THE BRAIN / GUT CONNECTION

Per Dr. David Pearlmutter, renowned Neurologist and Fellow of the American College of Nutrition

- Your brain weighs three pounds and has one hundred thousand miles of blood vessels.
- contains more connections than there are stars in the Milky Way.
- is the fattest organ in your body.

Your gut is the literal and figurative center of your health. The prestigious journal, Science calls the gut, “the inner tube of life”.

The health of your heart, bones, immune system and brain are governed by the gut bacteria, the microflora that eats what we eat. This relationship is the most powerful leverage that we have for maintaining our health.

The health of your brain is, to an extraordinary degree, dictated by the state of your microbiome—the vast population of organisms that live in your body and outnumber your cells 10 to 1.

Your microbiome affects your mood, libido, metabolism, immunity and even the perception of the world and the clarity of your thoughts. Simply put, everything about how we feel emotionally and physically hinges on the health of our microbiome.

Think of it as two independent, but interdependent businesses that must coordinate and communicate, but can act independently.

There are a number of remarkable roles that the gut plays in your overall health. A few of the main jobs are:

- Breaks down foods
- Lets the good stuff in
- Keeps the bad stuff out
- Makes stuff
- Protects us

The bacteria that live in your gut (about three pounds worth containing five hundred different species) produce vitamins and health-giving molecules that make up the gut eco-system.

There are over 100 trillion bacteria living in your gut. Plus, there are viruses, yeast species, and protozoa. When we factor in their genetic material, it means that an astonishing 99% of the DNA in our body is bacterial.

They influence all manner of physiology from our immune system to our metabolism, making vitamins, maintaining the gut lining and controlling inflammation, the key mechanism involved in Alzheimer's, Parkinson's, multiple sclerosis and any number of brain degenerative disorders. Inflammation generates in the gut.

They exert influence over the expression of our 23, 000 genes, in effect regulating the expression of the human genome. In fact, there was the startling discovery that bacterial DNA sequence have now been found in the human genome…meaning we are bacterial.

Approximately 90% of your immune system is located in the gut, and 95% of the body's serotonin is produced by the gut nerve cells. Every class of neurotransmitters found in the brain is found in the gut.

In fact, Dr. Michael Gershon, of Columbia University, has called the gut, "the second brain", because it has its own nervous system and many neurotransmitters like the brain.

The gut immune system talks to your brain every day. It is now being discovered that there is actually a bidirectional conversation going on in which the gut speaks to the brain and the brain speaks to the gut. This is possible because the gut brain actually comes from the same embryonic tissue as the "brain" brain.

Every cell in your body communicates with every other cell. There is always a lot of talking going on between your brain, immune system, gut, and hormones. It is through this "psycho-neuro-endocrine-immune system" that your gut and your immune system talk to your brain. The mind of the "gut" talks to your brain every day. One example of this is when you are aware of signals for hunger and elimination.

According to research, bacterial mischief in the small intestine (from bacteria that migrate up from the large intestine into a normally sterile territory) can trigger an immune and nervous system response that sends messages back to the brain, which can lead to insomnia, anxiety, depression, and impaired cognitive function. The gut immune system then "speaks" to the brain, sending messages of inflammation, which ultimately increases stress hormones like cortisol and changes neurotransmitter levels.

Your gut is talking to your brain and when these bacteria are involved, the communi-cation isn't good. This is one of the major ways your gut sends signals of ill health to your brain that can manifest themselves as: **chronic headaches, insomnia, anxiety, depression, epilepsy, movement disorders, schizophrenia, ADHD and those senior moments.**

Stress can send your stomach into a tailspin. But trouble in the gut can also affect the brain. This 2- way relationship may be the unlikely key to solving one of medicines' most perplexing mysteries—AUTISM. Nearly 60 years after the disorder was identified, the

number of cases has surged. It is estimated that 70 million people worldwide fall on the autism spectrum. Yet, there is no known cause or cure.

The Human Microbiome Project:

- Launched in 2008
- $115 million exploration of the gut microbiome
- Looked at the microbiome arrangement in the gut of individuals affected by various diseases
- Drawing correlations between emerging patterns in the abnormalities of gut bacteria and specific diseases

For example: Autism correlates with an overabundance of the Clostridia species. In diabetes, there are more Firmiculetes than Basteroidetes, which we see in obesity characteristic of the Western diet.

Autism is a complex spectrum of disorders that share 3 classic features:

- impaired communication,
- poor social engagement and
- repetitive behaviors.

On one end of the spectrum are people who are socially awkward but, in many cases, incredibly sharp. At the other extreme are individuals with severe mental disabilities and behavioral problems.

Recent ground-breaking research reports that the **gut bacteria** in individuals with autism aren't just **different** — they may actually contribute to the disorder. They found that individuals with autism had **fewer types** of gut bacteria. Among the most common health complaints from children with autism? **Gastrointestinal problems**. Ninety percent of children with autism suffer from tummy trouble. According to the CDC, they are **3.5 times more** likely to experience chronic diarrhea and constipation than their normally developing peers.

