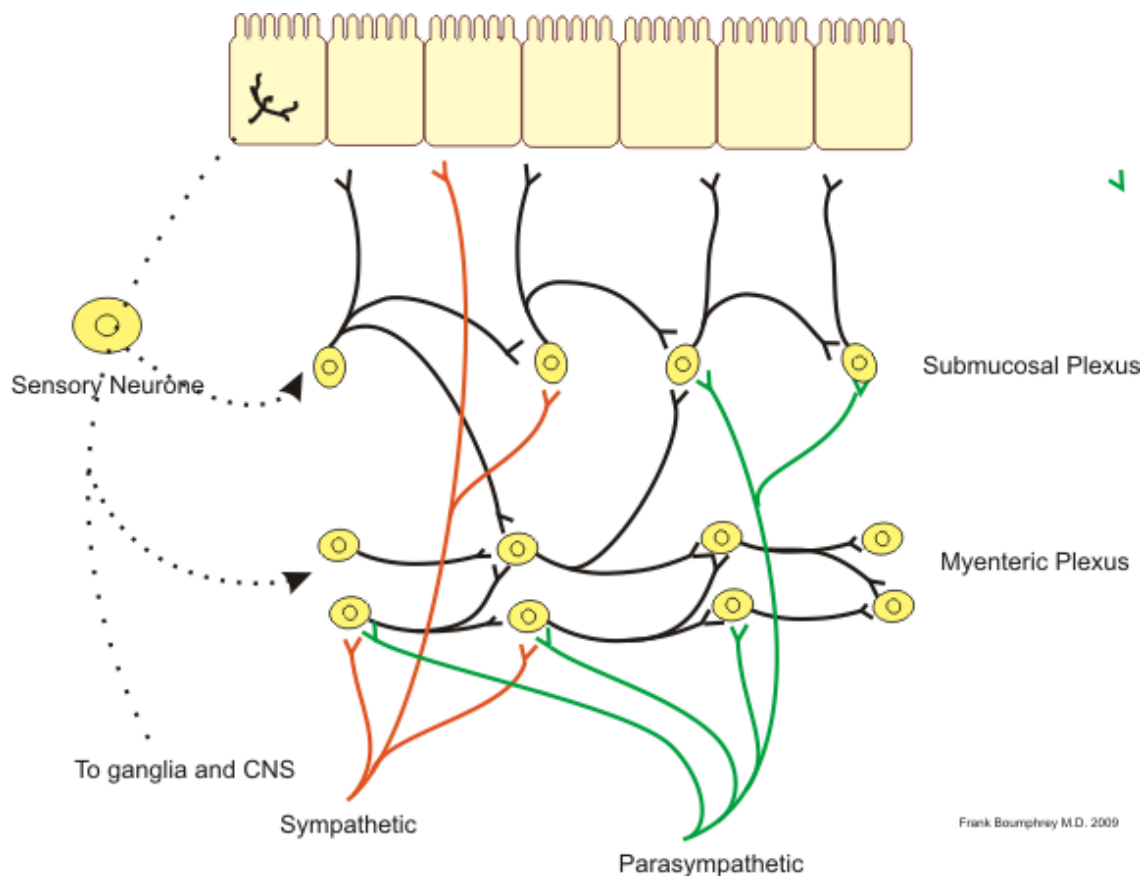


## 5.1.2

# Enteric Nervous System

The digestive system has its own nervous system known as the enteric nervous system (ENS). While the ENS is connected to the autonomic nervous system, it can operate independently of the brain and spinal cord and even influence behavior which is why it has sometimes been referred to as the second brain. The ENS includes two types of ganglia that were described above: the ganglia of the myenteric plexus and the ganglia of the submucosal plexus. It is connected to the central nervous system through the Vagus nerve for parasympathetic control and through the prevertebral ganglia for sympathetic control.



### Enteric Neural Control of the Gut

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The neurons of the ENS not only control muscle contractions and release of digestive enzymes, but the ENS also monitors pH levels and immune cell response, such as detecting histamine release from immune cells if pathogens are present in the digestive system and can trigger diarrhea or signal the body to initiate vomiting if needed.

The ENS also produce several neurotransmitters, such as acetylcholine, dopamine and serotonin. These neurotransmitters influence our feelings of well-being by sending signals of being satisfied, preventing depression, regulating sleep, appetite and body temperature. This is why hunger impacts our mood so much and leads us to find the food we need. When under stress, the feeling of butterflies in your stomach is a result of blood being diverted away from the digestive system during the fight or flight or sympathetic nervous system response. During times of sympathetic stimulation, the digestive system is inhibited. The parasympathetic nervous system ("Rest and digest") stimulates digestion by increasing blood flow to the digestive tract, stimulates the salivary glands to aid in chemical digestion, and increases peristalsis which aids in moving things through and the elimination of wastes.



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