Ministry of Higher Education
& Scientific Research
Al-Muthanna University
Faculty of Pharmacy

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Theory Human Anatomy

(CIHa 108)

Lec (5)

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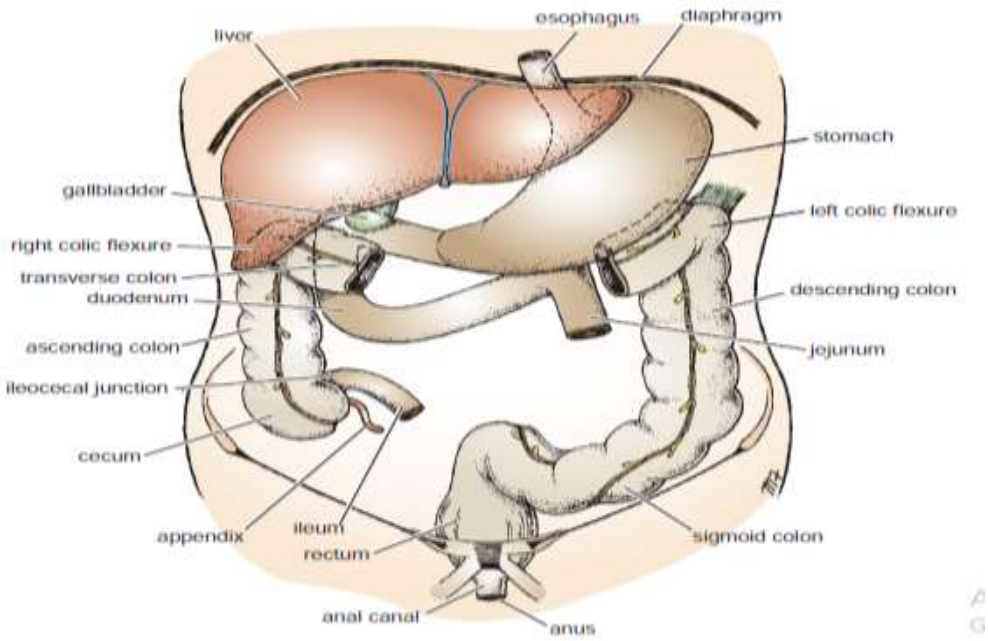
The Digestive System Part II

Gastrointestinal Tract

Esophagus (Abdominal Portion)

The esophagus is a muscular, collapsible tube about 10 in. (25 cm) long that joins the pharynx to the stomach. The greater part of the esophagus lies within the thorax. The esophagus enters the abdomen through an opening in the right crus of the diaphragm After a course of about 0.5 in. (1.25 cm), it enters the stomach on its right side. No anatomic sphincter exists at the lower end of the esophagus. The circular layer of smooth muscle in this region serves as a physiologic sphincter.



Stomach

Location and Description

The stomach is the dilated portion of the alimentary canal The stomach is situated in the upper part of the abdomen, extending from beneath the left costal margin region into the epigastric and umbilical regions. Much of the stomach lies under cover of the lower ribs. It is roughly J-shaped and has two openings, the **cardiac** and **pyloric orifices;** two curvatures, the **greater** and **lesser curvatures;** and two surfaces, an **anterior** and a **posterior surface** (Fig. 5.21). The stomach is relatively fixed at both ends but is very mobile in between.

The stomach is divided into the following parts (Fig. 5.21):

- **Fundus:**
- **Body:**
- **Pyloric antrum:**
- **Pylorus:**

The thick muscular wall is called the **pyloric sphincter,** and the cavity of the pylorus is the **pyloric canal** (Fig. 5.21). The **lesser curvature** forms the right border of the stomach and extends from the cardiac orifice to the pylorus (Fig. 5.21). The **greater curvature** is much longer than the lesser curvature and extends from the left of the cardiac orifice, over the dome of the fundus, and along the left border of the stomach to the pylorus (Fig. 5.21). The **cardiac orifice** is where the esophagus enters the stomach (Fig. 5.21). Although no anatomic sphincter can be demonstrated here, a physiologic mechanism exists that prevents regurgitation of stomach contents into the esophagus. The **pyloric orifice** is formed by the **pyloric canal**.

