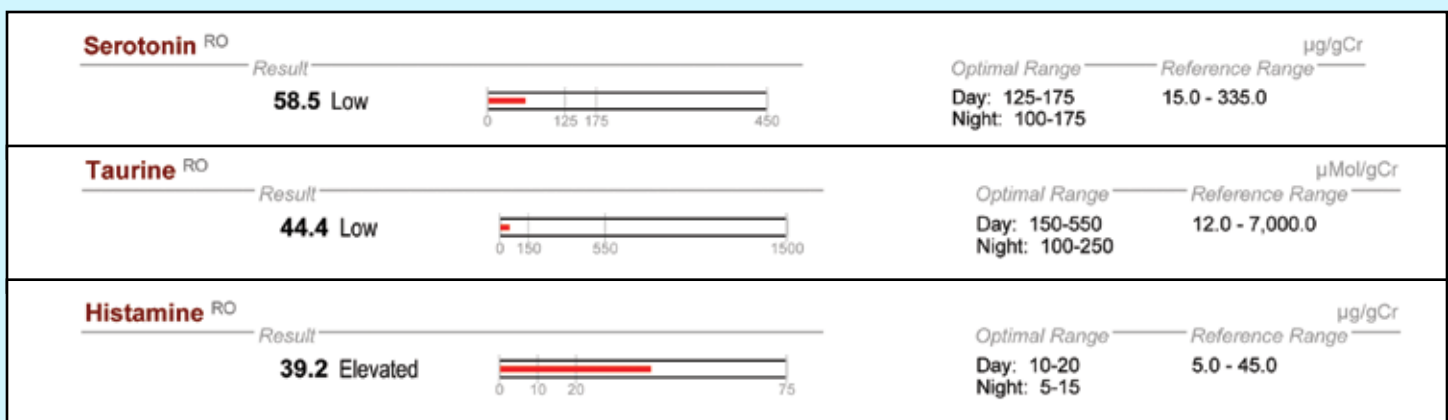
It turns out that just the opposite was true. Kimberly had taken all advanced classes her senior year of high school. Her first semester at college was no challenge whatsoever. Kimberly had joined a sorority and started drinking beer for the first time in her life. Because of Kimberly's ADHD, every sip of beer provided a temporary hit of dopamine that made her dopamine-deprived prefrontal cortex feel more normal.

While the majority of Kimberly's other sorority sisters were also out drinking four nights a week, they only drank one or two beers a night. Kimberly, like so many ADHD patients, including Lindsay Lohan, would binge on eight to 10 beers per night. Many nights her friends carried Kimberly back to the dormitory. I have determined that bingeing is a characteristic behavior of ADHD patients.

Due to the fact that beer is made with yeast and is full of yeast, as Kimberly drank an average of 30-35 beers a week, she was unknowingly on an accelerated course to developing severe Candida overgrowth in her gut. This subsequently produced the serotonin and taurine deficiencies that caused her onset of melancholic depression.

We detoxified Kimberly's gut and treated her serotonin and taurine deficiencies using the same herbal protocols discussed earlier in the anxiety chapter. We also treated her ADHD

Kimberly certainly learned a valuable lesson regarding the gut-brain connection! She promised her parents she would abstain from drinking beer if they would allow her to return to the prestigious University of Virginia. We followed Kimberly for our usual three-month period. She remained drug- and alcohol-free, and denied any cravings whatsoever.



Kimberly's beer binges caused severe deficiencies of the calming brain chemicals serotonin and taurine. Candida overgrowth both interferes with the overall production of serotonin, and at the same time prevents normal re-absorption of taurine by the kidneys. As taurine is excreted in the urine, it carries both potassium and magnesium along with it wasting these valuable anti-anxiety nutrients. The excessive histamine levels indicate that Kimberly's leaky gut gave her an overstimulated immune system.



Brenda's Bottom Line

Dr. Sponaugle has helped so many people get to the root of their depression by looking at what is actually occurring in many different parts of the body. He knows how to bring these many components back into balance so that patients can again feel normal. His message is similar to mine and to other doctors and natural health practitioners who are on the cutting-edge of medicine and healing because they take the time to learn about how the different systems in the body affect each other.

