

Large Intestine

The large intestine extends from the ileum to the anus. It is divided into the cecum, appendix, ascending colon, transverse colon, descending colon, and sigmoid colon. The rectum and anal canal are considered in the sections on the pelvis and perineum. The primary function of the large intestine is the absorption of water and electrolytes and the storage of undigested material until it can be expelled from the body as feces.

Cecum

Location and Description

The cecum is that part of the large intestine that lies below the level of the junction of the ileum with the large intestine (Figs. 5.32 and 5.33). It is a blind-ended pouch that is situated in the right iliac fossa. It is about 2.5 in. (6 cm) long and is completely covered with peritoneum. It possesses a considerable amount of mobility, although it does not have a mesentery. Attached to its posteromedial surface is the appendix. The presence of peritoneal folds in the vicinity of the cecum (Fig. 5.33) creates the superior ileocecal, the inferior ileocecal, and the retrocecal recesses (page 163).

As in the colon, the longitudinal muscle is restricted to three flat bands, the *teniae coli*, which converge on the base

of the appendix and provide for it a complete longitudinal muscle coat (Fig. 5.33). The cecum is often distended with gas and can then be palpated through the anterior abdominal wall in the living patient.

The terminal part of the ileum enters the large intestine at the junction of the cecum with the ascending colon. The opening is provided with two folds, or lips, which form the so-called ileocecal valve (see below). The appendix communicates with the cavity of the cecum through an opening located below and behind the ileocecal opening.

Relations

- **Anteriorly:** Coils of small intestine, sometimes part of the greater omentum, and the anterior abdominal wall in the right iliac region
- **Posteriorly:** The psoas and the iliacus muscles, the femoral nerve, and the lateral cutaneous nerve of the thigh (Fig. 5.34). The appendix is commonly found behind the cecum.
- **Medially:** The appendix arises from the cecum on its medial side (Fig. 5.33).

Blood Supply

Arteries Anterior and posterior cecal arteries form the ileocolic artery, a branch of the superior mesenteric artery (Fig. 5.33).

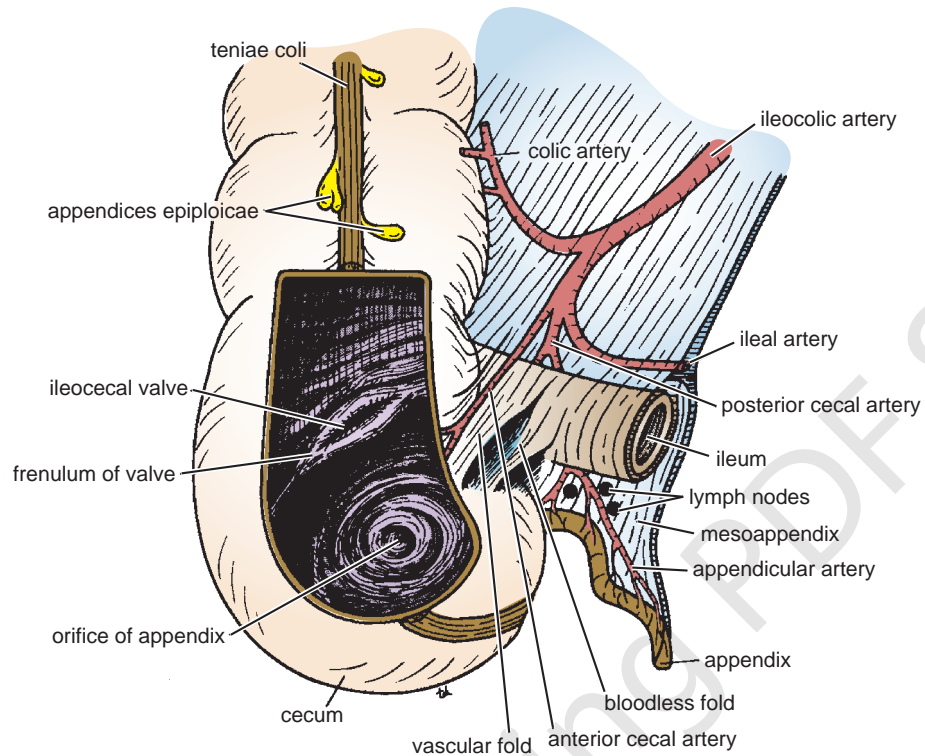


FIGURE 5.33 Cecum and appendix. Note that the appendicular artery is a branch of the posterior cecal artery. The edge of the mesoappendix has been cut to show the peritoneal layers.

