

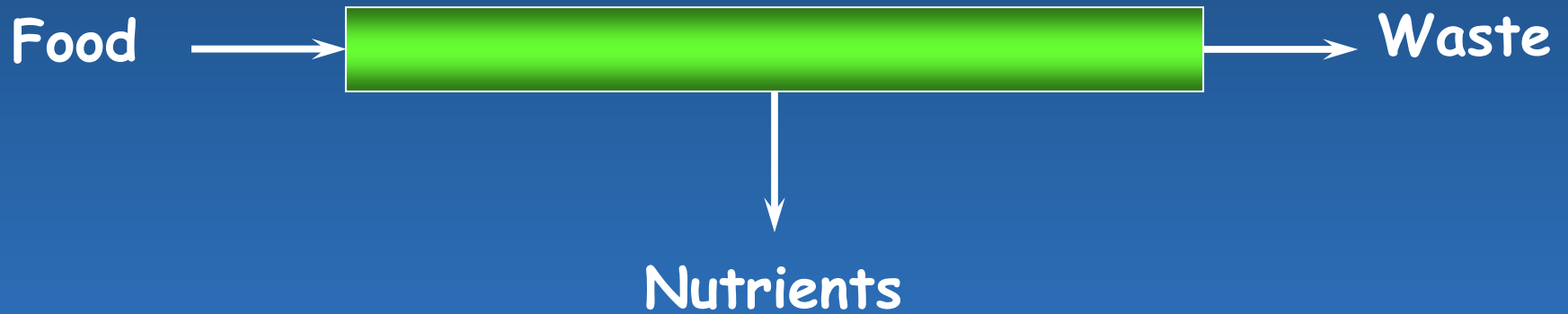
Harvard-MIT Division of Health Sciences and Technology

HST.121: Gastroenterology, Fall 2005

Instructors: Dr. Jonathan Glickman

Overview of Gastroenterology

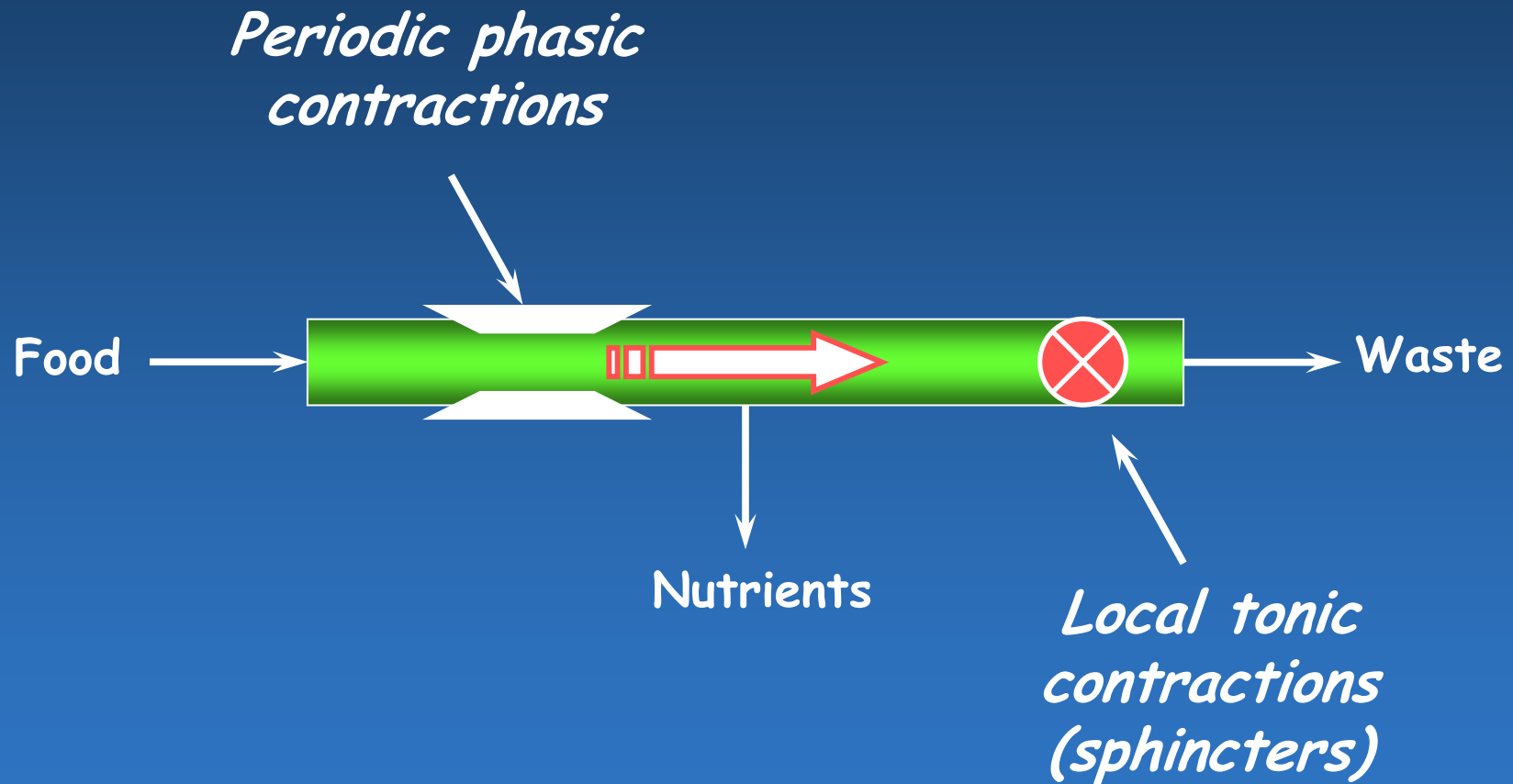
Gastroenterology Made Really Simple!



