Key concepts in Digestion IV

The Brain-Gut axis

…gut to brain, brain to gut talk...

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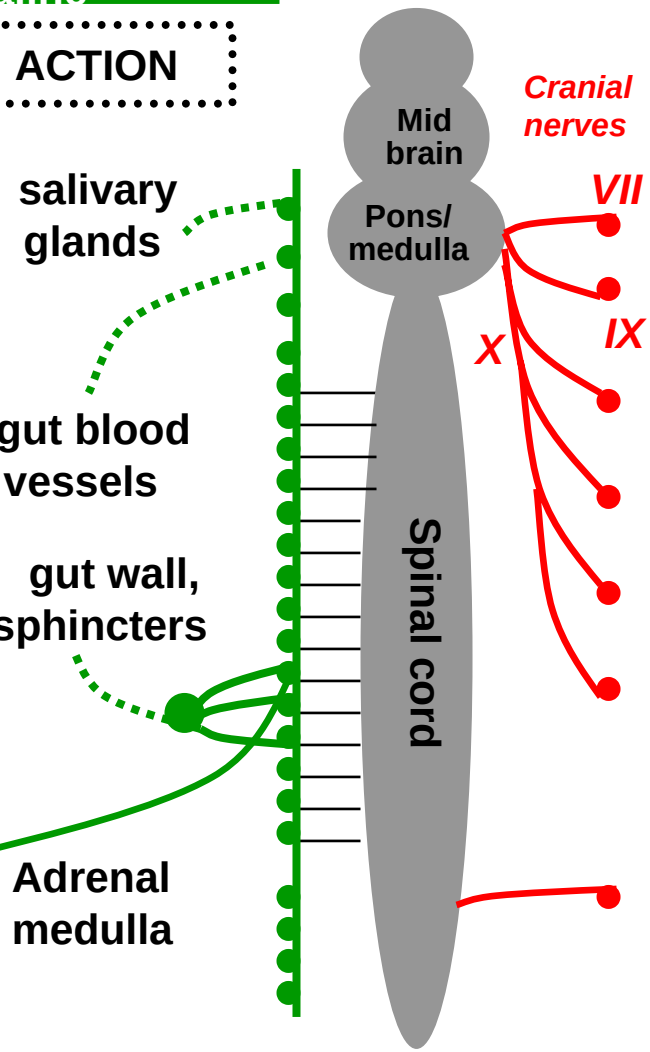
The autonomic nervous system