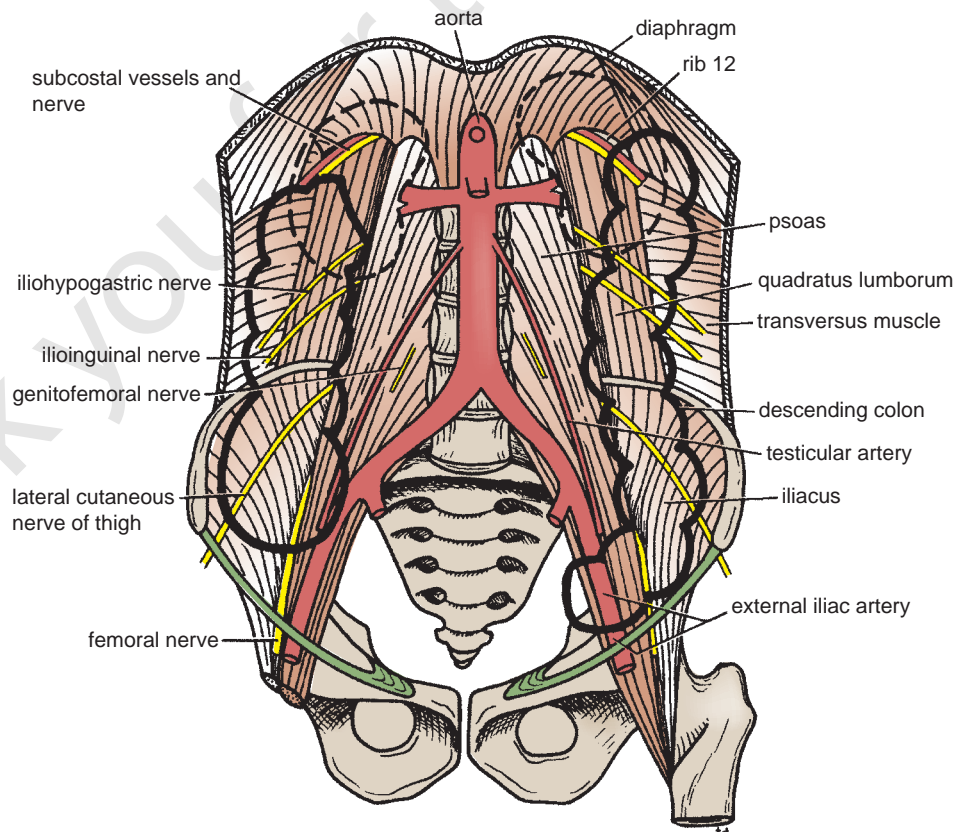


FIGURE 5.34 Posterior abdominal wall showing posterior relations of the kidneys and the colon.

Veins The veins correspond to the arteries and drain into the superior mesenteric vein.

Lymph Drainage

The lymph vessels pass through several mesenteric nodes and finally reach the superior mesenteric nodes.

Nerve Supply

Branches from the sympathetic and parasympathetic (vagus) nerves form the superior mesenteric plexus.

Ileocecal Valve

A rudimentary structure, the ileocecal valve consists of two horizontal folds of mucous membrane that project around the orifice of the ileum. The valve plays little or no part in the prevention of reflux of cecal contents into the ileum. The circular muscle of the lower end of the ileum (called the **ileocecal sphincter** by physiologists) serves as a sphincter and controls the flow of contents from the ileum into the colon. The smooth muscle tone is reflexly increased when the cecum is distended; the hormone **gastrin**, which is produced by the stomach, causes relaxation of the muscle tone.

