



Biochemical Individuality and Nutrition

By William J. Walsh, Ph.D., Walsh Research Institute

Each of us has innate biochemical factors which influence personality, behavior, mental health, immune function, allergic tendencies, etc. Scientists tell us that the number of different genetic combinations possible in a child from the same two parents exceeds 42 million. It's interesting to note that we do not possess a combination of characteristics from our parents, but instead have a diverse collection of characteristics from many ancestors on both sides of the family.



Except for identical twins, each human being has unique biochemistry resulting in quite diverse nutritional needs. Shakespeare was correct when he wrote "One man's meat is another man's poison." For example, some of us are genetically suited for a vegetable-based diet and others are not. Some persons can satisfy their nutritional needs by diet alone and others must have nutritional supplements to overcome genetic aberrations.

Because of genetic differences in the way our bodies process foods, most of us are quite deficient in certain nutrients and overloaded in others. Even with an ideal diet, most of us have certain nutrients that are at very low levels with many times the RDA required to achieve a healthy balance. The nutrients in overload must be carefully avoided in vitamin supplements or serious health problems can develop. After studying the biochemistry of 10,000 persons, we've learned that the greatest mischief is usually caused by nutrients that are stored in excessive amounts, rather than those at depleted levels. The most common nutrients in overload include copper, iron, folic acid, calcium, methionine, manganese, choline, and omega-6 fatty acids. Of course, these same nutrients may be in deficiency in other persons. This is why we are concerned by supplement manufacturers who attempt to develop the ideal combination of vitamins, minerals, and amino acids for the general population. This is a bit like trying to determine the ideal shoe size for the population. The truth is that multiple vitamins and minerals are too indiscriminate, and may do as much harm as good.

Each of us should ask the question, "Who am I nutritionally?" The answer to this question is important for all, but may be especially critical for persons with mental health problems.

Nutrients and Mental Health

As we enter the new millennium, the medical and scientific communities agree on the tremendous influence of neurotransmitters on behavior disorders, ADHD, depression, and schizophrenia. Most persons with these disorders were born with a predisposition for these problems due to genetically-aberrant levels of specific neurotransmitters. Our mental health is dependent upon having the proper amounts of these critical brain chemicals.

Some psychiatrists express their scorn for nutrient therapies, claiming that they are too puny to have any real clinical potency. They often say, "You really need a drug medication to get the job done for a serious condition like depression." My favorite response begins by asking the question, "Where do our neurotransmitters come from?"

The brain is a chemical factory which produces serotonin, dopamine, norepinephrine, and other brain chemicals 24 hours a day. The only raw material for these syntheses is nutrients, namely amino acids, vitamins, minerals, etc. If the brain receives improper amounts of these nutrient building blocks, we can expect serious problems with our neurotransmitters.

For example, some depression patients have a genetic pyrrole disorder which renders them grossly depleted in vitamin B-6. These individuals cannot efficiently create serotonin since B-6 is an important co-factor in the last step of its synthesis. Many of these persons report benefits from Prozac, Paxil, Zoloft, or other serotonin-enhancing medications. However, similar benefits may also be achieved by simply giving these patients sufficient amounts of B-6 along with augmenting nutrients.

Advances in epigenetic science have revealed the powerful impact of nutrients on gene expression, and enabled improved treatments for mental disorders. For example, we now understand that methionine and SAMe act as serotonin reuptake inhibitors, and folates and niacinamide depress neurotransmission at dopamine receptors. For the first time, we are able to adjust gene expression of enzymes that may be at improper levels.

Most neurotransmitter problems appear to be genetic or epigenetic in nature and involve abnormal absorption, metabolism or storage of key nutrients. As neuroscience advances, biochemical treatments to correct brain chemistry will become better defined. Nutrient therapy can be very potent and can avoid side effects, since no molecules foreign to the body are needed. This therapeutic approach may eventually eliminate the need for most psychiatric medications.

Biochemical Factors in Behavior Disorders, ADHD and Mental Illness

Because of access to a large database of biochemical information from more than 10,000 patients with mental health problems, examination of this data shows that most of these persons have striking abnormalities in specific nutrients required for neurotransmitter production. The most common chemical imbalances we encountered include the following:

Overmethylation

Many persons who suffer from anxiety and depression are over-methylated which results in excessive activity at dopamine, norepinephrine and serotonin receptors. Typical symptoms include sleep disorders, underachievement, upper body pain, and an adverse reaction to serotonin-enhancing substances such as Prozac, Paxil, Zoloft, methionine, and SAME. Biochemical treatment focuses on folates, Vitamins B-3 and B-12 that reduce activity of dopamine and norepinephrine. These persons should strictly avoid supplements containing copper, methionine, and other nutrients that could worsen anxiety and depression.