Sympathetic system: Noradrenaline

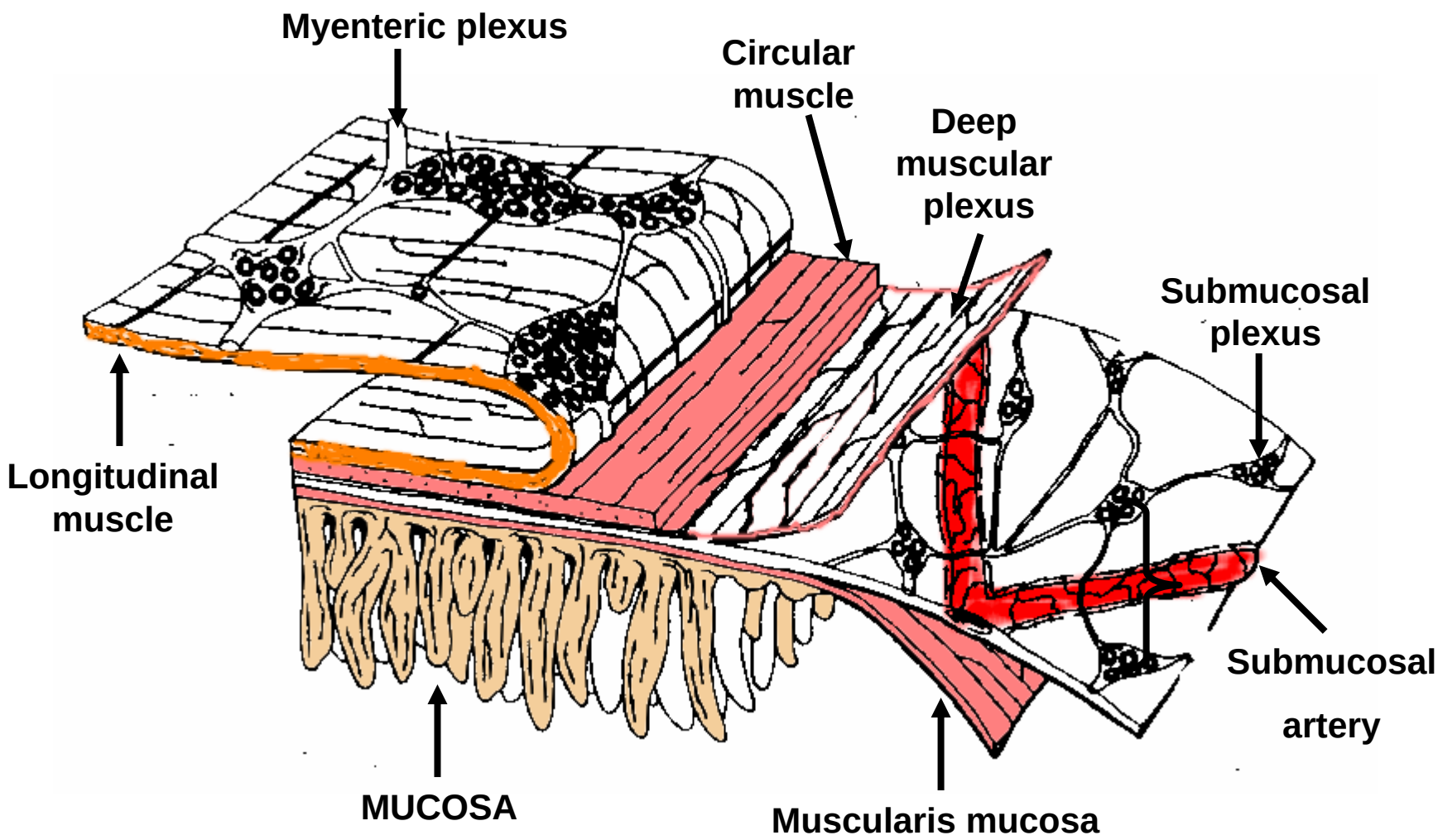
EFFECTS	ACTION
β (+) secretion of saliva	salivary glands
α (+) vasoconstriction β2 (-) vasodilation	gut blood vessels
β1/2 (-) decrease motility α (+) contraction	gut wall, sphincters
adrenaline (+) secretion	Adrenal medulla



