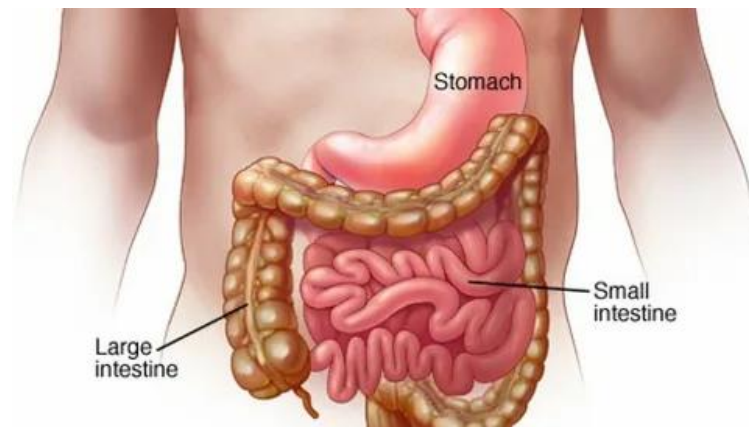


Small Intestine



Introduction to the Small Intestine

The small intestine is a crucial organ in the digestive system responsible for absorbing nutrients from the food we eat. This 609.6 Centimetres tube is where the majority of digestion and nutrient absorption occurs in the human body.

Anatomy of the Small Intestine

- **Three Segments:** The small intestine is divided into three segments: the duodenum, jejunum, and ileum.
- **Duodenum:** This is the first and shortest part, about 10 inches long, and is where the partially digested food from the stomach mixes with digestive enzymes from the pancreas and bile from the liver.
- **Jejunum:** The middle section, approximately 8 feet long, is where most nutrient absorption takes place.
- **Ileum:** The final section, about 11 feet long, further absorbs nutrients and connects to the large intestine.

Digestion in the Small Intestine

- **Enzyme Action:** As food enters the duodenum, enzymes break down carbohydrates, proteins, and fats into simpler molecules.
- **Nutrient Absorption:** The walls of the small intestine are lined with tiny finger-like projections called villi and microvilli, increasing the surface area for nutrient absorption.
- **Absorption of Nutrients:** Villi and microvilli absorb nutrients such as glucose, amino acids, and fatty acids, transporting them into the bloodstream for delivery to cells throughout the body.

Path Through the Small Intestine

- **Stomach to Duodenum:** Food travels from the stomach into the duodenum through the pyloric sphincter, a muscular valve that controls the release of chyme (partially digested food) into the small intestine.
- **Duodenum to Jejunum:** After mixing with digestive enzymes and bile, chyme moves through the duodenum into the jejunum, where most nutrient absorption occurs.

- **Jejunum to Ileum:** The remaining chyme then progresses through the jejunum to the ileum.
- **Ileocecal Valve:** At the end of the ileum, there is a valve called the ileocecal valve, which separates the small intestine from the large intestine. It regulates the flow of material between these two sections.

Nutrient Transport

- **Bloodstream:** Once absorbed, nutrients enter the bloodstream through tiny blood vessels in the villi.
- **Distribution:** The bloodstream carries these nutrients to cells throughout the body, providing essential energy and building blocks for growth and repair.

Conclusion

In summary, the small intestine is a vital organ in the digestive process, where food is broken down, and nutrients are absorbed for use by the body. Its intricate anatomy and efficient nutrient absorption mechanisms make it a key player in maintaining our overall health and well-being. Understanding its functions and the path of digestion through the small intestine is essential for appreciating the complexity of the digestive system.

Celiac Disease

- **Overview:** Celiac disease is an autoimmune disorder where the immune system reacts to gluten, a protein found in wheat, barley, and rye. This reaction damages the lining of the small intestine.
- **Impact on Small Intestine:** The inflammation and damage to the small intestine's lining reduce its ability to absorb nutrients, leading to malnutrition and various digestive symptoms.
- **Pathophysiology:** When someone with celiac disease consumes gluten, it triggers an immune response that attacks the villi in the small intestine. This damage impairs nutrient absorption and can lead to diarrhoea, weight loss, and other symptoms.

Crohn's Disease

- **Overview:** Crohn's disease is a chronic inflammatory bowel disease that can affect any part of the digestive tract, including the small intestine.
- **Impact on Small Intestine:** Inflammation in the small intestine can cause pain, diarrhoea, and complications like strictures (narrowing) or fistulas (abnormal connections).
- **Pathophysiology:** The exact cause is unknown, but it involves an abnormal immune response. Over time, inflammation can lead to tissue damage and scarring in the small intestine, disrupting its normal function.

Irritable Bowel Syndrome (IBS)

- **Overview:** IBS is a functional gastrointestinal disorder characterized by abdominal pain and changes in bowel habits.
- **Impact on Small Intestine:** IBS can affect the entire digestive system, including the small intestine, causing discomfort and irregular bowel movements.
- **Pathophysiology:** While the exact cause is unclear, it involves a combination of factors, such as altered gut motility, sensitivity, and the gut-brain axis. This can lead to symptoms like diarrhoea or constipation, which may originate in the small intestine.

Small Bowel Obstruction

- **Overview:** A small bowel obstruction occurs when there is a blockage in the small intestine, preventing the passage of food and fluids.
- **Impact on Small Intestine:** The blockage can lead to severe abdominal pain, vomiting, and other digestive issues.
- **Pathophysiology:** Various factors can cause obstructions, including adhesions, tumours, or hernias. When the small intestine is blocked, it can become distended and cause pain as it tries to move its contents past the obstruction.

Malabsorption Syndromes

- **Overview:** Malabsorption syndromes encompass a group of disorders where the small intestine cannot properly absorb nutrients from food.
- **Impact on Small Intestine:** Malabsorption can lead to nutrient deficiencies and a wide range of symptoms, including diarrhoea and weight loss.
- **Pathophysiology:** These disorders can be caused by various factors, such as celiac disease, pancreatic insufficiency, or bacterial overgrowth, all of which disrupt the normal absorption processes in the small intestine.