

Q5 Describe the hormonal response to a meal (March 2013)

Gut function:

- Regulated by the enteric nervous system, paracrine and endocrine hormones
- Hormones are released in response to neural innervation or in response to triggers associated with ingested food
- Gut functions influenced include secretion, digestion, absorption and motility

Hormones released early in response to food in the lumen:

- Acetylcholine → released from the postganglionic terminals of the vagus nerve during the cephalic and gastric phases of ingestion. Triggers the release of gastrin from gastric G cells
- Gastrin → Secreted by G-cells in the antrum in response to food in the lumen and vagal stimulation. Actions include stimulation of acid secretion, pepsinogen secretion, and a decrease in gastric emptying via CCKA receptors

Hormones released as a meal progresses:

- Produced by pyloric gland D cells in response to increasing acid levels (ie; as a meal progresses) and acts to inhibit gastrin release and directly inhibit acid release from parietal cells.
- Cholecystokinin → secreted by I cells in the duodenum and upper jejunum, stimulated by fatty acids and amino acids. Actions include GB contraction, pancreatic enzyme release, reduction in gastric emptying and satiety.
- Secretin → Secreted by S-cells found in the upper SI, stimulated by decreased pH in duodenal lumen. Actions include HCO_3^- secretion (pancreas and bile ducts) and inhibition of gastrin release and gastric acid secretion in stomach
- Motilin → Secreted by M-cells found largely in the in the upper gut in response to alkalinity of the intestinal chyme. It increased gut motility to propel the chime forward, and is probably associated with the initiation of the migrating motor complex (MMC).
- Gastric inhibitory peptide → secreted by K-cells in the jejunum, stimulated by glucose, fatty acids and amino acids in the lumen. Actions include a decrease in GIT motility and acid secretion, and activation of insulin release
- Insulin → released in response to BSL >5. Multiple actions including effects on CHO, protein and lipid metabolism.
- Neurotensin → Secreted by N-cells found in the end of the gut (last part of ileum and rectum). Release is stimulated by fatty acids. Actions include slowing of motility in SI.