

## Mechanism of Secretion and Actions of the Gastrointestinal Hormones

Hormone family	Gastrin family		Secretin family			Others	
Hormone	Gastrin	Cholecystokinin (Pancreozymin, CCK)	Secretin	Gastric Inhibitory Peptide (GIP)	Vasoactive Intestinal Peptide (VIP)	Motilin	Somatostatin
Site of secretion	Gastrin-secretory cells (G-cells) from the mucosa of antrum & duodenum.	APUD cells in the mucosa of the small intestine.	APUD cells in the mucosa of the duodenum and upper part of the small intestine.	APUD cells in the mucosa of the upper part of the small intestine.	APUD cells in the mucosa of the small intestine.	APUD cells in the mucosa of the upper part of the small intestine.	D-cells of GIT mucosa and D-cells of pancreas.
Mechanism of secretion	<p><b>Stimulation:</b></p> <p><b>*Luminal:</b></p> <ul style="list-style-type: none"> <li>-Rise pH above 2 of the fluid bathing the antrum &amp; duodenal mucosa: this occurs just after intake of meals.</li> <li>-Chemical stimuli as soup extracts &amp; peptones: Gastrin is increased by the presence of the products of protein digestion in the stomach, particularly amino acids, which act directly on the G-cells. Phenylalanine and tryptophan are particularly effective.</li> <li>-Distension of the wall of the pyloric antrum of the stomach.</li> </ul> <p><b>*Neuronal:</b></p> <ul style="list-style-type: none"> <li>-Vagal stimulation via GRP. Atropine does not inhibit the gastric response to a test meal in humans, because the transmitter secreted by post-ganglionic vagal fibers that innervate the G-cells is Gastrin-releasing peptide (GRP).</li> </ul> <p><b>Inhibition:</b></p> <p><b>*Luminal:</b></p> <ul style="list-style-type: none"> <li>-Acid (HCl) in the lumen and somatostatin.</li> </ul> <p><b>*Blood-borne:</b></p> <ul style="list-style-type: none"> <li>-Secretin and GIP.</li> </ul>	Contact of small peptides, amino acids, fatty acids and bile salts to the mucous membrane of the upper part of the small intestine.	Decline in the pH of the fluid bathing the upper intestinal mucosa below 4.5, i.e. by the acid bathing the mucosa of upper intestine. This occurs when the acid chyme is released from the pylorus into the duodenum.	Due to presence of glucose and fat in the duodenum.	The presence of products of digestion in the lumen of the small intestine.	Contact of the digestive products with the mucosa of the upper part of the small intestine.	By HCl in the lumen of all GIT.
Actions	<ol style="list-style-type: none"> <li>1. Stimulation of acid and pepsin secretion by the stomach.</li> <li>2. Stimulation of the growth of mucosa of the stomach, small intestine &amp; colon (Trophic action).</li> <li>3. Stimulation of gastric motility.</li> <li>4. Stimulation of insulin release after a protein meal.</li> </ol>	<ol style="list-style-type: none"> <li>1. Stimulation of pancreatic juice rich in enzymes.</li> <li>2. Contraction of the wall of the gallbladder.</li> <li>3. Augments the action of secretin on producing secretion of alkaline pancreatic juice.</li> <li>4. Trophic effect on the pancreas.</li> <li>5. Inhibits gastric emptying.</li> <li>6. Enhance the motility of the small intestine and colon.</li> <li>7. Stimulate insulin secretion.</li> </ol>	<ol style="list-style-type: none"> <li>1. Stimulation of secretion of pancreatic juice large in volume and rich in bicarbonate. This increase the pH of the fluid in the upper part of the small intestine to become suitable for the action of digestive pancreatic enzymes.</li> <li>2. Augments the action of the CCK in production of pancreatic secretion if digestive enzymes.</li> <li>3. Inhibition of gastric acid secretion.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inhibition of the secretion of HCl by the stomach.</li> <li>2. Stimulation of insulin secretion.</li> </ol>	<ol style="list-style-type: none"> <li>1. Stimulates intestinal secretion of electrolytes and hence of water.</li> <li>2. Vasodilatation of the intestinal vessels.</li> <li>3. Stimulation of the pancreatic bicarbonate secretion.</li> <li>4. Inhibition of gastric secretion.</li> <li>5. Relaxation of gastrointestinal smooth muscles.</li> </ol>	<ol style="list-style-type: none"> <li>1. Stimulation of antral and duodenal motility.</li> <li>2. Contraction of the lower esophageal sphincter.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inhibition of gastric acid secretion.</li> <li>2. Inhibition of gastrin, GIP, VIP, secretin and motilin.</li> </ol>
Notes	<p><b>Zollinger-Ellison Syndrome: "Pancreatic Islet Cell Adenoma Gastrinemia)</b></p> <p>It is a disease where the non-beta cell tumor in the islets of the pancreas. These cells secrete large amounts of gastrin, resulting in high levels of gastrin in blood (Hypergastrinemia). There is increased secretion of highly acidic gastric juice leading to the development of duodenal ulcers.</p>		Decreased secretion of secretin leads to marked drop of pH in the duodenum leading to duodenal ulcers. The nicotine in Tobacco inhibits the release of secretin. It is common that heavy smokers suffer from duodenal ulcers.				