These new studies suggest that **treatment** may one day come in the form of a **probiotic** — live, beneficial bacteria. According to Paul Patterson, a professor of biology who co-authored the study, "If you block the gastrointestinal problems, you can treat the behavioral symptoms." In a commentary in the journal, *"Cell"*, Professor Rob Knight hailed the finding as **"groundbreaking."**

THE CORNERSTONE OF ALL DEGENERATIVE CONDITIONS, INCLUDING BRAIN DISORDERS, IS INFLAMMATION WHICH CAN BE TRIGGERED BY CARBS, ESPECIALLY THOSE CONTAINING GLUTEN OR ARE HIGH IN SUGAR.
ELEVATED CYTOKINES ARE SEEN IN SEVERAL DISEASES SUCH AS:

- Alzheimer's disease
- Parkinson's disease
- Multiple Sclerosis
- Autism

Once the **inflammatory cascade** takes over, cytokines collect and can **attack the brain**. Cytokines are highly antagonistic to the brain, damaging tissue and leaving the brain vulnerable to dysfunction and disease.
Carbs can destroy your brain. Even so-called healthy carbs like whole grains can cause:

- Dementia
- Diabetes
- Focus and Concentration problems
- Insomnia
- ADHD
- Epilepsy
- Anxiety / Chronic Stress
- Chronic Headaches
- Depression
- Decreased Libido and more

YOUR BRAIN ON FIRE!!!
At the center of chronic inflammation is the concept of "**oxidative stress**" — a biological type of "rusting". This gradual corrosion happens on all tissues. It is a **normal process**, but when it runs rampant, it can become **deadly**.

What's causing your inflammation and how do we treat it most effectively?
Some contributing factors:

- Sugar, processed food, Trans fats
- Stress
- Toxins
- Hidden food allergies and sensitivities

DIETARY CHOICES!!!

Why are acid blocking drugs ranked in the top selling category of America's $252 billion dollar drug market?
Three of these drugs used to treat reflux – Nexium, Protonix and Prevacid, are in the top twenty best selling drugs and account for $12.1 billion in sales annually. The answer is that we are not very kind to our gut.

We eat a diet that is low in fiber and nutrients and rich in sugar, additives, and chemicals which changes the ecosystem of our gut. We live under chronic stress and are exposed to chemicals and toxins such as mercury which all damage the intestinal barrier and normal gut function.

In addition, our culture is a pill popping culture. We have a pill for everything. Among these, are antibiotics, anti-inflammatories, aspirin, steroids, and acid-blocking medications that all disrupt the gut's ability to stay in balance and do its job.

All in all, we live in dangerous digestive times. The implications for this imbalance are far reaching.

Inflammation—Leaky Gut
All the factors that cause **imbalances** in the gut **damage** the **delicate intestinal lining** which in turn sets the **inflammatory processes** in motion in the brain and the body.

Damage to this delicate barrier creates a **leaky gut** (known in medical terms as *increased intestinal permeability*). Because of this damage, you cannot digest food properly. Now, there are **partially digested food particles** from normally innocuous foods "**leaking**" into your bloodstream through the leaky gut.

The body reacts by **increasing** the **immune response** and generating **inflammation**. This is essentially how you create antibodies and **develop allergies** to common foods. It is also what can make you…
sick & fat,
toxic & inflamed,
depressed & anxious,
forgetful & foggy.

Controlling systemic inflammation ensures:

- Better health
- Greater longevity
- A reduction in symptoms of chronic mental and physical diseases
- Greater mental acuity
- Greater mental acuity
- Improved physical performance

There is an intimate dance between your gut and your brain.
Fix the gut – then mood, behavior and cognition will all improve.

- If you want to eliminate molecules that poison your brain
- if you want to eliminate the possibility of "autointoxication"
- if you want to eliminate the inflammation in your gut that is setting your brain on fire

The solution is simple:
Eliminate the dietary and environmental factors that are traumatizing your gut and feed it the food and nutrients that it needs so you can live in harmony with it.

What can we do?
Better food choices bring about significant changes in our body's microbiome. By taking probiotics and choosing prebiotic foods such as: Jerusalem artichokes, dandelion greens, garlic, leeks, onions, jicama, Mexican yam as well as fermented foods like: kimchi, kombucha, tea, yogurt, kefir you can reestablish good gut health and gain control over

inflammation, the corner-stone of all degenerative diseases. By balancing bacteria and reducing leaky gut, you can decrease inflammation.

Some of the nutraceuticals that are good for the gut and in turn, the brain, include:

- Prebiotics,
- Probiotics, and
- L-Glutamine

PROBIOTICS REDUCE AGGRESSIVELY NEGATIVE THOUGHTS

Recent research from the Netherlands' Leiden Institute for Brain and Cognition has discovered in a triple blind study that negative and aggressive thinking can be changed by supplementing with probiotic bacteria. After 4 weeks of treatment, the probiotic group showed significantly lower scores in aggression, control issues, hopelessness, risk aversion, and rumination compared to the placebo group.

"The researchers concluded the study had demonstrated that a 4 week, multispecies, probiotic intervention has a positive effect on cognitive reactivity to naturally occurring changes in sad moods in healthy individuals not currently diagnosed with a depressive disorder."

LOVE YOUR GUT — LOVE YOUR BRAIN!

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T. Boland, ARNP, FAARM, ABAAHP, LMFT
Total Health Solutions, Inc.™
totalhealthsolutions@protonmail.com

