

## **Your Gut: The Inner Tube of Life**

By: Mark Hyman, MD

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We all have had gut feelings. And we know what it is to feel something in our gut. In Japan, the gut is viewed as the seat of the mind and soul. A Japanese business mogul was once asked how he knew whether to do a deal, and he replied, “I swallow it, and if it feels good in my belly, I do it.”

Your gut has a mind of its own ...

The “mind” of the gut talks to our brain every day. We are familiar with signals for hunger, or elimination. But a new conversation is being discovered between the gut and the brain, a bidirectional conversation with the brain speaking to the gut and the gut to the brain.

This week I want to talk a little bit about the gut, explore the relationship between the gut and the brain and explain why your “inner tube of life” is so important to lifelong health.

### **What is the Gut and Why is It Important?**

The gut is a snake-like, disgusting and smelly thing, which we hope will quietly, silently, do its job of digesting, absorbing, and assimilating our food. We trust it will prevent toxins and bacteria from intruding into our systems, while eliminating our wastes in a timely and efficient manner without the least awareness on our part. Just do your job please.

Unfortunately, while the gut is a source of great intelligence, is it is also the source of great mischief for millions.

Nearly 70 million people suffer from some form of digestive disorder. Over 6 million diagnostic procedures are done for digestive problems and 45 million people visit the doctor for gut problems every year. Forty percent of all visits to internists are for “functional bowel” disorders such as reflux and irritable bowel syndrome. And the cost for treating digestive disorders is \$107 billion a year.<sup>i</sup>

You would think by now we would have a clear understanding of the causes of irritable bowel syndrome, constipation, diarrhea, reflux, and inflammatory bowel disease, just a few of the common problems experienced by millions. You would think by now we would have developed effective treatments to fix these problems.

Unfortunately our understanding and treatments of this highly sophisticated and integral part of our body are still quite primitive despite the explosion of scientific research on what *Science* magazine called, “the inner tube of life”.

Over the last 15 years of practice and research, I have found the gut to be the source of inestimable suffering. And I have found remarkable discoveries and cures that hold the promise, not only of getting relief from common “functional” gastrointestinal symptoms (and most allergic and autoimmune diseases which originate in the gut) but from everything from depression to autism, to OCD, to ADHD to dementia and Parkinson’s disease.

Let’s start our exploration of the inner tube of life by discussing what it does.

### **Your Gut’s Job: A Day at Work**

There are a number of remarkable roles the gut plays in our overall health. Here are a just a few of the main jobs:

1. Breaks Down Your Food:
  - a. Breaking down and digesting our food with the help of adequate stomach acid, digestive enzymes, and bile.
2. Lets in the Good Stuff:
  - a. Absorbing only the molecules we need such as amino acids, fats, sugars, and vitamins and minerals through a one-cell thick layer barrier to keep us properly nourished.
3. Keeps Out the Bad Stuff:
  - a. While letting in the nutrients essential for life, it must prevent, block, or neutralize nasty toxins, bugs, and chemicals that flow through our inner tube of life.
4. Makes Stuff:
  - a. Bacteria that live in your gut (about 3 pounds worth containing 500 different species) produce vitamins and health-giving molecules that are all part of your gut ecosystem
5. Protects You:
  - a. Your gut immune system comprises 60 percent of your total immune system and is called the GALT (or gut-associated lymphoid tissue). It lies under that one-cell layer I mentioned above through which nutrients are absorbed. It’s job is to protect you from illness. When it is in balance you are well. When it is out of balance a host of problems can occur.)

That’s a lot of work. And it all has to function seamlessly for you to be properly nourished, to have a balanced immune system, and to adequately detoxify.

The gut has to be completely in balance for your brain to be in balance. The brain experiences everything that happens in your gut directly through nervous system

feedback, immune activity, cytokines, and other assorted mischievous molecules made in your gut.

Despite its critical importance, few people look to the gut as the seat of health and happiness. Nowhere is this truer than when it comes to our broken brains. Who would ever think that problems in your brain originate in your gut?

When it comes to the gut, most physicians and scientists miss what is right in front of us, because we are looking for solutions in the wrong place. How could the cure for autism start in the gut? How could depression be rooted in bacterial imbalances in the gut? How could dementia occur from eating wheat?

We have no model for seeing this. So we don't.

Luckily, a few revolutionary doctors and scientists are looking at how the gut is connected to the brain. And what they are finding is astonishing.