Undermethylation

Many patients with obsessive-compulsive tendencies, oppositional-defiant disorder, or seasonal depression are undermethylated which is associated with low serotonin neurotransmission. They generally exhibit seasonal allergies, perfectionism, competitiveness, and other distinctive symptoms and traits. A high percentage have an inborn tendency to be depressed in calcium, magnesium, methionine, and Vitamin B-6. These undermethylated persons may benefit nicely from Paxil, Zoloft, and other serotonin-enhancing medications, although nasty side effects are common. A more natural approach is to directly correct the underlying problem using SAME, methionine, calcium, magnesium, amongst others. Although most undermethylated patients thrive on folates, supplements of folates must be avoided for patients whose problems are dominated by low activity at serotonin receptors. Folic acid, folinic acid, and methylfolate all reduce serotonin/dopamine neurotransmission by an epigenetic mechanism, and this effect overwhelms the folate benefits of improved methylation and serotonin synthesis.

Copper Overload

A common problem in ADHD, behavior disorders, and hormonal depression is a genetic inability to control copper, zinc, manganese, and other trace-metal levels due to improper functioning of metallothionein proteins. Elevated copper can cause striking changes in the levels of dopamine and norepinephrine in the brain and are also associated with hormonal imbalances and intolerance to estrogen. They must avoid supplements and "enriched" foods containing copper. In addition, we recommend they drink bottled water and limit use of swimming pools and jacuzzis treated with copper sulfate anti-algae agents. Foods to be limited due to high copper content include shellfish, chocolate, and carob. Biochemical treatment focuses on zinc, B-6, and other nutrients that stimulate metallothionein synthesis and functioning.

Pyrrole Disorder

A common feature of many behavior and emotional disorders is pyroluria, an inborn error of pyrrole chemistry which results in a dramatic deficiency of zinc and Vitamin B-6. Common symptoms include explosive temper, emotional mood swings, poor short-term memory, and frequent infections. These patients are easily identified by their inability to tan, poor dream recall, abnormal fat distribution, and sensitivity to light and sound. The decisive laboratory test is analysis for pyrrole levels in urine. Treatment centers on normalizing blood levels of B-6 and zinc.

Glucose Dyscontrol

Our database indicates a significant number of our patients have chronic low blood glucose levels. This problem generally isn't the cause of behavior disorders, depression, etc., but instead is an aggravating factor which can trigger striking symptoms. Typical symptoms include drowsiness after meals, irritability, craving for sweets, trembling, anxiety, and intermittent poor concentration and focus. Treatment includes chromium, CoQ-10, and other glucose-stabilizing nutrients, but the primary focus of treatment is on diet. These patients benefit from six or more small meals daily with emphasis on complex carbohydrates and protein. In essence, they cannot tolerate large meals or quick sugars. Complex carbohydrates provide the necessary glucose in a slow, gradual manner and may be thought of as "time-release" sugar.

Toxic Substances

Occasionally we encounter a patient whose condition has resulted from a heavy-metal overload (lead, cadmium, mercury, etc.) or toxic levels of pesticides or other organic chemicals. Our database indicates that persons with a metallothionein disorder are especially sensitive to toxic metals, and that overmethylation is often associated with severe chemical sensitivities. Effective treatment requires a three-part approach: (1) avoidance of additional exposures, (2) biochemical treatment to hasten the exit of the toxic from the body, and (3) correction of underlying chemical imbalances to minimize future vulnerability to the toxic.

Malabsorption

Although only 10% of our database case histories involve serious malabsorption, more than 90% of autistics exhibit this problem. There are three primary classes of absorption problems: (1) stomach problems, including excessive or insufficient HCl levels, (2) incomplete digestion in the small intestine, and (3) problems at the brush-border of the intestine where most nutrients are absorbed into the portal blood stream. The consequences can include nutrient deficiencies, inflammation of the intestinal tract, candida, and mental health problems. Incomplete breakdown of protein and fats can adversely affect brain neurotransmission, and is has been associated with impulsivity and academic underachievement. Treatment depends on the type of malabsorption present and may involve probiotics, adjustment of stomach HCl levels, and digestive enzymes.

Essential Fatty Acids

The brain is 20% fat (by dry weight) and these fatty substances fulfill very important functions. Glial cells enable brain plasticity, regulate neurotransmission, nourish brain neurons, and form the myelin sheaths which surround our brain cells. There is strong evidence of the important roles for omega-3 oils (especially EPA and DHA) and omega-6 oils (especially AA and DGLA) in ADHD, depression, and schizophrenia. A famous Harvard study showed EPA and DHA supplements to be more effective than psychiatric medications in combating bipolar depression. Typical American diets usually result in insufficient omega-3 and excessive omega-6, and some nutritionists routinely recommend supplements of omega-3 oils. However, biochemical individuality also exists with oils and certain persons are innately low in omega-6 oils. A review of symptoms and specialized lab tests can identify individual needs.