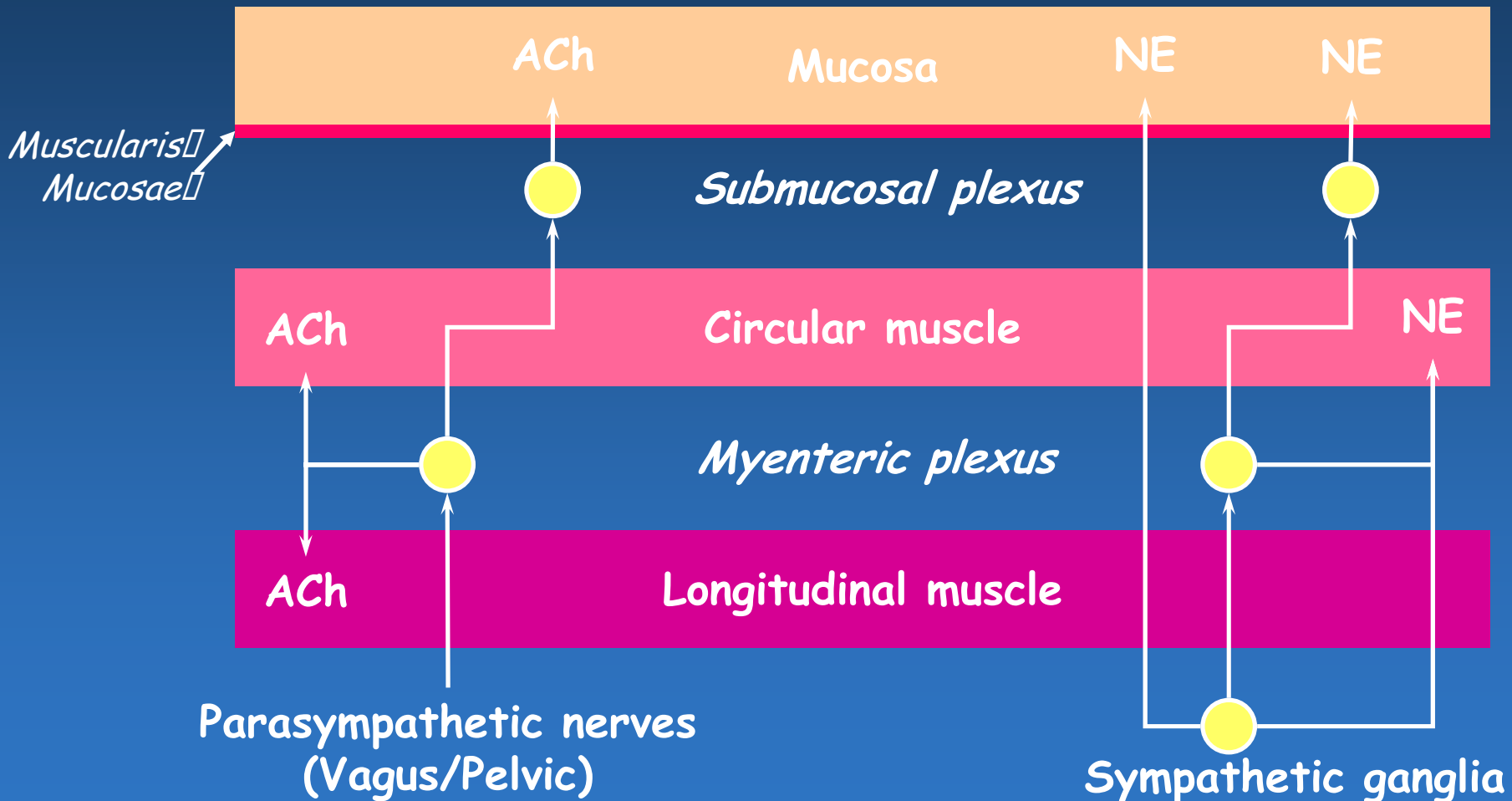
The Basic Structure

Image removed due to copyright reasons.