### **The Brain Gut Connection: Your Gut is Your Second Brain**

Dr. Michael Gershon, of Columbia University, has called the gut the “second brain”. In fact, your gut has a mind of its own, literally. While it is connected to the brain through an extensive network of wiring and communication systems, it is also the only “organ” besides the brain that has its own nervous system.

We call it the ENS or enteric (or gut) nervous system, as opposed to the CNS or central nervous system. The small intestine alone has as many neurons as the spinal cord. Ninety-five percent of the body's serotonin (remember, that's the happy mood chemical) is produced by the gut nerve cells, and every class of neurotransmitters found in the brain is also found in the gut.

The question is how does this nervous system down below interact with the one above?

The gut brain actually comes from the same embryonic tissue as the “brain” brain. And it is still connected via the autonomic nervous system—the sympathetic and parasympathetic nerves.

Acting completely independently, it has a number of important jobs: it keeps everything moving in the right direction from the top down by coordinating the contraction of muscle cells; it triggers the gut hormones and enzymes to be released from cells to promote digestion; it helps keep the blood flowing so when you absorb your food it can get to where it needs to go, and it controls the immune and inflammatory cells in the gut.<sup>ii</sup>

All that happens in the background and is communicated back up to your brain via the autonomic nervous system. Think of it as two independent, but inter-dependent businesses that must coordinate and communicate but can act independently.

But how does this interaction affect us?

Everyone has experienced “butterflies” in the stomach, or had diarrhea under acute stress, or, worse, become incontinent in life-threatening situations. Clearly we can have a “nervous” stomach because of our thoughts and feelings and external events, but can we have a “nervous” brain (or a depressed or hyperactive or autistic or demented brain) because of mischief originating in the gut—specifically due to problems with digesting food, the gut-immune system, or signals that go haywire on the way from our gut-brain or ENS to our “brain” brain?

In medical training, most doctors think pejoratively of people with “functional bowel” disorders. Doctor’s see nothing with the tools they use—scopes, x-rays, and scans. No tumors, ulcers, or blockages. Nothing “real”. So these patients are just neurotic people with emotionally triggered symptoms. Right?

The evidence is directing us otherwise.

The suffering for millions is real. So the question becomes, are these tens of millions of Americans “crazy” with “psycho-somatic symptoms” that lead them to be irritable, anxious, depressed, and obsessed with their digestive system? Or are we missing something?

Thankfully new science is shedding light on this topic.

Over the years I have seen emotional, psychiatric, and behavioral symptoms triggered by problems in the gut. One of my patients was a thirty-year old executive who would experience anxiety and insomnia whenever his irritable bowel would act up. Another was a little boy who would have explosive bouts of anger whenever his stomach was a little “swollen” with gas. Yet another was a woman who found herself free of lifelong depression after a course of antibiotics (metronidazole) we used to clear out bad bacteria from her gut.

When psychiatric symptoms are “coincidentally” cleared up with antibiotics, then that gets my attention.<sup>iii</sup> How could this happen? An autistic boy I treated actually began to speak after changing his diet and eliminating gluten and dairy, changing the “information” that went into his gut.

These remarkable stories are all evidence of the intimate connection between your gut and your brain.

Doctors often blame patient’s psychiatric problems for their gut symptoms. They are “psycho-somatic” illnesses created in the brain of people whose anxieties get the best of them.

But perhaps, very often, it just may be the other way around. Mischief in the gut causes disturbance in the brain. Fix the gut, and mood, behavior, and cognition all improve.

Many different factors affect gut (and brain) health:

- Unfriendly bacteria in the gut and other bugs like yeast that produce brain toxins
- Fermentation of starches from your diet that produce gas and toxic levels of ammonia
- Odd, partially digested food proteins that interfere with normal brain operations;
- Activation of the immune system because of digestive imbalances that damage the protective barrier, which normally keeps the outside world from entering through the gut.

Why are millions having all these gut problems?

The answer is that we are not very kind to our guts. We eat a SAD diet (standard American diet) that is low in fiber, rich in sugar, low in nutrients, and high in additives and chemicals, changing the ecosystem of our guts.

We are under chronic stress, which damages the normal intestinal barrier and affects the ENS.

Our drug culture pushes antibiotics, anti-inflammatories, aspirin, steroids, and acid-blocking medications that all disrupt our guts' ability to stay in balance and do its job.

And we are exposed to toxins such as mercury, which damage our normal gut function.

All in all, we live in dangerous digestive times.