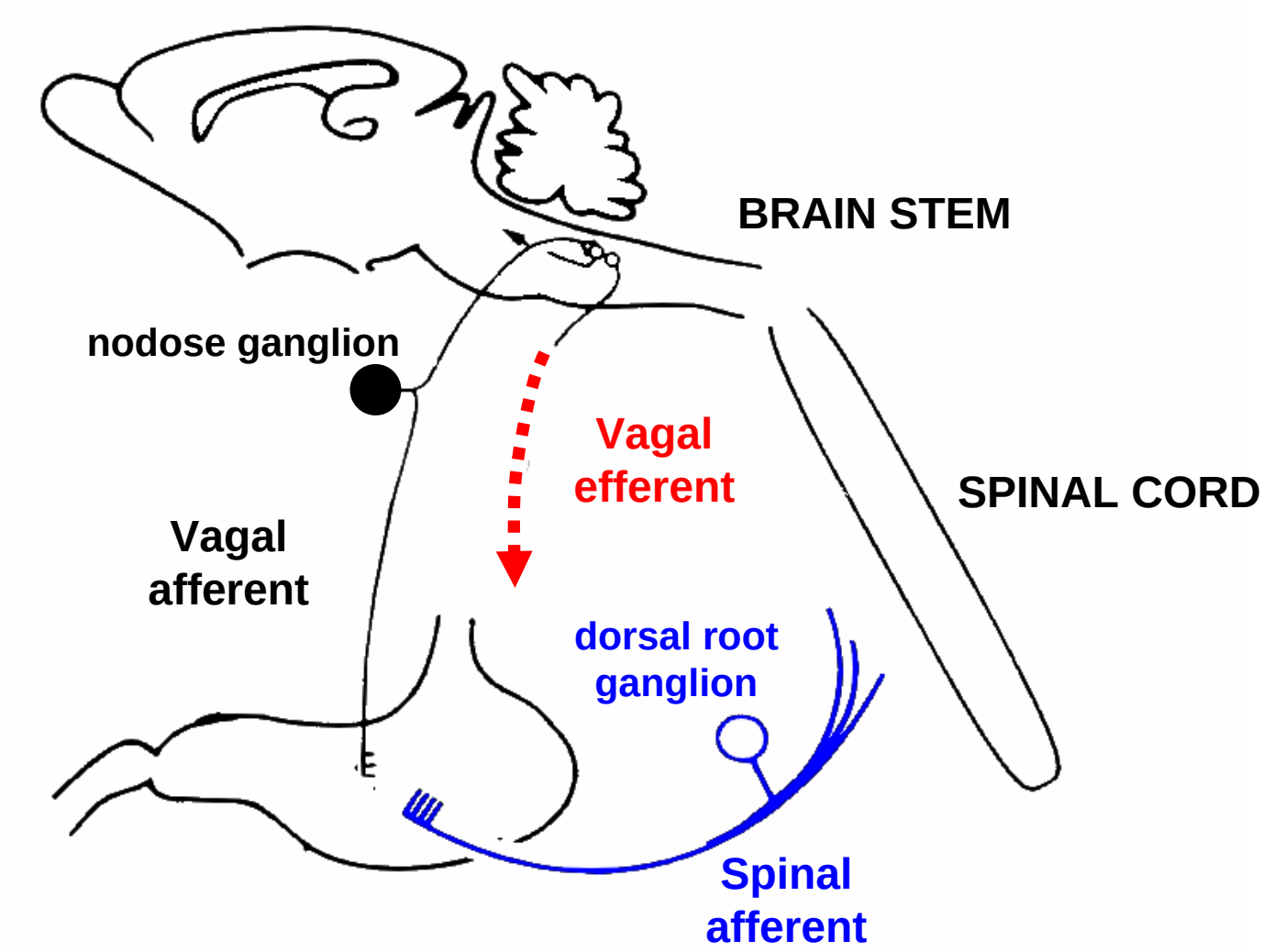
Parasympathetic system: Acetylcholine (Ach)

ACTION	EFFECTS
Salivary glands	(+) secretion of saliva
Gut wall	(+) increased motility and tone
Gut sphincters	(-) reflex relaxation
Gut secretions	(+) e.g acid, enzymes & electrolytes
Pancreas	(+) exocrine & endocrine secretion
Rectum	(+) defaecation