Appendix

Location and Description

The appendix (Fig. 5.1) is a narrow, muscular tube containing a large amount of lymphoid tissue. It varies in length from 3 to 5 in. (8 to 13 cm). The base is attached to the posteromedial surface of the cecum about 1 in. (2.5 cm) below the ileocecal junction (Fig. 5.33). The remainder of the appendix is free. It has a complete peritoneal covering, which is attached to the mesentery of the small intestine by a short mesentery of its own, the **mesoappendix**. The mesoappendix contains the appendicular vessels and nerves.

The appendix lies in the right iliac fossa, and in relation to the anterior abdominal wall its base is situated one third of the way up the line joining the right anterior superior iliac spine to the umbilicus (McBurney's point). Inside the abdomen, the base of the appendix is easily found by identifying the teniae coli of the cecum and tracing them to the base of the appendix, where they converge to form a continuous longitudinal muscle coat (Figs. 5.32 and 5.33).

Common Positions of the Tip of the Appendix

The tip of the appendix is subject to a considerable range of movement and may be found in the following positions: (a) hanging down into the pelvis against the right pelvic wall, (b) coiled up behind the cecum, (c) projecting upward along the lateral side of the cecum, and (d) in front of or behind the terminal part of the ileum. The first and second positions are the most common sites.

Blood Supply

Arteries The appendicular artery is a branch of the posterior cecal artery (Fig. 5.33).

Veins The appendicular vein drains into the posterior cecal vein.

Lymph Drainage

The lymph vessels drain into one or two nodes lying in the mesoappendix and then eventually into the superior mesenteric nodes.

Nerve Supply

The appendix is supplied by the sympathetic and parasympathetic (vagus) nerves from the superior mesenteric plexus. Afferent nerve fibers concerned with the conduction of visceral pain from the appendix accompany the sympathetic nerves and enter the spinal cord at the level of the 10th thoracic segment.

Ascending Colon

Location and Description

The ascending colon is about 5 in. (13 cm) long and lies in the right lower quadrant (Fig. 5.35). It extends upward from the cecum to the inferior surface of the right lobe of the liver, where it turns to the left, forming the **right colic flexure**, and becomes continuous with the transverse colon. The peritoneum covers the front and the sides of the ascending colon, binding it to the posterior abdominal wall.

Relations

- **Anteriorly:** Coils of small intestine, the greater omentum, and the anterior abdominal wall (Figs. 5.2 and 5.3).
- **Posteriorly:** The iliacus, the iliac crest, the quadratus lumborum, the origin of the transversus abdominis muscle, and the lower pole of the right kidney. The iliohypogastric and the ilioinguinal nerves cross behind it (Fig. 5.34).

Blood Supply

Arteries The ileocolic and right colic branches of the superior mesenteric artery (Fig. 5.32) supply this area.

Veins The veins correspond to the arteries and drain into the superior mesenteric vein.

Lymph Drainage

The lymph vessels drain into lymph nodes lying along the course of the colic blood vessels and ultimately reach the superior mesenteric nodes.

Nerve Supply

Sympathetic and parasympathetic (vagus) nerves from the superior mesenteric plexus supply this area of the colon.

Transverse Colon

Location and Description

The transverse colon is about 15 in. (38 cm) long and extends across the abdomen, occupying the umbilical region. It begins at the right colic flexure below the right lobe of the liver (Fig. 5.4) and hangs downward, suspended by the transverse mesocolon from the pancreas (Fig. 5.6). It then ascends to the **left colic flexure** below the spleen. The left colic flexure is higher than the right colic flexure and is suspended from the diaphragm by the **phrenicocolic ligament** (Fig. 5.35).

The **transverse mesocolon**, or mesentery of the transverse colon, suspends the transverse colon from the anterior border of the pancreas (Fig. 5.6). The mesentery is attached to the superior border of the transverse colon, and the posterior layers of the greater omentum are attached to the inferior border (Fig. 5.6). Because of the length of the transverse mesocolon, the position of the transverse colon

