

Physiology of the gastrointestinal tract: An overview.

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The digestive system consists of the gastrointestinal (GI) tract and the accessory digestive glands such as pancreas and liver. The GI tract is a tube-like structure which consists of mouth, pharynx, esophagus, stomach, small intestine (duodenum, jejunum and ileum) and large intestine (cecum, colon and rectum). Histologically, the GI tract consists of a mucosa (close to the lumen of the tract), submucosal, two muscle layers (outer longitudinal and inner circular) and a serosa (the outermost layer). The GI tract performs various functions including digestion, motility, secretion and absorption. To perform these functions the GI tract is controlled by a sophisticated and a complete nervous system also known as the enteric nervous system or the ENS. The ENS consists of two ganglionated nerve plexuses referred to as the submucosal plexus, located under the submucosal, and the myenteric plexus, sandwiched between the two muscle layers. In addition to the ENS, the wall of the GI tract contains a specialized smooth muscle cells known as the interstitial cells of Cajal (ICC). The ICCs are capable of generating electrical activity that leads to the peristaltic motility pattern of the gut. Finally, although autonomous, the ENS is connected to the central nervous system by the vagus nerve, providing the parasympathetic innervation, and the splanchnic nerve, which provides both sympathetic and spinal afferent innervation to the ENS and the GI tract. In addition to the ENS, the functions of the gastrointestinal tract are also controlled by five hormones secreted from the gut. These hormones include (according to their date of discovery) secretin, gastrin, cholecystokinin, gastric inhibitory peptide and motilin. While the basic motility of the gut occurs by contraction and relaxation of the two muscle layers, each part of the gut has its own motility pattern. Digestion occurs mostly by pancreatic enzymes, and absorption occurs by the small intestine.