The enteric nervous system



CNS to gut connections



The brain-gut axis

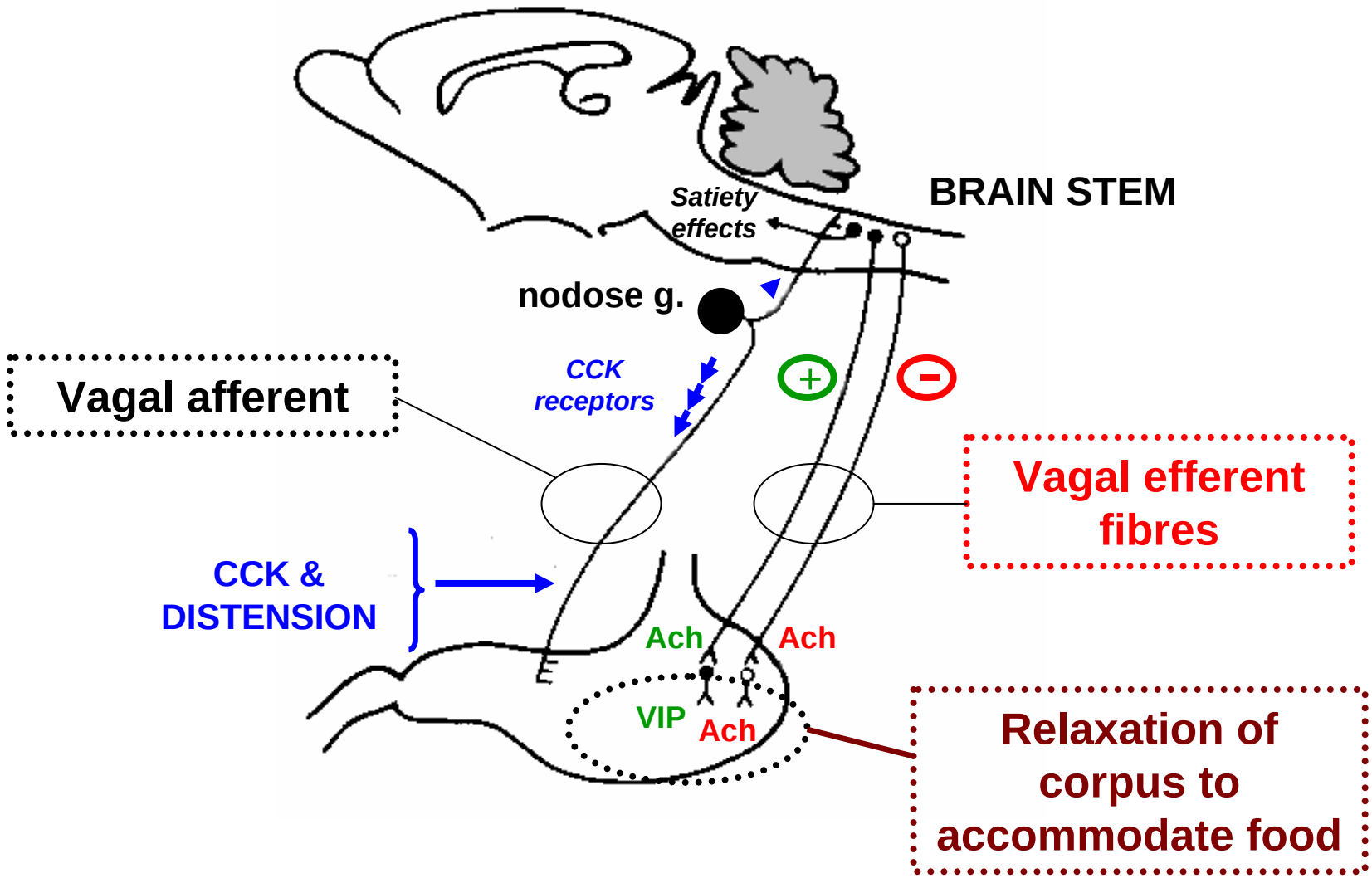
Gut- to- brain
(afferent neurons)

- **autonomic reflexes**
- **e.g. vago-vagal reflex control of gastric tone**
- **Pain**
- **discomfort, bloating etc.**
- **cyto-protection**
- **reflex control of blood flow**