The Propulsion System: Driven by the Muscles



The Neural Control System: The Brain in the Gut

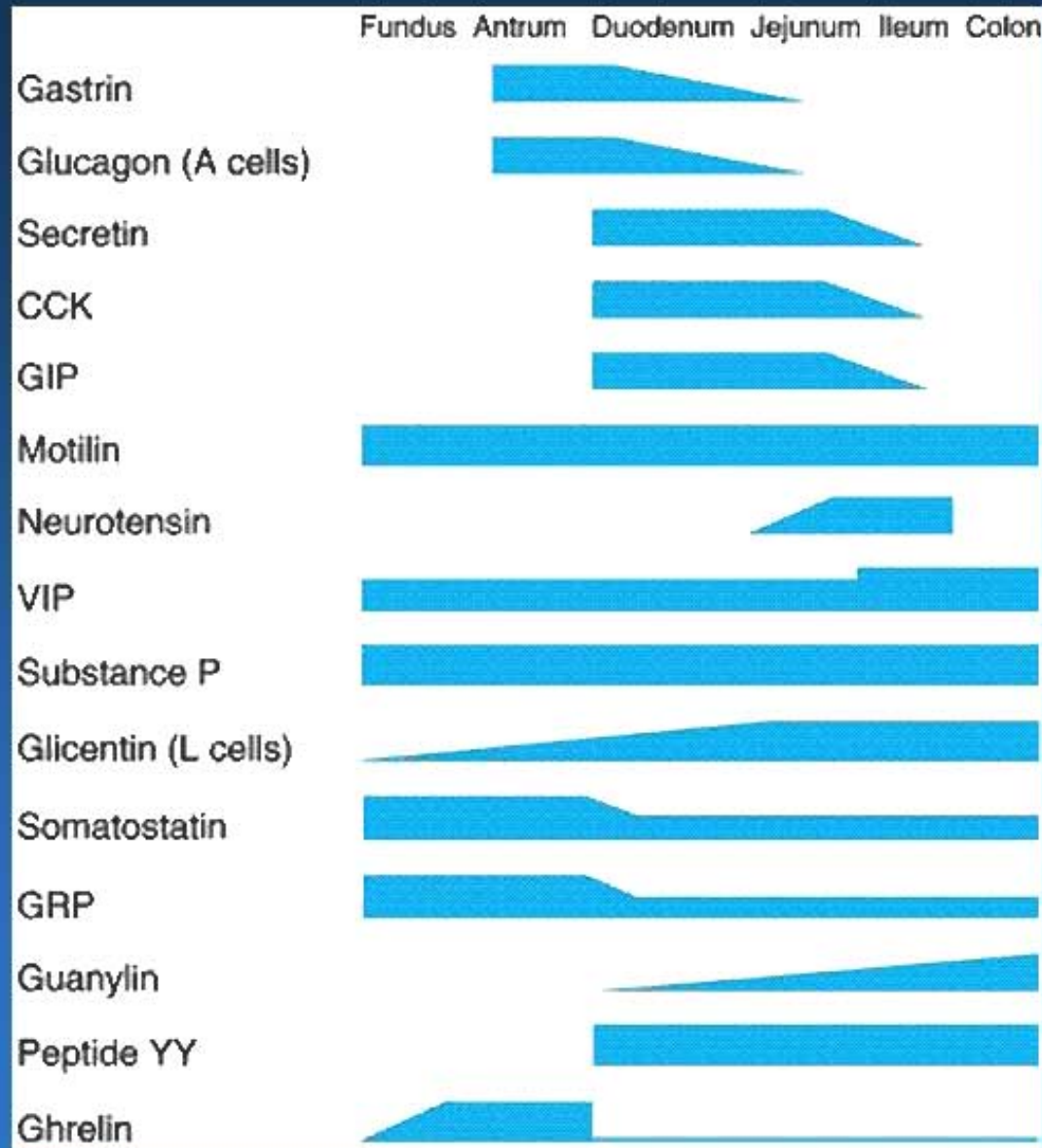


The Neurocrine Effectors

Peptide	Actions
Acetylcholine (ACh) •	•Smooth muscle contraction •Sphincter relaxation □• Increased salivary, gastric, and pancreatic secretions
Norepinephrine (NE)	Smooth muscle relaxation Sphincter contraction Increased salivary secretion
Vasoactive intestinal peptide (VIP)	Smooth muscle relaxation Increased intestinal and pancreatic secretions
Gastrin-releasing peptide (GRP, bombesin)	Increased gastrin secretion
Enkephalins	Smooth muscle contraction Decreased intestinal secretions
Substance P	Smooth muscle contraction Increased salivary secretions
Neuropeptide Y	Smooth muscle relaxation Decreased intestinal secretions

The hormonal control system

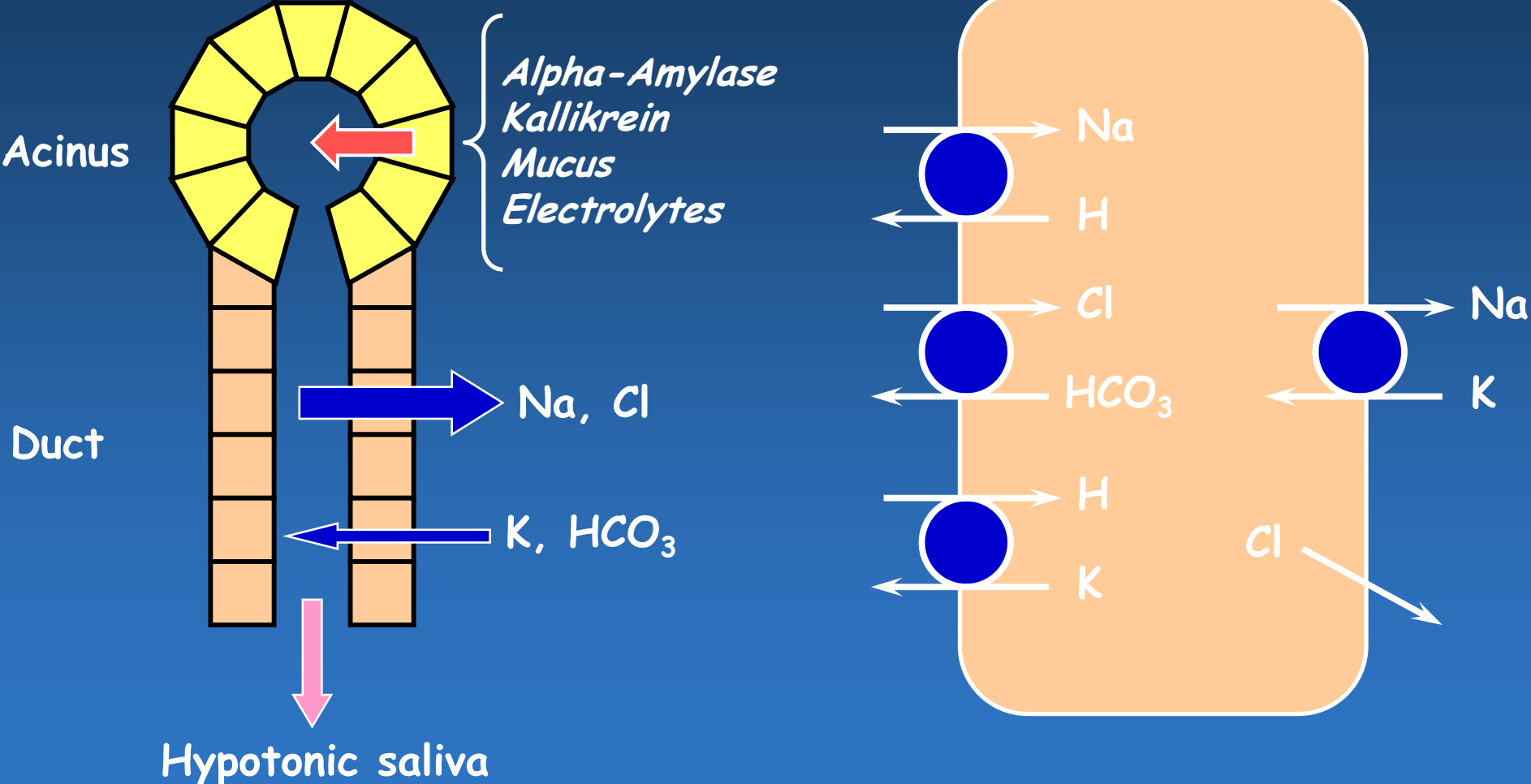
Hormone	Stimuli	Site of secretion	Actions
Gastrin	Vagal stimulation Gastric distension Peptide and amino acids	G cells (stomach)	Stimulation of gastric acid secretion Growth of gastric mucosa
Cholecystokinin (CCK)	Fatty acids Peptide and amino acids	I cells (duodenum and jejunum)	Pancreatic enzyme, HCO ₃ secretion Gallbladder contraction Inhibition of gastric emptying
Secretin	Fatty acids Duodenal motility	S cells (duodenum)	Pancreatic enzyme, HCO ₃ secretion Inhibition of gastrin, acid secretion
Ghrelin	Fasting	Stomach	Stimulates appetite (CNS)
Glucagon-like peptide (GLP-1)	Fatty acids, amino acids Oral glucose	L cells (duodenum and jejunum)	Satiety (CNS) Inhibition of acid secretion Stimulation of insulin secretion