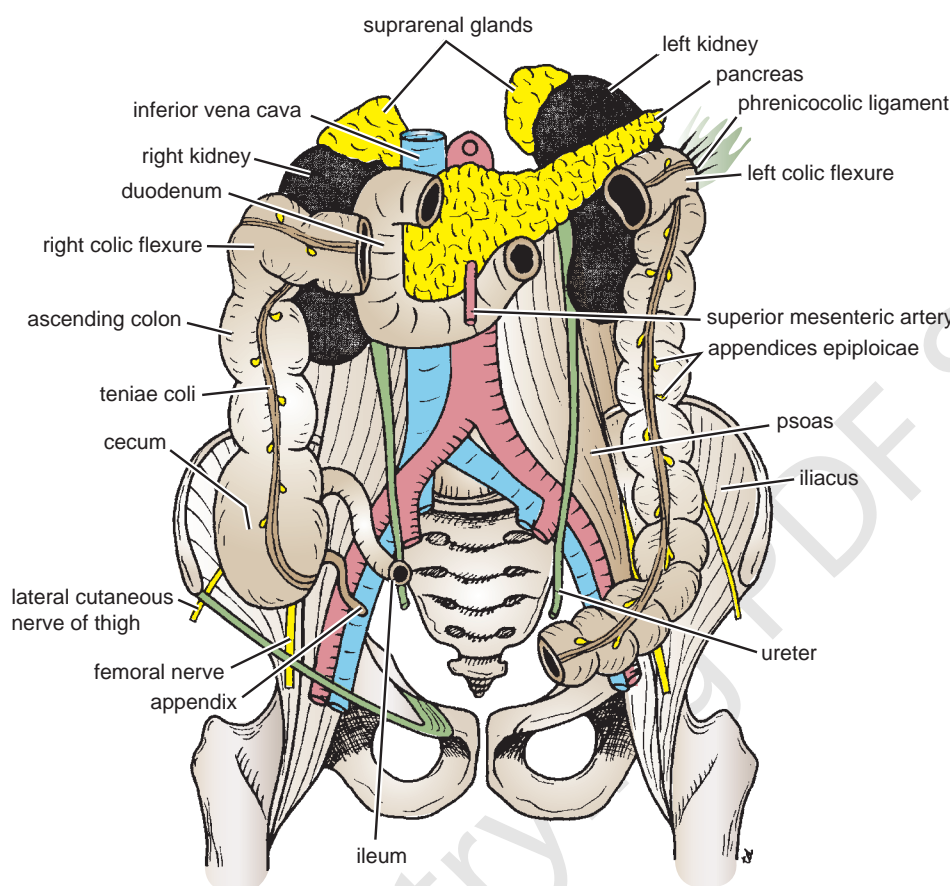


FIGURE 5.35 Abdominal cavity showing the terminal part of the ileum, the cecum, the appendix, the ascending colon, the right colic flexure, the left colic flexure, and the descending colon. Note the teniae coli and the appendices epiploicae.

is extremely variable and may sometimes reach down as far as the pelvis.

Relations

- **Anteriorly:** The greater omentum and the anterior abdominal wall (umbilical and hypogastric regions) (Fig. 5.6)
- **Posteriorly:** The second part of the duodenum, the head of the pancreas, and the coils of the jejunum and the ileum (Fig. 5.35)

Blood Supply

Arteries The proximal two thirds are supplied by the middle colic artery, a branch of the superior mesenteric artery (Fig. 5.32). The distal third is supplied by the left colic artery, a branch of the inferior mesenteric artery (Fig. 5.36).

Veins The veins correspond to the arteries and drain into the superior and inferior mesenteric veins.

Lymph Drainage

The proximal two thirds drain into the colic nodes and then into the superior mesenteric nodes; the distal third drains into the colic nodes and then into the inferior mesenteric nodes.

Nerve Supply

The proximal two thirds are innervated by sympathetic and vagal nerves through the superior mesenteric plexus; the

distal third is innervated by sympathetic and parasympathetic pelvic splanchnic nerves through the inferior mesenteric plexus.

Descending Colon

Location and Description

The descending colon is about 10 in. (25 cm) long and lies in the left upper and lower quadrants (Fig. 5.35). It extends downward from the left colic flexure, to the pelvic brim, where it becomes continuous with the sigmoid colon. (For the sigmoid colon, see page 263.) The peritoneum covers the front and the sides and binds it to the posterior abdominal wall.

