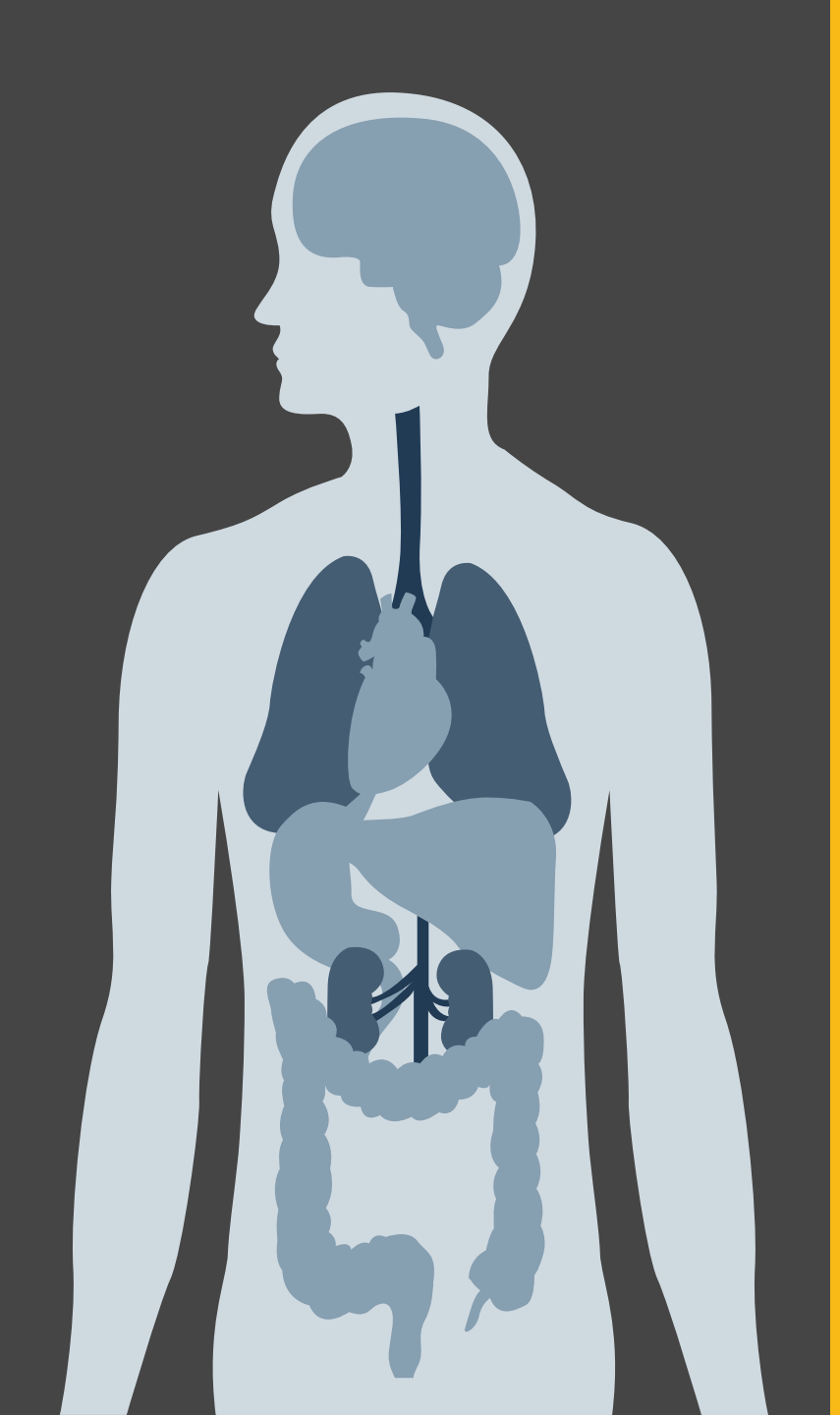

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GASTROINTESTINAL PEPTIDES

Year 2 Medicine
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3049
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OBJECTIVES

- Describe the Effects of **Gastrointestinal Peptides** on Food Intake
- Discuss Possible Treatments for **Obesity**
- Describe the **Functions** of Carbohydrates, Fats, Proteins, Vitamins, Minerals and Water

Introduction

- The gastrointestinal tract is the body's largest endocrine organ and releases more than 20 different regulatory peptide hormones.

- Most of these hormones are sensitive to gut nutrient content and food intake is mediated, in part, by coordinated changes in circulating peptide hormone levels.

