

Why do you think is so important to have a “brain in the gut”?

The ENS plays a critical role in maintaining homeostasis. The ENS determines the autonomic response necessary in “fight or flight” response by slowing down or stopping digestion. The ENS, also, influences the gut by acting on the endocrine cells, and the cells of the immune system.

Another important function of the ENS is that the microbiome in the gut sends signals via the ENS, and through the vagus nerve, interacts with the CNS by regulating brain chemistry and influencing the release of hormones associated with food craving (secretion of dopamine and serotonin), stress response, anxiety, happiness, depression, learning, memory function and pro social behavior.

What are the functions of the ENS in mammals?

The main function of the ENS, are:

- **Control of motility of the small and large intestines**

The major patterns of motility in the intestines, are: propulsive reflexes that move food for small and longer distance (peristaltic) and retropulsion associated with vomiting or gagging. The ENS is programmed to generate these outcomes.

- **Regulation of fluid exchange and local blood flow**

ENS controls fluxes of fluid cross the epithelial surfaces of the gastrointestinal tract. Local blood flow to the GI tract mucosa is regulated through enteric vasodilator neurons so that the mucosal blood flow is appropriate to balance the nutritive needs of the mucosa and to accommodate the fluid exchange between the vasculature, interstitial fluid and gut lumen.

- **Regulation of gastric and pancreatic secretion**

Neural regulation happens through cholinergic neurons in the stomach wall, these neurons receive inputs both from the ENS and from the vagus nerve.

- **Regulation of gastrointestinal endocrine cells**

Nerve fibers run close to endocrine cells of the mucosa of the gastro-intestinal tract which sample the luminal environment.

- **Defense reactions**

Enteric neurons are involved in defense reactions of the gut including diarrhea to eliminate toxins, colonic propulsive activity to rid of pathogens and vomiting.

- **Entero-enteric reflexes**

Entero-enteric reflexes regulate one region in relation to others for example when nutrients enter the small intestine, secretion of digestive enzymes from the pancreas occur.

Ref.: http://www.scholarpedia.org/article/Enteric_nervous_system