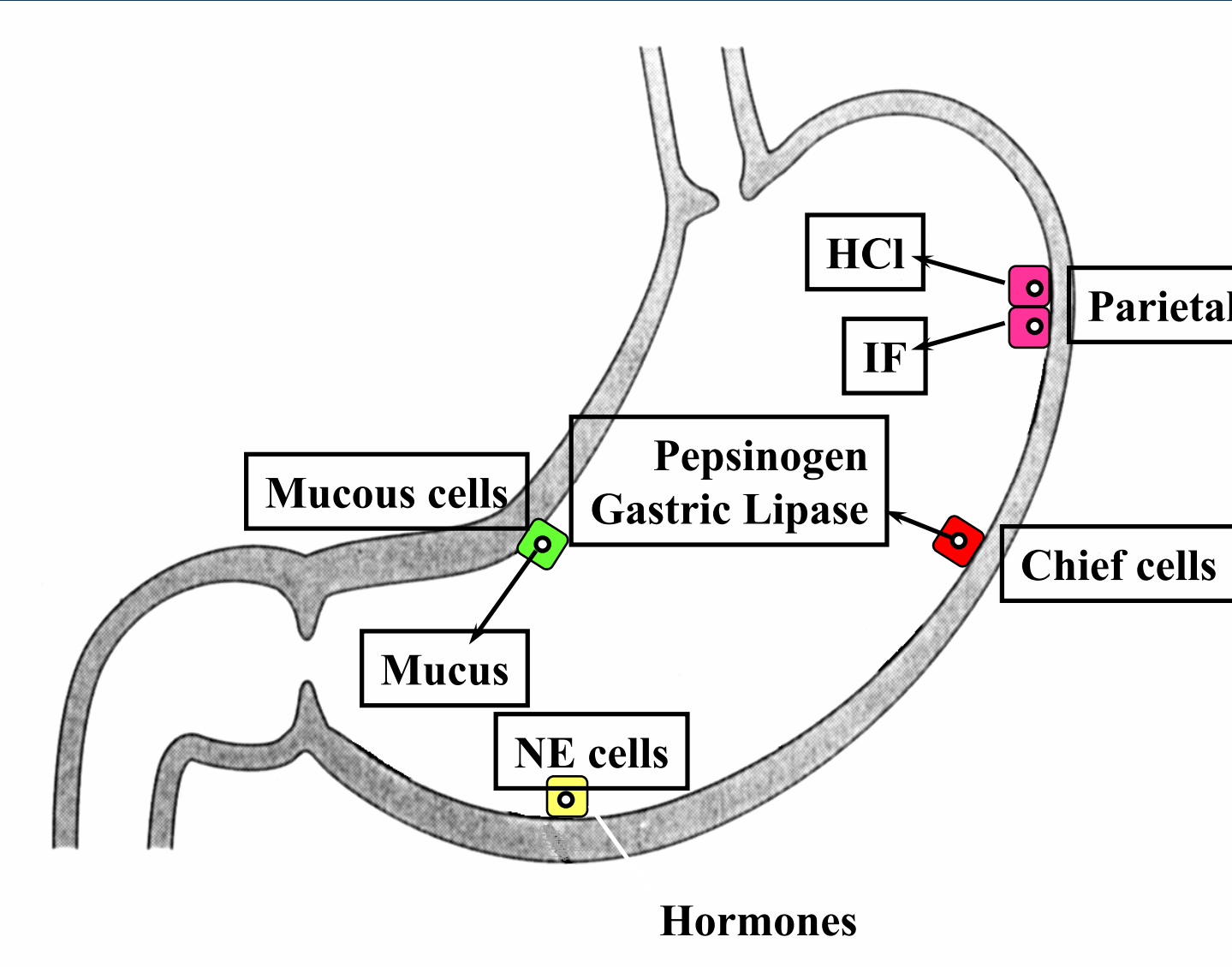
Gut-brain hormonal interactions

Image removed due to copyright reasons.

