

Most of us never give a thought to our intestines until they send a loud and clear message that something is not right. Yet, have you ever wondered why certain medications, like some antidepressants and antibiotics, can lead to nausea and constipation or diarrhea? Or why long-term stress can lead to constipation, diarrhea and ulcers? Or even, why certain conditions, such as autism, are closely associated with intestinal problems? The best answer is that each of us has two distinct areas that function as a brain. There is the most familiar area of neurons encased in our skull and there is a lesser-known area of similar neurons located in the intestine--labeled by some scientists as "the second brain."

While the second brain (technically known as the "enteric nervous system") contains more neurons than the spinal cord—over half of our nerve cells are located in our gastrointestinal system—it is not the seat of conscious thoughts or decision-making. Its influence is far-reaching nonetheless. The second brain has been found to determine our mental state and emotions and play a key role in diseases throughout the body.

The enteric nervous system not only produces about 95 percent of the serotonin found in the body but also more than 30 neurotransmitters also found in the brain. Not surprising, then, that medications and diseases that affect serotonin levels would have a profound effect, not just on the brain, but also on the gut. And, diseases that primarily affect the bowel can have a profound effect on mental state, emotions and mood.

Some examples of the connection between the two brains include:

- Chemicals (benzodiazepines) commonly found in pain relievers and anti-anxiety medications are produced in the gut.
- The gut has a natural affinity for and can produce natural opiates and can also evidence addiction just like the brain.
- The gut has cycles during sleep: alternating 90 minute cycles of slow-wave muscle contractions with corresponding short bursts of rapid muscle movement that matches the brain's sleep patterns.
- The gut contains at least 70 percent of our immune system. Mast cells are concentrated in the intestine to release histamine, prostaglandins and other

chemicals designed to stimulate inflammation, a protective response to prevent infection.

Recent studies have shown that the second brain not only has the ability to learn and remember, but also has the ability to think for itself. The question this creates is: can we teach our second brain to be healthy and function well? The question needs more study, but preliminary thought is a resounding Yes!

We have long neglected our gastrointestinal health and have forgotten what many cultures have long known—the state of our gut has a profound influence on our overall health. It would seem that the gut is more responsible than we ever imagined for our mental well-being, our health and how we feel. It's time to pay attention to this unknown but critical brain.