

**PHYSIOLOGICALLY, THE** bowel is synonymous with the gut, the gastrointestinal tract, including stomach and the intestines. In this context, the association made between the bowel and the brain in the following statements is quite intriguing. “The brain and nerves are in sympathy with the stomach.”<sup>1</sup> “The diseased stomach affects the entire nervous system, brain, and mind . . . the nerves of the brain are diseased by the abuse heaped on the stomach.”<sup>2</sup> “The success of acquiring a good memory and a calm, uniform temper depends not upon circumstances, but very much upon the way in which the stomach is treated.”<sup>3</sup>

When we think of the gut we think of the digestion of food—period; but there’s more. Embedded in the wall of the gut are nerves that compose the enteric nervous system [ENS]. The ENS

has long been known to control digestion. Some scientists though are referring to it as *the second brain*. The ENS contains millions of neurons, more than in either the spinal cord or the peripheral nervous system. Amazingly, it has the capacity of coordinating digestion autonomously. It was discovered that if the main connection with the brain, the vagus nerve, is severed the ENS remains capable of coordinating digestion. No other organ can work independently of the brain.

A quick comparison of the brain with the ENS reveals that both are made of various types of neurons, with glial support cells. The ENS has more receptors than the brain for substances that are typically thought of as molecules of emotion. The ENS has its own version of a blood-brain barrier to keep its environment stable. A wide range of hormones and around 40 neurotransmitters of the same classes of

neurotransmitters as those found in the brain are produced by the ENS. Neurons in the gut are thought to generate as much dopamine as those in the head. Intriguingly, about 95 percent of the serotonin present in the body at any time is in the ENS. What are these neurotransmitters doing in the gut?

One of the major research interests of Heiko Braak, MD of the Institute for Clinical Neuroanatomy in Germany is Parkinson’s disease. Parkinson’s disease typically manifests itself in progressive tremors, slowed movement, and lack of muscle control. It is associated with loss of brain cells that produce dopamine. Abnormal clumps of proteins have been found in the brains of people afflicted with Parkinson’s, which are also associated with dementia. They have been named Lewy bodies. Braak has found that these Lewy bodies also show up in dopamine-producing neurons in the gut. In fact, based on his research and the distribution of Lewy bodies in people who died of Parkinson’s, Braak thinks that Parkinson’s actually starts in the gut, as the result of an environmental trigger and then spreads to the brain. Amazingly enough there are some who see the same connection between the characteristic plaques or tangles found in the brains of people with Alzheimer’s with the plaques that are also present in neurons in their guts. These are strange findings.



Irritable bowel syndrome is an ailment that has a more understood mind-body connection. In fact, it is commonly thought of as a psychosomatic disease or what might be referred to as “all in your head.” The abdominal cramping, pain, bloating, gas, diarrhea, and constipation, are far from the brain and yet are often accompanied by depression. When doctors look inside at the colon everything looks fine and

**BOTH LONG-LASTING PAIN AND PSYCHOLOGICAL PROBLEMS CAN RESULT FROM A SINGLE CAUSE . . .**

dandy with no obvious damage or inflammation. One school of thought sees validity to the idea that irritable bowel syndrome can be caused by the degeneration of neurons in the ENS. This “is lent weight by recent research revealing that 87 out of 100 people with the condition had antibodies in their circulation that were attacking and killing neurons in the gut.”<sup>4</sup>

Pankaj Pasricha, MD specializes in gastroenterology, motility disorders, and neurogastroenterology. Regarding his research he states, “A characteristic feature of disorders such as irritable bowel syndrome or functional dyspepsia is their association with psychological problems such as anxiety or depression. The current thinking generally is that the latter causes or exacerbates gastrointestinal symptoms. We sought an alternative explanation, namely

that gastrointestinal problems cause depression and anxiety. Thus, both long-lasting pain and psychological problems can result from a single cause, gastric irritation, if it occurs in vulnerable individuals.”<sup>5</sup> In other words, he is suggesting that rather than the mental state causing GI upset, GI upset is causing psychological problems.

He and his fellow researchers subjected 10-day-old laboratory rats to mild stomach irritation daily for six days. He found that the rats that experienced gastric irritation early in life were significantly more likely than their peers to display depressed and anxious behaviors later in life long after the physical damage had healed.

Dr. Emeran Mayer, Professor of Medicine, Physiology and Psychiatry at the University of California, Los Angeles has found that, “The majority of patients with anxiety and depression will also have alterations of their GI function.”<sup>6</sup> Current research is giving insight as to how the connection between mind and body is a two-way street. A highway of connection between the gut and the brain, the vagus nerve, relays messages downward and upward. “In fact, about 90 percent of the signals passing along the vagus nerve come not from above, but from the ENS.”<sup>7</sup>

Over the centuries the term bowels has been used to refer to the interior, the deep inner parts, the seat of emotion. The Bible has some interesting ways of using the word bowels. “Behold, O LORD; for I am

in distress: my bowels are troubled; mine heart is turned within me” (Lamentations 1:20, KJV). Jeremiah links the experience of the bowels and heart.

Paul wrote, “Put on therefore, as the elect of God, holy and beloved, bowels of mercies, kindness, humbleness of mind, meekness, longsuffering” (Colossians 3:12, KJV).

Next month we will continue our perusal of the bowels.

<sup>1</sup> Ellen White, *Mind Character & Personality*, p. 392.

<sup>2</sup> Ibid.

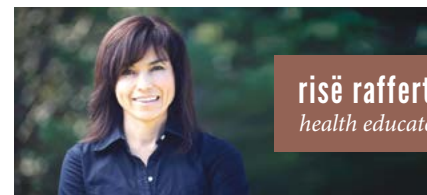
<sup>3</sup> Ellen White, *Manuscript Releases*, vol. 10, p. 299.

<sup>4</sup> Emma Young, “Gut Instincts: The secrets of your second brain,” *Neuroscience*, Dec. 18, 2012, <http://neurosciencesuff.tumblr.com/post/38271759345/gut-instincts-the-secrets-of-your-second-brain>.

<sup>5</sup> Jenny Thai, “Gastrointestinal research provides food for thought,” *The Stanford Daily*, May 17, 2011, <http://www.stanforddaily.com/2011/05/17/gastrointestinal-research-provides-food-for-thought/>.

<sup>6</sup> Harriet Brown, “The Other Brain Also Deals With Many Woes,” *The New York Times*, August 23, 2005, [http://www.nytimes.com/2005/08/23/health/23gut.html?pagewanted=all&\\_r=0](http://www.nytimes.com/2005/08/23/health/23gut.html?pagewanted=all&_r=0).

<sup>7</sup> Emma Young, “Gut Instincts: The secrets of your second brain,” *Neuroscience*, Dec. 18, 2012, <http://neurosciencesuff.tumblr.com/post/38271759345/gut-instincts-the-secrets-of-your-second-brain>.



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