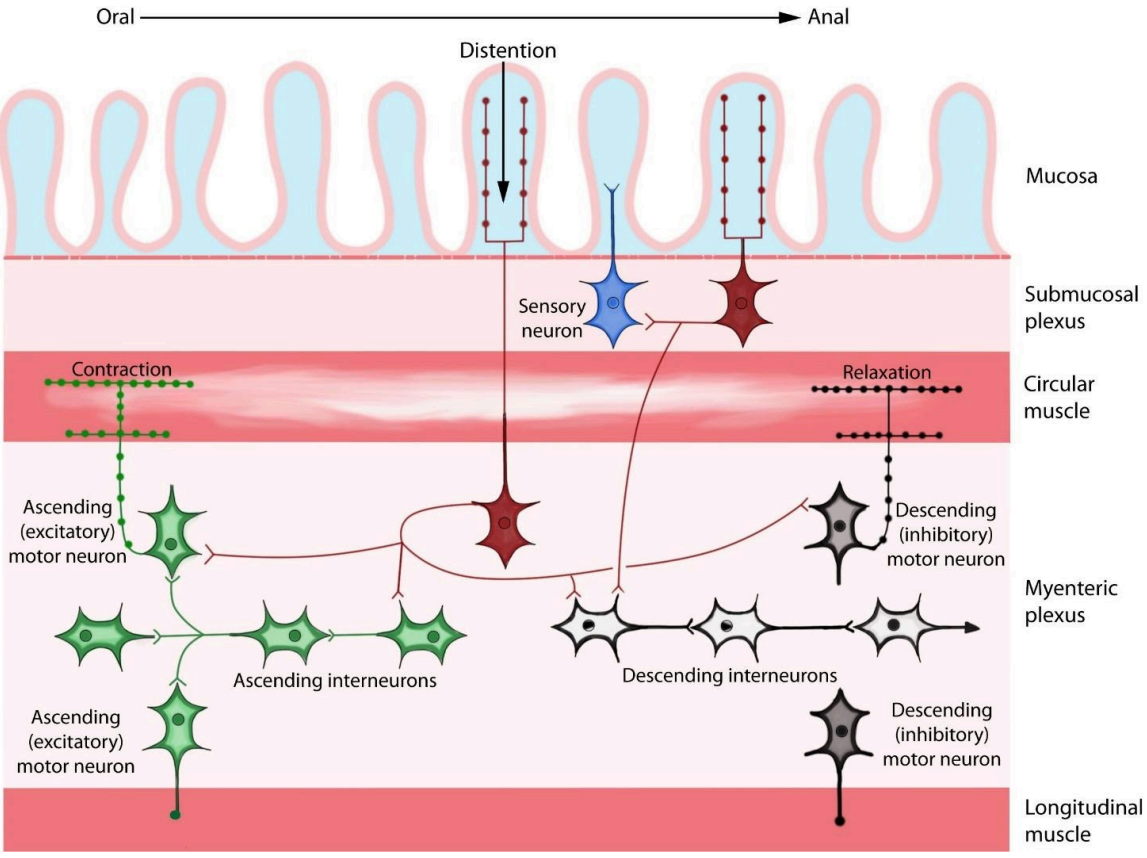
10.1.4

The Enteric Nervous System

The enteric nervous system (ENS) is sometimes referred to as the third division of the nervous system (central, peripheral, and enteric). This system is composed of a nerve plexus or a meshwork of fibers innervating the digestive tract from the esophagus to the distal colon. The ENS includes the **myenteric plexus** and the **submucosal plexus** which receive preganglionic fibers from the parasympathetic division and postganglionic fibers from the sympathetic division of the ANS. Innervation from the ANS and sensory input from within the wall of the gut work together to control smooth muscle motor activity and gut secretory actions. However, the ENS releases a variety of neurotransmitters and is capable of controlling digestive functions independently of the CNS by way of local reflexes. When food is introduced into the digestive tract, stretch receptors in the gut are activated and send action potentials through afferent **enteric sensory neurons**. These neurons synapse with **enteric interneurons** which are capable of activating efferent **enteric motor neurons**. These neurons innervate glands and smooth muscle. Their increased activity enhances digestive enzyme secretions and gut contraction to cause mixing and propulsion of food. The ENS is particularly important in providing synchronous peristaltic movements ensuring propulsion of food in one direction (see figure below).



The enteric nervous system, showing the submucosal and myenteric plexuses.

Image by BYU-Idaho student 2014