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Anatomy

Microanatomy of the small intestine

The **small intestine** is divided into the duodenum, jejunum, and ileum. Much of the **small intestine** is covered in projections called villi that increase the surface area of the tissue available to absorb nutrients from the gut contents.

The small intestine is where most chemical digestion takes place. Many of the [digestive enzymes](https://en.m.wikipedia.org/wiki/Digestive_enzyme) that act in the small intestine are secreted by the [pancreas](https://en.m.wikipedia.org/wiki/Pancreas) and [liver](https://en.m.wikipedia.org/wiki/Liver) and enter the small intestine via the [pancreatic duct](https://en.m.wikipedia.org/wiki/Pancreatic_duct). Pancreatic enzymes and [bile](https://en.m.wikipedia.org/wiki/Bile) from the gallbladder enter the small intestine in response to the Hormone [cholecystokinin](https://en.m.wikipedia.org/wiki/Cholecystokinin), which is produced in the small intestine in response to the presence of nutrients. [Secretin](https://en.m.wikipedia.org/wiki/Secretin), another hormone produced in the small intestine, causes additional effects on the pancreas, where it promotes the release of [bicarbonate](https://en.m.wikipedia.org/wiki/Bicarbonate) into the duodenum in order to neutralize the potentially harmful acid coming from the stomach.

Absorption of the majority of nutrients takes place in the [jejunum](https://en.m.wikipedia.org/wiki/Jejunum), with the following notable exceptions:

* [Iron](https://en.m.wikipedia.org/wiki/Iron) is absorbed in the duodenum.
* [Folate](https://en.m.wikipedia.org/wiki/Folate) (Vitamin B9) is absorbed in the duodenum and jejunum.
* [Vitamin B12](https://en.m.wikipedia.org/wiki/Vitamin_B12) and [bile salts](https://en.m.wikipedia.org/wiki/Bile_salts) are absorbed in the [terminal ileum](https://en.m.wikipedia.org/wiki/Terminal_ileum).
* Water is absorbed by [osmosis](https://en.m.wikipedia.org/wiki/Osmosis) and [lipids](https://en.m.wikipedia.org/wiki/Lipid) by passive diffusion throughout the small intestine.
* [Sodium bicarbonate](https://en.m.wikipedia.org/wiki/Sodium_bicarbonate) is absorbed by active transport and [glucose](https://en.m.wikipedia.org/wiki/Glucose) and [amino acid](https://en.m.wikipedia.org/wiki/Amino_acid) [co-transport](https://en.m.wikipedia.org/wiki/Co-transport)
* [Fructose](https://en.m.wikipedia.org/wiki/Fructose) is absorbed by [facilitated diffusion](https://en.m.wikipedia.org/wiki/Facilitated_diffusion).

The small intestine supports the body's [immune system](https://en.m.wikipedia.org/wiki/Immune_system) The presence of [gut flora](https://en.m.wikipedia.org/wiki/Gut_flora) appears to contribute positively to the host's immune system. [Peyer's patches](https://en.m.wikipedia.org/wiki/Peyer%27s_patch), located within the ileum of the small intestine, are an important part of the digestive tract's local immune system. They are part of the lymphatic system, and provide a site for antigens from potentially harmful bacteria or other microorganisms in the digestive tract to be sampled, and subsequently presented to the immune system.

The small intestine has three distinct regions – the **duodenum**, **jejunum**, and **ileum**. The **duodenum**, the shortest, is where preparation for absorption through small finger-like protrusions called villi begins.

The small intestine wall has four layers: the outermost serosa, **muscularis**, **submucosa**, and innermost **mucosa**.

The small intestine is a long, narrow, folded or coiled tube extending from the stomach to the large **intestine**; It is about 6.7 to 7.6 metres (22 to 25 feet) long, highly convoluted, and contained in the central and lower abdominal cavity.

The mucosa of the **small intestine** is lined by a simple columnar **epithelium** which consists primarily of absorptive cells (enterocytes), with scattered goblet cells and occasional enteroendocrine cells. In crypts, the **epithelium** also includes Paneth cells and stem cells.

Large intestine

The 4 major functions of the large intestine are recovery of **water** and electrolytes, formation and storage of faeces and fermentation of some of the indigestible food matter by bacteria. The ileocaecal valve controls the entry of material from the last part of the small intestine called the ileum. The main regions of the large intestine are the cecum, the colon, and the **rectum**.

The 4 **layers of the large intestine** from the lumen outward are the mucosa, submucosa, muscular **layer**, and serosa. The muscular **layer** is made up of 2 **layers** of smooth muscle, the inner, circular **layer**, and the outer, longitudinal **layer**. These **layers** contribute to the motility of the **large intestine.**

The **large intestine** consists of the **colon**, rectum, and anal canal. The wall of the **large intestine** has the same types of tissue that are found in other parts of the digestive tract but there are some distinguishing **characteristics**. The mucosa has a **large** number of goblet cells but does not have any villi.

The wall of the **large intestine** is lined with simple columnar **epithelium**. Instead of having the evaginations of the small **intestine** (villi), the **large intestine** has invaginations (the **intestinal** glands).