

Editing Sample

(excerpt from article written by biochemist)

~~The gut is actually considered the second brain. The majority of human beings are not aware that they possess a “second brain”: that is, the gut. The development of the intestines and brain occur at the same time in the fetus. In the fetus, the intestines and the brain develop simultaneously (and of the same matter?). There are actually more receptors for serotonin in the gut than there are in the brain! As a result, more serotonin receptors actually reside in the gut than in the brain! In fact, 95% ninety-five percent of the body’s serotonin in the body is in the digestive system.~~

In the 1800’s, doctors ~~new~~ knew that if you drugged the brain, you would drug the gut. ~~Based on that rationale~~ opium was ~~therefore~~ a favorite common treatment for diarrhea. ~~Optimizing the health of the gastrointestinal tract plays a role in addressing neurotransmitter disorders. Fast forward to modern medicine and doctors use a drug called Zelnorm to address idiopathic constipation. Similarly, modern medicine advocates the use of a neurological drug called Zelnorm as an antidote to idiopathic constipation. Zelnorm can help by acting like serotonin. Serotonin helps which coordinates and normalizes the function of the muscles in your intestines so they function more normally. intestinal muscles . In other words, the brain and the gut—because they share neurotransmitters—are inextricably connected. As aforementioned, enhancing the neurotransmitters in the brain can provide essential support for the digestive system. Likewise, optimization of gastrointestinal health is highly significant in addressing neurotransmitter disorders.~~

~~Since everything in the body is obviously connected, why would serotonin only work in the gut? Of course it doesn’t. It can address muscle coordination throughout the entire body! Unfortunately, the view of a lack of serotonin seems to only be associated with mood disorders or depression. This is not the case. The effects and functions of serotonin in various systems throughout the body exemplify the interconnectedness of these systems—especially the brain and the gut. Unfortunately, it is common for low levels of serotonin to be associated exclusively with depression or other mood disorders. This is not the case. As indicated by the successful use of Zelnorm to treat gastrointestinal symptoms, serotonin is also an integral part of the healthy digestive system. Furthermore, however, since everything in the body is connected, why would serotonin only work in the brain or the gut? Of course, it doesn’t. In fact, serotonin can address muscle coordination throughout the entire body! All neurotransmitters work in concert and serotonin is the master neurotransmitter, governing the function of all neurotransmitters.~~

Balancing neurotransmitters, beginning with maintaining adequate levels of serotonin and dopamine is imperative for overall optimal health.

The G.A.L.T.

The ~~gut associated lymphoid tissue~~ Gut Associated Lymphoid Tissue, or “GALT,” comprises ~~70%~~ seventy percent of the human immune system. Something as simple as a delayed food allergy reaction can interfere with the GALT, thereby disrupting immune system function~~ing~~, inducing microinflammation, and reducing the gastrointestinal production of serotonin. Further~~more~~, this inflammation ~~could~~ may reduce the surface area of absorption for some key nutrients, which may then affect other parts of the body, including the brain. ~~As an example, look at celiac disease.~~

Take Celiac Disease, for example. This disease ~~which~~ presents with a long list of symptoms not excluding the neurological, ~~yet begins in the gut.~~ According to the American Journal of Gastroenterology in 1999, **“Celiac disease should be considered in the presence of depression, particularly if not responsive to the usual antidepressant therapy.”** (proper citation in footnote or MLA style).

But despite its various manifestations in multiple biological systems, Celiac Disease—~~an autoimmune dysfunction caused by intolerance to gluten (the protein found in many grains such as wheat)—~~ ultimately begins ultimately in the gut. ~~Celiac disease is a perfect example of~~ It thus epitomizes how one condition, perhaps induced by interference with the GALT, ~~can influence a plethora of biochemical alterations,~~ perhaps induced by interfering with the GALT. There are other mechanisms of action, such as the formation of gluteomorphine based compounds in the gut, affecting neurotransmitter receptors. ~~Although~~ There are of course other negative catalysts, such as the formation in the gut of gluteomorphine-based compounds in the gut, that inhibit neurotransmitter receptors, such as formation of gluteomorphine-based compounds in the gut. ~~However,~~ Interference with the GALT, however, is has some one of the most detrimental and far-reaching effects, for it reduces nutrient absorption, ~~which and that too~~ can lead to depression, as well as attenuate the production of cellular energy, known as ATP (adenosine triphosphate).

Active Transport

The release of neurotransmitters from a cell requires energy production and utilization. Deficiencies of ATP or its transporter magnesium will result in a reduction in neurotransmitters at a synapse, and thus a deficiency state.

The graphic above depicts the release of serotonin from a neuron. Notice how it is not ~~isn't~~ as simple as manufacturing and releasing serotonin into a synapse. It takes cellular

energy to release serotonin from the neuron! If ATP levels are low within a neuron—
often the result, as aforementioned, of a weak digestive system due to a flawed GALT--;
less_ less neurotransmitter will be released. Think of it as a secondary deficiency.

Supporting the health of the mitochondrion with specific nutrients can enhance the production of cellular energy, and fortify the lipid by the layer of the mitochondrion, allowing for optimal production of ATP.

There are many nutrients that support mitochondrion health. The graphic below lists the most common nutrients.

Searching for Hidden Allergies

An important part of optimizing gastrointestinal health to support the GALT and neurotransmitter production is to identify food allergies.

IgG EIA RAST ~~f~~Foods blood test is an easy method for detecting delayed food allergy reactions. The IgG RASTThis highly sensitive blood test identifies not just immediate reactions like classic peanut or shellfish allergies, which can lead to anaphylactoid or anaphylaxis reactions, _-This highly sensitive test identifies but also delayed food allergy reactions which may be slow to manifest symptomatically. via symptoms. Hidden and delayed food allergy reactions can occur days after the offending food is was consumed, making it nearly all but impossible —without this test—to -determine try to figure out what one is allergic or sensitive to without this test. I believe this is one of the most important tests one an individual suffering from nutritional allergies and sensitivities can undertake undergo. However, nNot all IgG RAST tests, however, are created equal equally efficient. Many traditional laboratories may offer a some version of the IgG RAST blood test; however, they it may be severely inaccurate. Discuss this concept with a doctor knowledgeable in integrative medicine.

In conclusion, the gut is certainly not of secondary importance to the brain in achieving optimal health. On the contrary, the gastrointestinal system harbors the majority of some of the most essential neurotransmitters in the body, including serotonin, the master neurotransmitter. Furthermore, not only do the gut and the brain form cotemporaneously in our earliest stages of fetal development, but logically, they also function coordinately in the human body. For centuries and in the contemporary medical world, doctors have therefore been able to treat certain digestive ailments with drugs that access and alter the chemistry of the brain. Now we also know, however, that in order to treat many neurological disorders, we must begin with the “second brain”: the gut. This biological center is the powerhouse for both physical and mental health; proper nutrition is the fuel.

In part three of this article, I will focus on the adaptation mechanism of food allergies, and its ramifications ~~for~~^{on} neurotransmitter synthesis and utilization.