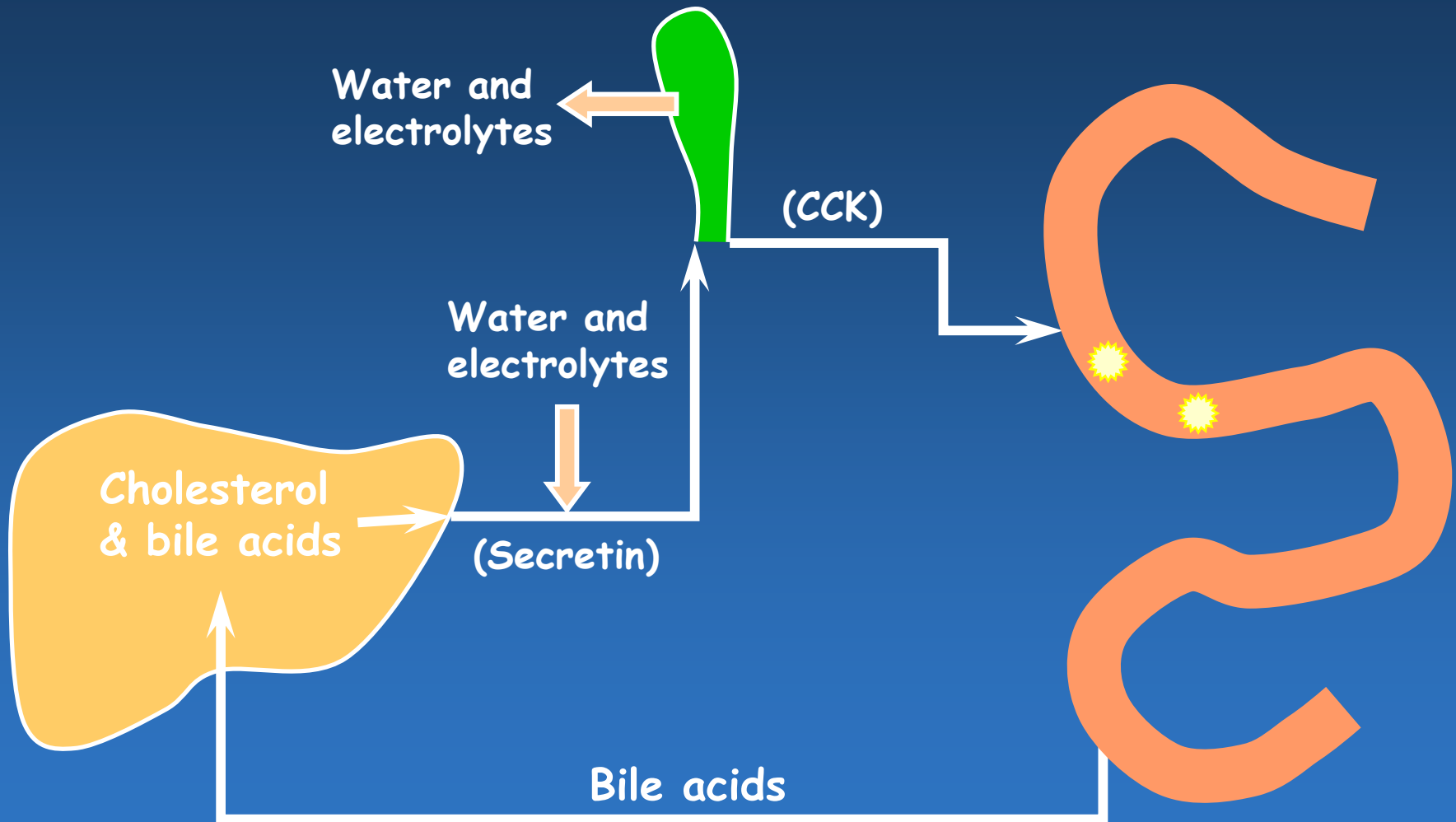
Salivary Secretion



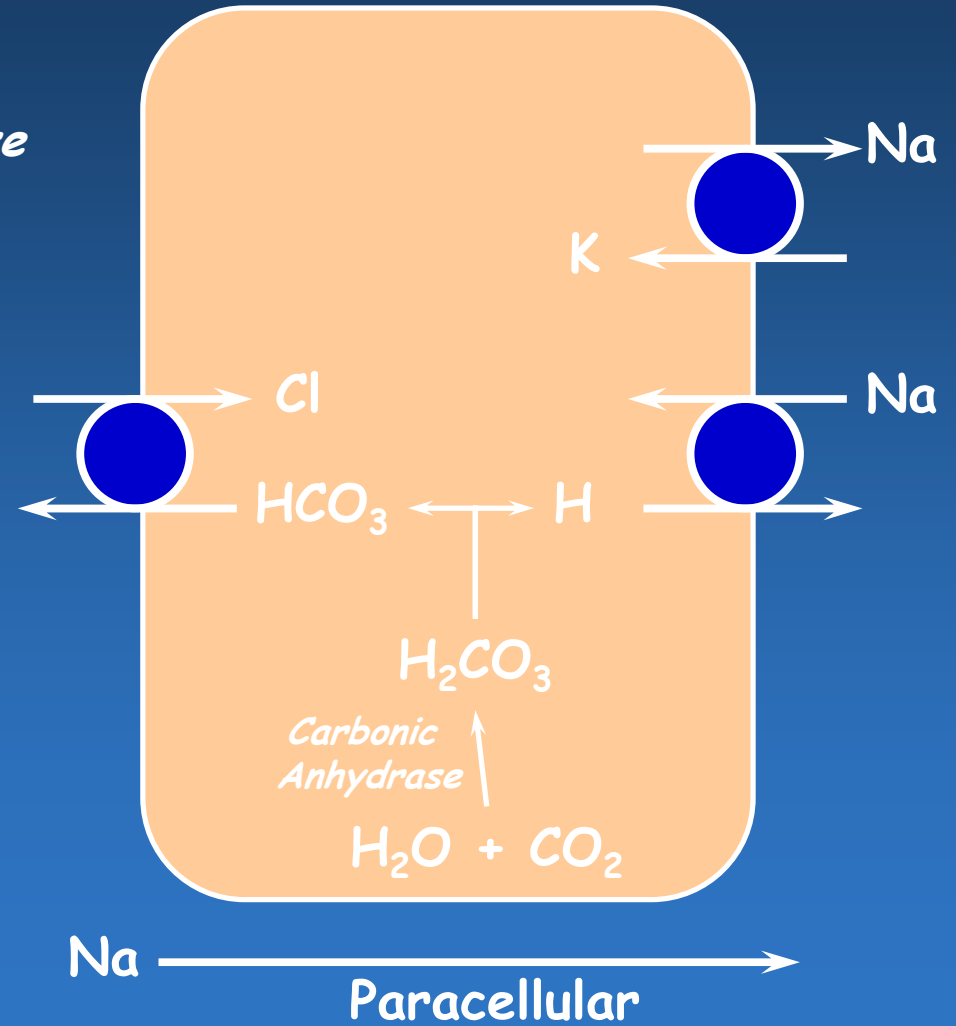