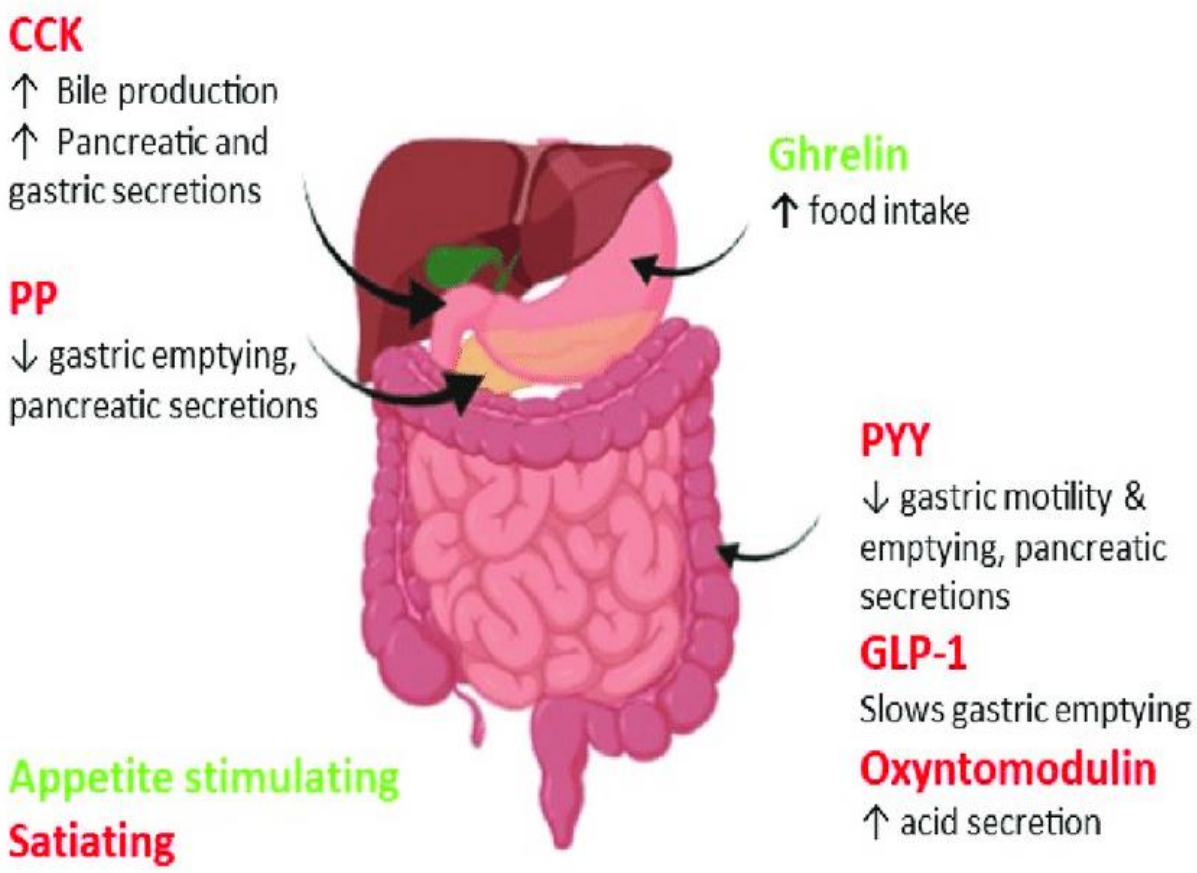
Gastrointestinal Peptides and Food Intake

Several peptides are released from the gut. Most are anorexigenic and inhibit food intake, mainly:

- **cholecystokinin (CCK)**,
- **glucagon-like peptide 1 (GLP-1)**,
- **peptide YY (PYY)**,

