

# Clinical Significance and Functions of Enteric Nervous System

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## Perspective

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## DESCRIPTION

One of the primary subsystems of the Autonomic Nervous System (ANS), the Enteric Nervous System (ENS) or intrinsic nervous system, is made up of a network of neurons that controls how the gastrointestinal tract works. Although it may be impacted by the sympathetic and parasympathetic nervous systems, it is capable of working independently of them. The "second brain" moniker refers to the ENS. Those cells came from neural crests.

Although the enteric nervous system can function without the help of the brain or spinal cord, it does depend on the vagus nerve and prevertebral ganglia in healthy individuals. However, research has demonstrated that the system can still function if the vagus nerve is severed. Along with the secretion of digestive enzymes, the enteric nervous system's neurons also regulate the motor activities of the body. These neurons communicate via a variety of CNS-like neurotransmitters, such as acetylcholine, dopamine, and serotonin. For neurogastroenterologists, the abundance of serotonin and dopamine in the gut is a major field of investigation.

## Research & Reviews: Neuroscience

For a number of reasons, the enteric nervous system has been called a "second brain". The enteric nervous system is capable of independent operation. The parasympathetic and sympathetic nervous systems, as well as the prevertebral ganglia, are how it typically communicates with the Central Nervous System (CNS). However, research on vertebrates demonstrates that the enteric nervous system continues to operate even after the vagus nerve is severed.

### Functions

**Peristalsis:** A series of radially symmetrical muscle spasms and relaxations known as peristalsis go along a muscular tube. Peristalsis is a mechanism that helps the smooth muscles of the digestive tract in mammals like humans and other people move food through the digestive system. The word is a New Latin borrowing from the Greek peristallein, "to wrap around," which is derived from the prefix peri-, "around," and the verb stallein, "to place." William Bayliss and Ernest Starling, two physiologists, made the discovery of peristalsis in 1899. They discovered while experimenting on canine small intestines that the response of raising gut pressure resulted in the contraction of the muscle wall above the point of stimulation and the relaxation of the muscle wall.

**Segmentation:** Segmentation contractions in the main smooth muscular walls of the intestines contract during segmentation contractions. Segmentation happens concurrently in both directions when the circular muscles alternately contract, unlike peristalsis, which involves the contraction and relaxation of muscles in only one direction. This enables extensive mixing of the chyme, or intestinal contents, to promote better absorption.

**Secretion:** Cholinergic neurons found in the walls of the digestive system control the release of gastrointestinal hormones such as gastrin and secretin. The vagovagal reflex, which involves communication between the vagus nerve and digestive tract neurons via both afferent and efferent pathways, regulates the release of hormones.

### Significance

In order to understand and treat gastrointestinal motility and functional gastrointestinal problems, neurogastroenterology includes the study of the brain, the stomach, and their interconnections. Neurogastroenterology is the branch of medicine that specializes in the study of the digestive system's sympathetic, parasympathetic, and enteric divisions. The phrase is also used to refer to a branch of gastroenterology that treats gastrointestinal motility and functional abnormalities.

**Disorders of the muscles:** The second category of gastrointestinal problems examined by neurogastroenterologists is motility disorders. The esophagus, the stomach, the small intestines, and the large intestines are the four areas that motility problems affect. The study of common motility problems such as gastroesophageal reflux disease, which results in the mucosa of the esophagus being damaged by stomach acid rising through the lower esophageal sphincter, is the main focus of clinical research in neurogastroenterology.

**Stomach ischemia:** Ischemia can impair ENS function. Since 2011, transplantation has become a clinical reality in the United States and is frequently carried out at some hospitals, despite once being described as a hypothetical possibility.