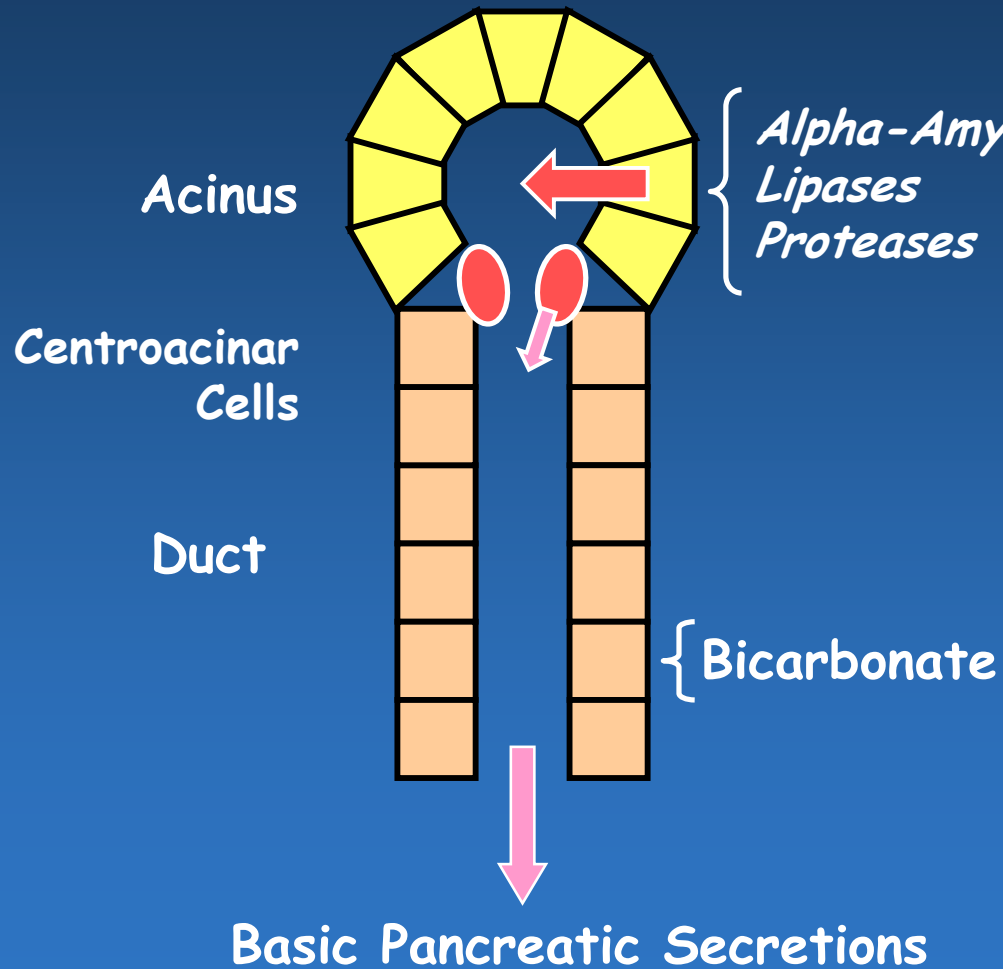
Gastric Secretions