Depression is another one of those conditions that traditional doctors like to throw antidepressants at. In fact, you may be reading this information because a doctor told you that certain symptoms you have are “all in your head,” even if you know you aren't depressed. You may actually have another condition that most traditional doctors do not know how to treat correctly. These include irritable bowel syndrome (IBS), fibromyalgia, chronic fatigue syndrome, Candida overgrowth, and multiple chemical sensitivity, each of which can trigger depression. These conditions are also covered in this book. Read about them to learn more about what may be leading to your depression.

Healing this condition begins in the gut since so many digestive issues can trigger inflammation and nutrient deficiencies which can affect your mood. Building a healthy gut is the first step in building the foundation of your health. Find a doctor who is knowledgeable and open to balancing the brain chemistry by using neurotransmitter testing and hormone testing to get to the bottom of your symptoms. The following recommendations will help you on your journey.

“Healing this condition begins in the gut since so many digestive issues can trigger inflammation and nutrient deficiencies which can affect your mood.”

Recommended Testing

- Comprehensive stool analysis (CSA) (See the Appendix.)
- Food sensitivity test (See the Appendix.)
- Neurotransmitter profile (See the Appendix.)
- Hormone test

Diet

- Follow the Fiber 35 Eating Plan found in the Appendix of this book.
- If Candida overgrowth is present, follow the Candida Diet found in the Appendix.
- Include plenty of fruits and vegetables, whole grains, nuts, fish and poultry in the diet to help prevent anxiety.
- To avoid toxins in foods, eat organic foods whenever possible.
- Reduce consumption of saturated fat and eliminate trans fats from the diet.

Lifestyle

- Regular physical activity can help to improve mood by releasing endorphins.
- If overweight, lose weight, especially if abdominal fat is present.
- Reduce toxin exposure.
- Get adequate sleep because lack of sleep can adversely affect mood.

Complementary Mind/Body Therapies

- Stress reduction therapies such as yoga, biofeedback, massage, and meditation can be helpful to relieve stress.
- Acupuncture may be helpful for people with depression.
- Colon hydrotherapy is beneficial to remove toxins.

Recommended Nutraceuticals	Dosage	Benefit	Comments
Critical Phase For treatment contact Florida Detox and Wellness . (See the Appendix.)			
Probiotics	200 billion culture count daily for two weeks	Protects the intestinal lining, binds toxins, helps improve immune and digestive function.	Look for high amounts of bifidobacteria, the main bacteria in the colon.
Mood Formula	Use as directed	Helps to balance mood instability.	Look for a formula that contains ingredients like 5-HTP, St. John's wort, B6, folic acid, rhodiola, L-tyrosine.
Candida Cleanse	See Appendix	Helps to eradicate Candida overgrowth.	Look for ingredients such as uva ursi, caprylic acid, undecylenic acid, barberry, garlic, neem, grapefruit and olive leaf extracts.
Helpful			
Multivitamin/mineral Formula	High potency	Vitamins and minerals support brain function.	Be sure vitamins are in their natural forms. Look for high amounts of B vitamins.
Daily Maintenance			
Probiotics	50 billion culture count daily after critical phase	Protects the intestinal lining, binds toxins, helps improve immune and digestive function and reduce inflammation.	Look for high amounts of bifidobacteria, the main bacteria in the colon.
Omega-3 Fatty Acids	At least 1-2 grams daily	Helps support healthy brain function.	Get a concentrated, enteric coated, high dose EPA/DHA formulation.
Fiber	4-5 grams twice daily	Helps bind toxins, produce healthy bacteria levels and good bowel elimination.	Use in conjunction with a high-fiber diet to obtain 35 grams of fiber daily.
Digestive Enzymes	1-2 capsules with meals	Helpful to fully digest foods and absorb nutrients important for brain function.	Undigested food can trigger mood imbalances.
Vitamin D₃	At least 1,000 to 2,000 iu daily	Helps heal leaky gut, decrease inflammation, increase overall health.	Research is showing many health conditions are associated with low vitamin D levels.

See further explanation of supplements in the Appendix