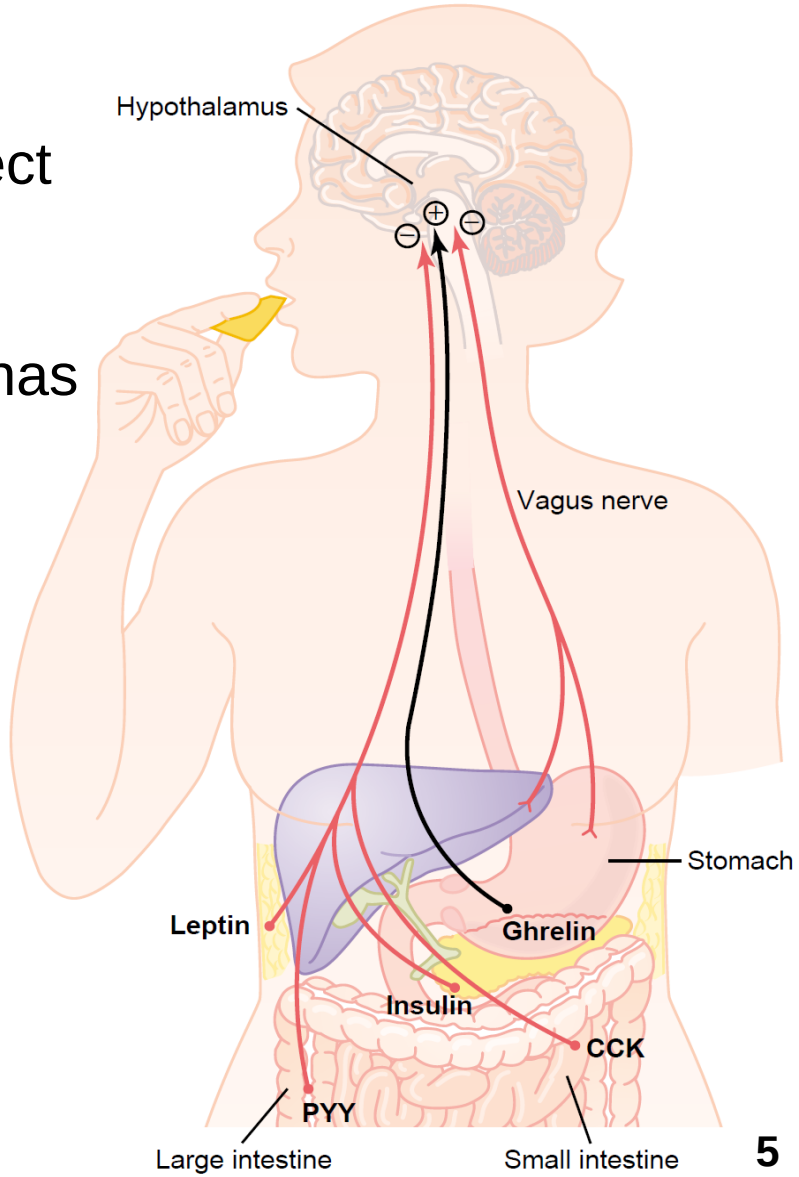
while only one peptide is orexigenic and stimulates food intake:

- **ghrelin**.



Feedback for Control of Food Intake

- Cholecystokinin is released from the duodenum and has direct effects on the hypothalamus to reduce eating.
- Peptide YY (PYY) is secreted from the ileum and colon and has a similar effect to cholecystokinin
- Glucagon-like peptide enhances insulin secretion from the pancreas, and both suppress food intake.
- Ghrelin is released mainly by the stomach and is known to induce food intake and stimulate gastric emptying.

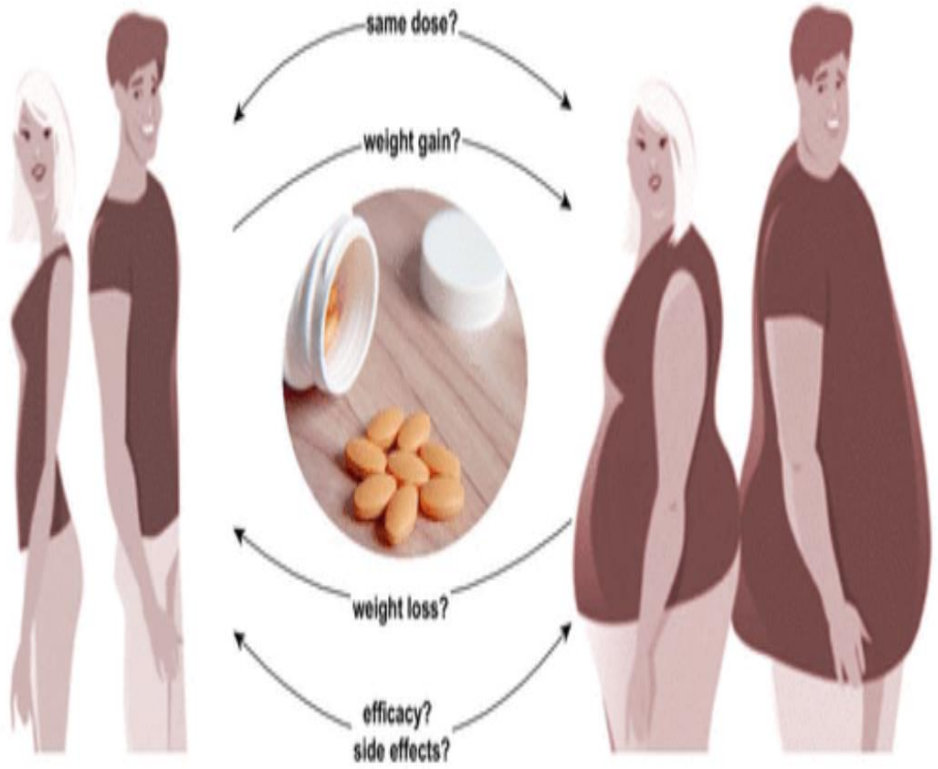


Conservative Treatment: Physical Activity

Long-term physical activity is able to reduce body weight and has an impact on gastrointestinal peptide hormones. The concentration of ghrelin is reduced following aerobic sports and resistance exercise, contributing to a reduction of food intake. This is also accompanied by reciprocal changes of anorexigenic hormones.