An article in the *Journal of the American Medical Association* by Dr. Henry Lin<sup>iv</sup> mapped out a new way of thinking about irritable bowel and the psychological symptoms seen in irritable bowel patients.

He turns the current view on its head by saying that bacterial mischief in the small intestine (from bacteria that migrate up from the large intestine into a normally sterile territory) triggers an immune and nervous system response that sends messages back to the brain, which leads to insomnia,<sup>v</sup> "sickness behavior", anxiety, depression,<sup>vi</sup> and impaired cognitive function.<sup>vii</sup> The gut immune system "speaks" to the brain, sending messages of inflammation, which trigger high levels of CRF (corticotropin releasing factor) in the hypothalamus (which increases stress hormones like cortisol),<sup>viii</sup> and changes neurotransmitter levels.<sup>ix</sup>

Your gut is talking to your brain. And when these bacteria are involved, the communication isn't good.

So bottom line—little bacteria in our gut start a cascade of immune and neurological events that stop our brain from doing what it was designed to do and create poor connections and communication all around.

This is one of the major ways your gut sends signals of ill health to your brain that can manifest themselves as any one (or perhaps all) of the conditions mentioned above and many others.

I want to discuss how this happens. Let me start by telling you a story of one of my patients who suffered this problem.

### **Bugged Out: How Bugs in Your Brain Make You Crazy**

*The most remarkable story of how bugs in the gut can affect your brain is from a woman who came to see me, with the typical “whole list” of problems (which is why I call myself a “whole listic” doctor).*

*Most of her problems started in her gut—she had the usual diagnoses of irritable bowel with terrible bloating after meals as well as acid reflux, and she also had an autoimmune disease with joint pains and lots of inflammatory symptoms such as allergies and rashes.*

*She also had metabolic syndrome or pre-diabetes, thyroid problems, and chronic stress.*

*In addition to all these problems, she also suffered from debilitating obsessive-compulsive disorder. She was an educated, otherwise well-balanced human being, and there was nothing odd about her on the surface. But she could not pick up anything off her floor or clean or move anything in her house because of this weird obsession—for years!!!*

*In the 10 years before she came to see me, she had become increasingly withdrawn because of her severe fatigue and her frustration and exhaustion with these quirky behaviors.*

*Actually she had been given many “diagnoses” over the years by many different doctors, including depression, anxiety, OCD, and sleep disorder. She also had severe fatigue for many years.*

*As a result, she took many drug cocktails over the years including Ritalin and Dexedrine—or speed. And when I first saw her she was on Provigil (a new drug to wake up the brain), Depakote, a seizure drug given to OCD and bipolar patients, as well as two anti-depressants Celexa and Wellbutrin. She was also on a highly controlled new drug for sleep called Xyrem (which was the knockout date rape drug or GHB). This was*

*quite a collection of mood stabilizers, uppers, downers—this woman was a walking pharmacy.*

*We found she was allergic to gluten and dairy and she was making very odd peptides (little proteins) because of poor digestion. These are morphine-like proteins that result from incomplete digestion of casein (from dairy) and gluten (from wheat). These have been linked to many psychiatric disorders, especially autism and ADHD.<sup>x</sup>*

*She also had vitamin D and magnesium deficiency, which can contribute to depression and anxiety.*

*When we looked at her gut environment with a stool analysis, we found there weren't any of the normal healthy bacteria growing, her gut lining was inflamed, and some strangers had taken up residence in her gut, including yeasts and odd bacteria.*

*A gut is a veritable ecosystem—like a rainforest. There are over 500 species of bacteria living there weighing in at a whopping 3 pounds. There is more bacterial DNA in your body than human DNA. All of them need to be in balance and in the right place (mostly in your large intestine) for your gut to function properly.*

*There are good bugs and bad bugs. The good bugs help digest your food, produce vitamins, control inflammation, boost immune function, and more. The bad bugs produce toxins, ferment starches leading to bloating and gas, and tend to move into areas of the bowel like the stomach and small intestine where they create terrible mischief. We generally want to get rid of the bad bugs and add more good bugs or probiotics to keep the gut healthy.*

*As part of this woman's gut clean up, I gave her a new treatment pioneered by Dr. Mark Pimentel, of the University of California at Los Angeles School of Medicine.<sup>xi</sup> A non-absorbed antibiotic called Xifaxin clears out abnormal bacteria in the small bowel. I expected her bloating and even some of her inflammatory symptoms to clear up by fixing her gut. But I was surprised by what she told me after she took the antibiotic.*