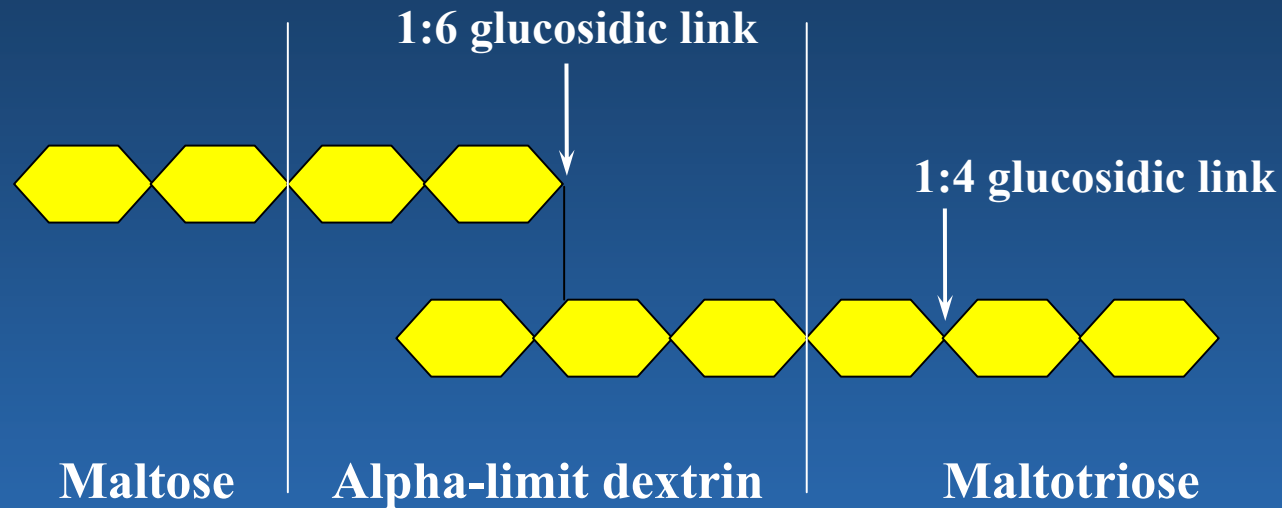
Biliary Secretion



Pancreatic Secretions

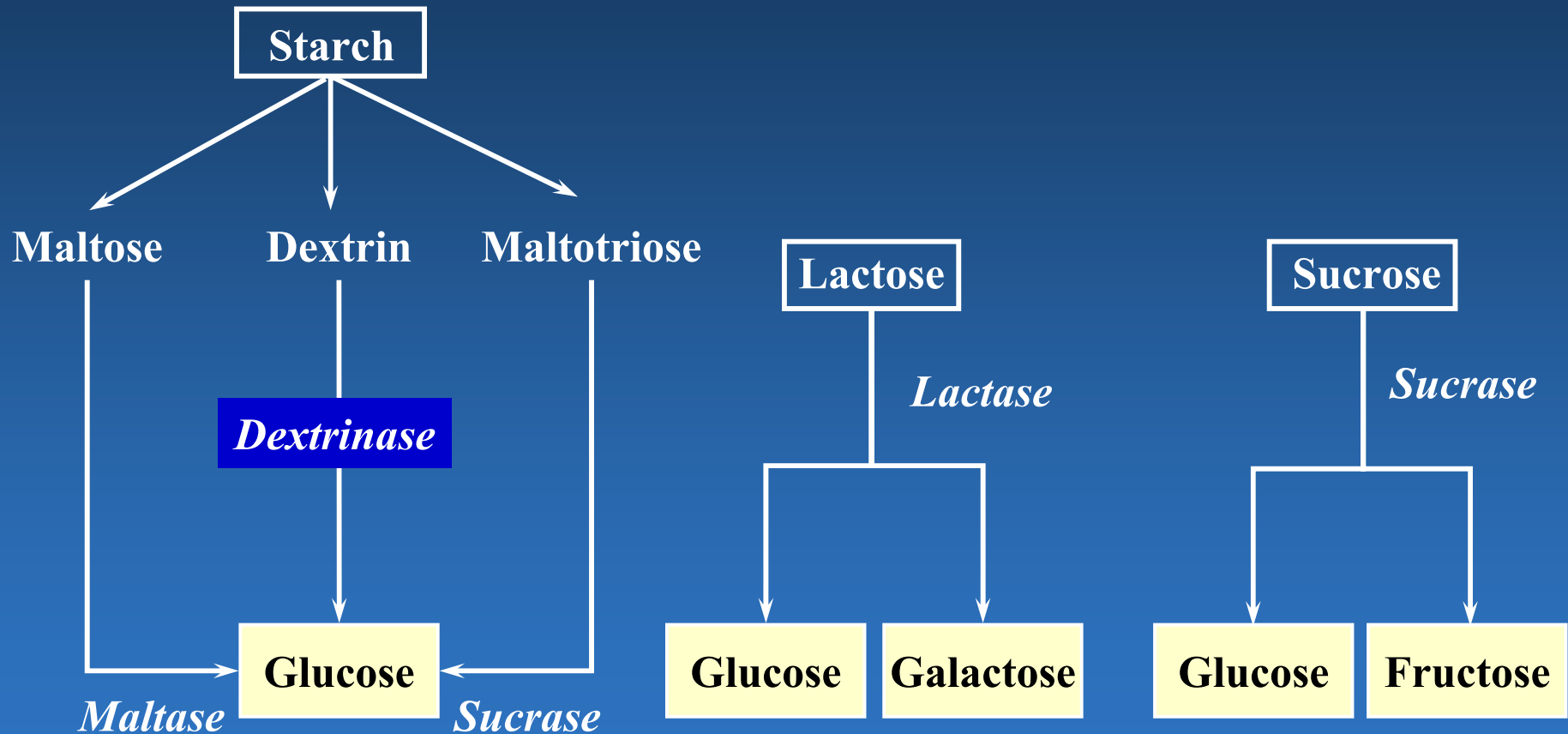


Carbohydrate Digestion

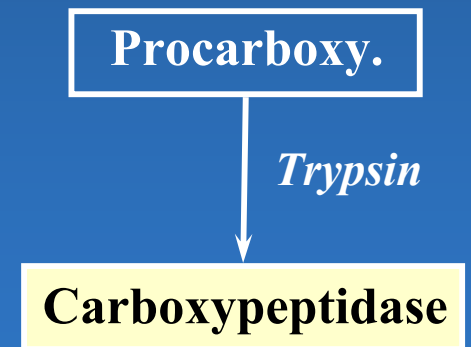
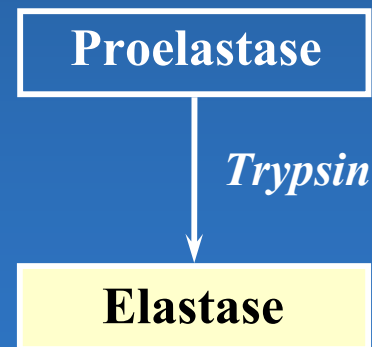
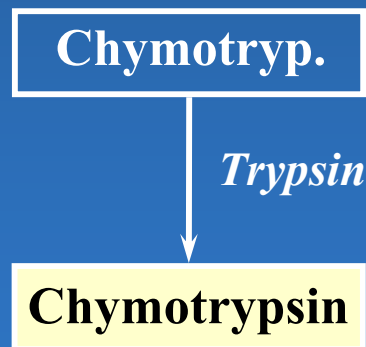
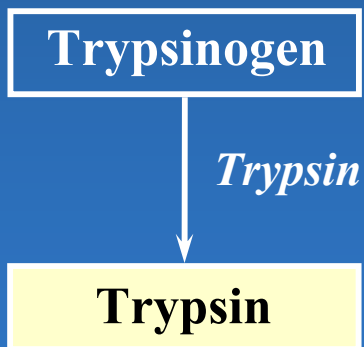
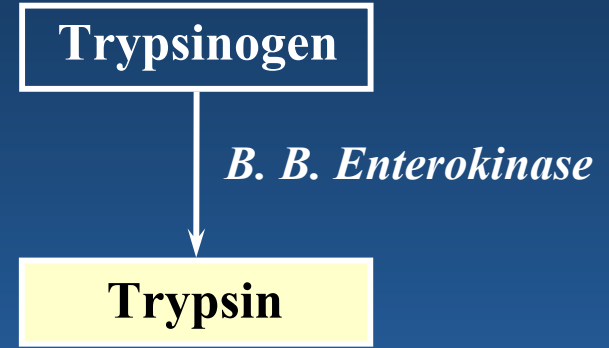