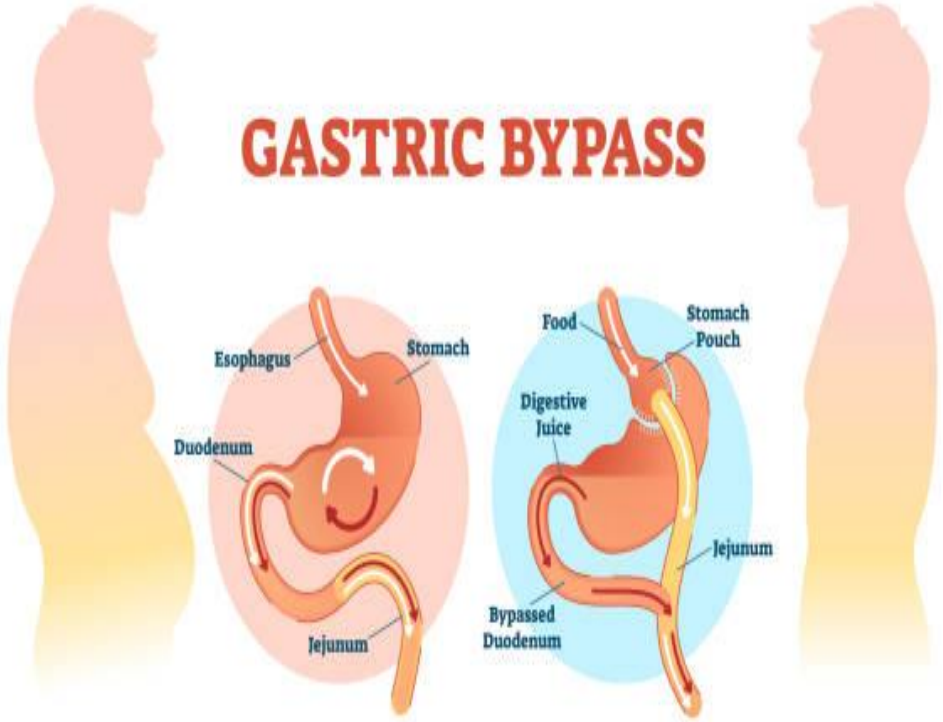
Conservative Treatment: Pharmacology

Only a few drugs targeting gut peptide hormones are available. A promising approach is to block the action of ghrelin in the CNS by inhibiting its acylation using ghrelin-O-acyltransferase inhibitors (peptide analogues). Many other targets of anti-obesity drugs exist within and outside the CNS, but further investigations are needed.



Surgical Treatment: Bariatric Surgery

Bariatric surgery works by changing the anatomy of the stomach and by altering gastrointestinal peptide signaling. It has been shown that some types of bariatric surgery have led to a pronounced and long-lasting decrease of circulating ghrelin.



Surgical Treatment: Deep Brain Stimulation

New approaches have been tested to reduce body weight and food intake. One of the most interesting approaches is deep brain stimulation (DBS), in which electrical impulses are delivered to feeding centers in the CNS to modulate a disturbed neuronal network and induce weight loss.

Nutrients

Nutrients are required by the body to sustain basic functions and are optimally obtained by eating a balanced diet.

There are six major classes of nutrients essential for human health → carbohydrates, lipids, proteins, vitamins, minerals, and water.

Functions of the Essential Nutrients

Carbohydrates – Provide a ready source of energy for the body and structural constituents for the formation of cells.

Proteins – Necessary for tissue formation, cell reparation, hormone and enzyme production, and a healthy immune system.

Fats – Provides stored energy for the body, functions as structural components of cells, signaling molecules for proper cellular communication, provides insulation to vital organs and works to maintain body temperature.

Vitamins – Regulate body processes and promote normal body system functions.

Minerals – Regulate body processes, are necessary for proper cellular function, and comprise body tissue.

Water – Transports essential nutrients, transports waste products for disposal, and aids with body temperature maintenance.

Conclusion

The basic mechanisms regulating food intake are complex and difficult to modulate. A better understanding of the pathophysiology of peptide regulators is important to clarify their role in obesity and also for the treatment of any dysregulations.

Finally, it should be highlighted that a healthy lifestyle in which weight loss can be achieved by a balanced diet and physical activity is better than more invasive approaches.

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THANK YOU