*Overnight her OCD disappeared, after years of unsuccessful treatment with psychotherapy and psychiatric medications, she was suddenly able to clean her entire house and pick up everything off the floor. The lights in her brain had come on for the first time in ten years.*

*A high level of ammonia in her blood caused her OCD. Ammonia is a neurotoxin that excites and damages brain cells and the mitochondria (the site of energy production in all cells). Bacteria in the gut produce ammonia, and when the liver can't detoxify it, or there is just too much, it causes brain damage.*

*Every physician knows this because since the 1960's doctors have been treating a condition known as "hepatic encephalopathy,"<sup>xii</sup> a form of temporary insanity common in patients with liver failure. The brain dysfunction results from too much ammonia, and is cured by clearing out the ammonia-producing bacteria in the gut with antibiotics. So this idea shouldn't seem strange to most doctors.*

*But, it occurs in many patients—not just those with liver failure.*

*When we rechecked her ammonia level after treatment, it had returned to normal. After a few months, the bacteria came back, and so did her OCD symptoms and her high ammonia level, and once again treating the bacteria cured her OCD. The link was clear.*

And this is just one of many ways abnormal gut bacteria can affect your thoughts and cognitive function.

In fact, Pimentel, talks about common symptoms like brain fog and fatigue in patients with irritable bowel that clear up when the toxic bacteria are cleaned up using the treatment he studied. A bloated belly, leads to a bloated brain. The symptoms can vary from OCD to depression to anxiety to autism or even psychosis.

So what else do we know about how bugs down below affect command central up on top?

### **Bad Bugs Below and Above: Intestinal Bugs and Your Brain**

Beside ammonia, there are also many odd, toxic molecules that are produced by the 500 species of bugs that make their home in your intestinal tract, populating the surface of your gut, which is 100 square meters in surface area, but only one cell thick.

These good bugs are very busy living in a symbiotic manner with you. You give them a place to live in your gut, and they reciprocate by helping you digest your food, make necessary vitamins (like vitamin K and biotin), detoxify poisons, produce energy for your intestinal cells (butyrate), regulate cholesterol metabolism, and keep normal pH balance.

They also compete for real estate with bad bugs—parasites, yeast, and toxin-producing bacteria. When these bad bugs take over (because you took too many antibiotics or don't eat enough plant foods with lots of fiber which the good bugs love to eat, and eat too much sugar which the bad bugs love even more) then the whole ecosystem is disrupted leading to a bigger set of disruptions that alter your mood and brain function.

Let me tell you another story. Watch the [2-minute video here](#). This six-year-old girl suffered from "auto-intoxication" which led to crazy behavior. This process of a bug



producing actual brain chemistry modulating toxins is just one way the gut can affect the brain. There are many more.

Many studies have shown abnormal, toxin-producing flora in children with developmental problems like these.<sup>xiii</sup> Normal kids have normal flora.

While I have been using children with ADHD, behavioral problems, and autism as examples throughout this book, these principles apply to everyone with mood, behavioral, or memory problems.

Of course other behavioral and psychotherapeutic approaches may be necessary to help manage emotions, belief, attitudes, thinking patterns and behavior. But it is much easier to work on yourself if your brain is not in chaos, if signals and communication systems in your brain are not incoherent and unsynchronized by toxins, allergens, infections, and nutritional deficiencies and stress.

An integrated, comprehensive approach to regain balance is always necessary and often remarkably effective.<sup>xiv</sup> Treating the gut is almost always one piece of that puzzle.

Changes in diet and tuning up biochemistry with nutrients have profound effects on brain and behavior. In one study<sup>xv</sup> 207 patients with severe, violent behavior disorders were treated with a comprehensive metabolic and biochemical systems approach. They were tested, and their problems with metals, methylation, blood sugar, nutrient deficiencies, and gut problems were all corrected.

Seventy-six percent of the group actually followed the program. Over 90 percent of the participants significantly reduced violent behavior, and 54 percent had total elimination of their severe behavior problems.

This study should be headline news. But you don't hear about it, because it is not a new drug or procedure but a simple diet and nutrient-based approach.<sup>xvi</sup>

The take home point to all of this is simple: The health of your gut has a broad array of effects across many different systems in your body. You need to heal your "inner tube of life" if you want to achieve lifelong vibrant health. Caring for your gut is an essential step in the Daniel Plan. To learn more about how to care for your gut see my article [Is 7 Keys to Optimal Digestive Health.](#)

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