Relations

- **Anteriorly:** Coils of small intestine, the greater omentum, and the anterior abdominal wall (Figs. 5.2 and 5.3)
- **Posteriorly:** The lateral border of the left kidney, the origin of the transversus abdominis muscle, the quadratus lumborum, the iliac crest, the iliacus, and the left psoas. The iliohypogastric and the ilioinguinal nerves, the lateral cutaneous nerve of the thigh, and the femoral nerve (Fig. 5.34) also lie posteriorly.

Blood Supply

Arteries The left colic and the sigmoid branches of the inferior mesenteric artery (Fig. 5.36) supply this area.

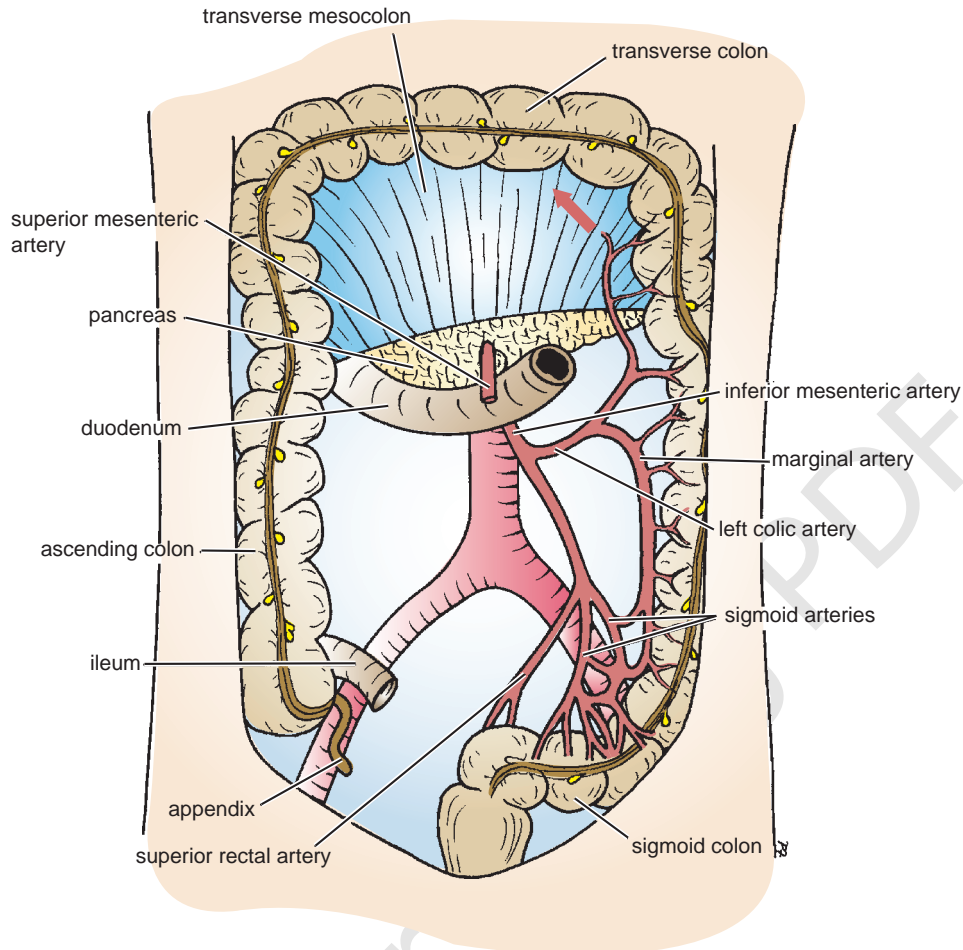


FIGURE 5.36 Inferior mesenteric artery and its branches. Note that this artery supplies the large bowel from the distal third of the transverse colon to halfway down the anal canal. It anastomoses with the middle colic branch of the superior mesenteric artery (arrow).

Veins The veins correspond to the arteries and drain into the inferior mesenteric vein.

Lymph Drainage

Lymph drains into the colic lymph nodes and the inferior mesenteric nodes around the origin of the inferior mesenteric artery.

Nerve Supply

The nerve supply is the sympathetic and parasympathetic pelvic splanchnic nerves through the inferior mesenteric plexus.