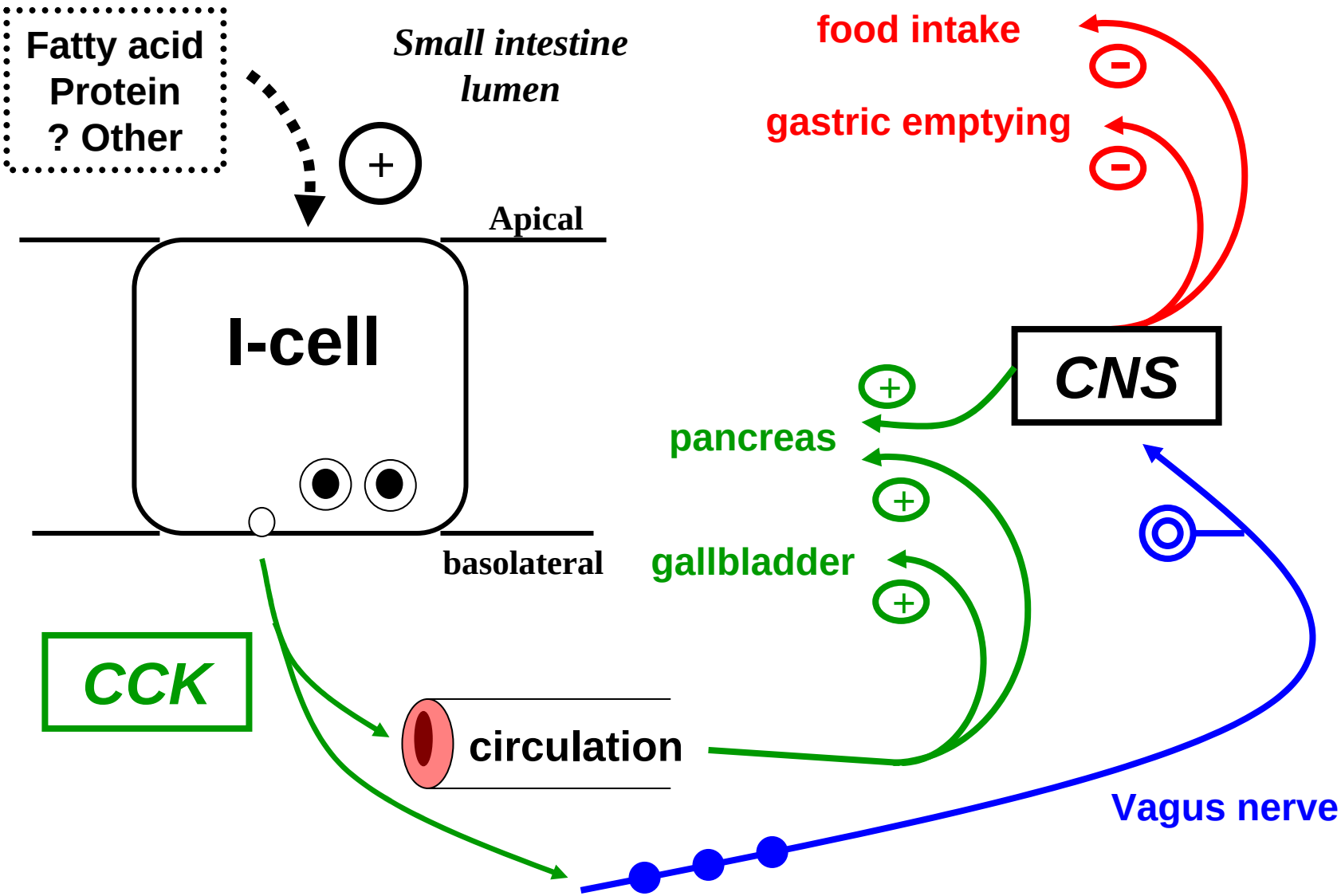
Brain- to- gut
(efferent neurons)

- **“Cephalic phase”**
- **thought, smell, taste stimulate H^+**
- **autonomic reflexes**
- **e.g. vago-vagal reflex control of gastric tone**

Receptive relaxation of the body of the stomach (corpus) in response to a meal



Cholecystokinin (CCK) cell physiology



CCK: integrator of brain and gut

Cholecystokinin (CCK)

regulates digestion in the small intestine by:

- **stimulating secretion of pancreatic juice**
- **stimulating gallbladder contraction**
- **inhibiting gastric emptying and food intake**

CCK acts directly on pancreas and gallbladder, and modifies CNS function via the vagus nerve