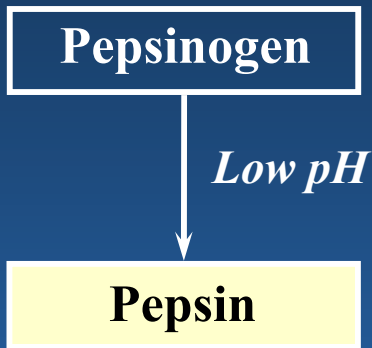


Alpha-amylase breaks 1:4 linkages except at either end of starch molecules. This results in the production of three simple sugars as shown above.

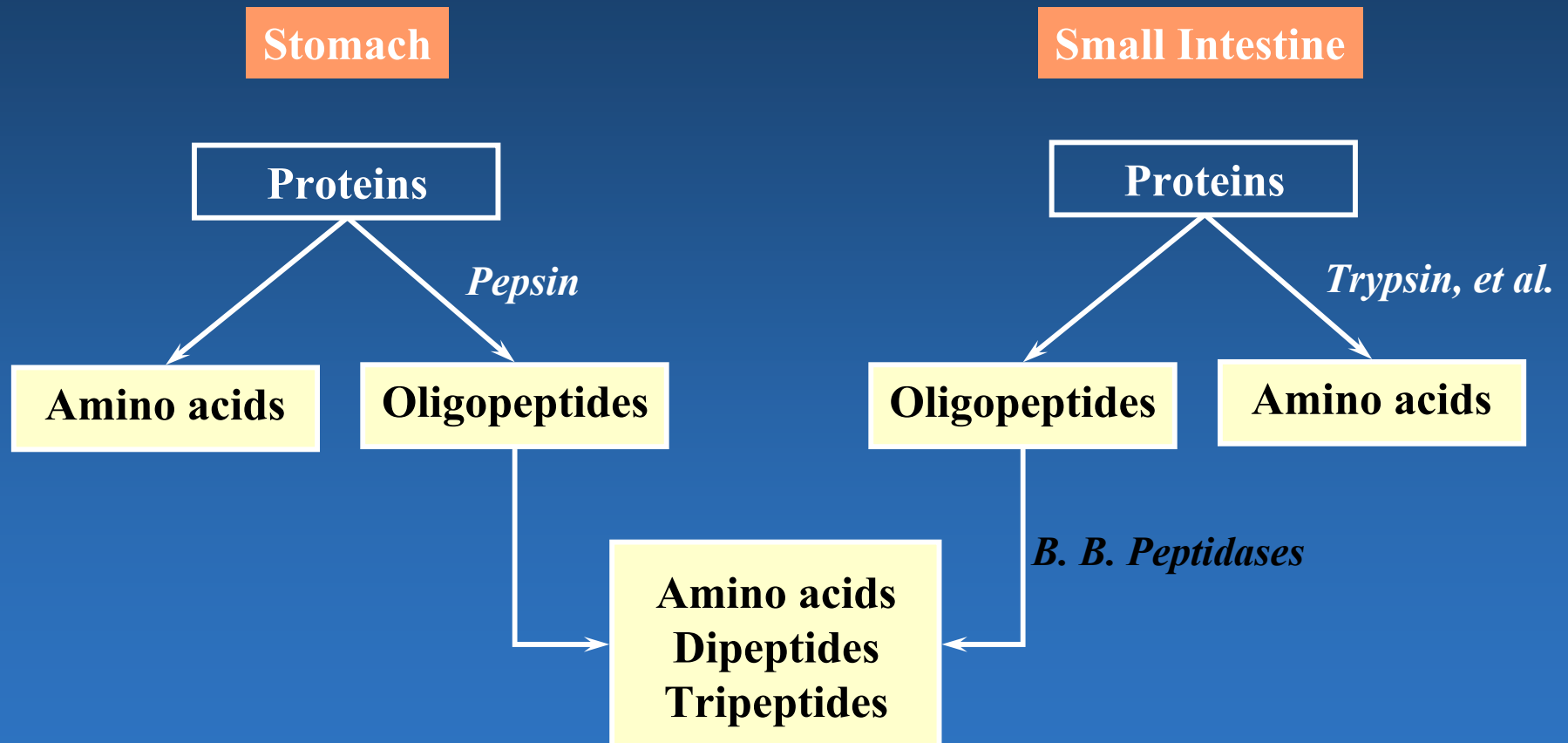
Overview of Carbohydrate Digestion



Overview of Protein Digestion



Overview of Protein Digestion



Overview of Lipid Digestion