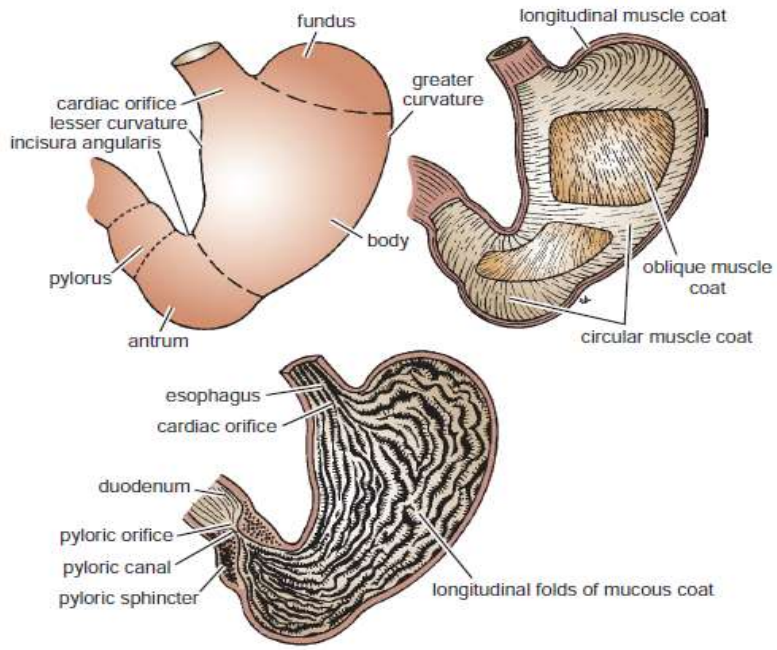


FIGURE 5.21 Stomach showing the parts, muscular coats, and mucosal lining. Note the increased thickness of the circular muscle forming the pyloric sphincter.

Small Intestine

The small intestine is the longest part of the alimentary canal and extends from the pylorus of the stomach to the ileocecal junction (Fig. 5.1). The greater part of digestion and food absorption takes place in the small intestine. It is divided into three parts: the duodenum, the jejunum, and the ileum.

Duodenum

Location and Description

The duodenum is a C-shaped tube, about 10 in. (25 cm) long, which joins the stomach to the jejunum. It receives the openings of the bile and pancreatic ducts. The duodenum curves around the head of the pancreas

Parts of the Duodenum

The duodenum is situated in the epigastric and umbilical regions and is divided into four parts.

First Part of the Duodenum The first part of the duodenum begins at the pylorus and runs upward and backward on the trans pyloric plane at the level of the 1st lumbar vertebra (Figs. 5.27).

Second Part of the Duodenum The second part of the duodenum runs vertically downward in front of the hilum of the right kidney on the right side of the 2nd and 3rd lumbar vertebrae (Figs. 5.27). the bile duct and the main pancreatic duct pierce the duodenal wall. They unite to form the ampulla that opens on the major duodenal papilla (Fig. 5.28). The accessory pancreatic duct, if present, opens into the duodenum a little higher up on the minor duodenal papilla (Figs. 5.27 and 5.28).

Third Part of the Duodenum The third part of the duodenum runs horizontally to the left on the subcostal plane, passing in front of the vertebral column and following the lower margin of the head of the pancreas (Figs.5.27).

Fourth Part of the Duodenum The fourth part of the duodenum runs upward and to the left to the **duodenojejunal flexure** (Figs. 5.26 and 5.27)

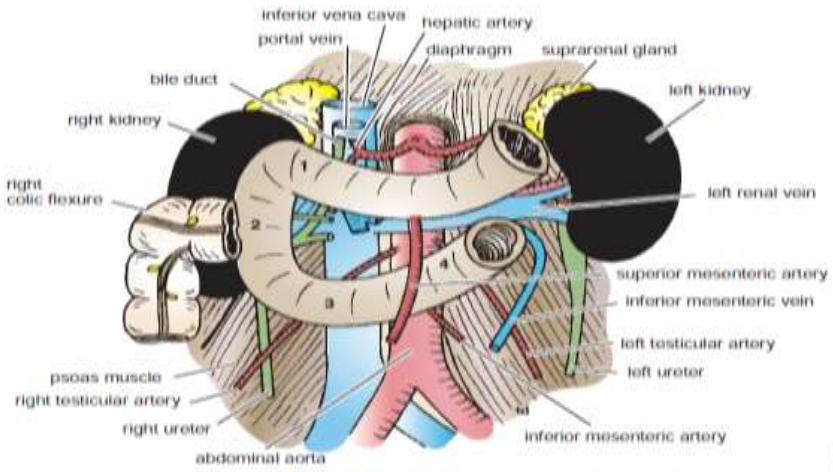


FIGURE 5.27 Posterior relations of the duodenum and the pancreas. The numbers represent the four parts of the duodenum.

Jejunum and Ileum

Location and Description

The jejunum and ileum measure about 20 ft (6 m) long; the upper two fifths of this length make up the jejunum.
The jejunum begins at the duodenojejunal flexure, and the ileum ends at the ileocecal junction. The coils of jejunum and ileum are freely mobile and are attached to the posterior abdominal wall by fold of peritoneum known as the **mesentery of the small intestine** (Fig. 5.30).

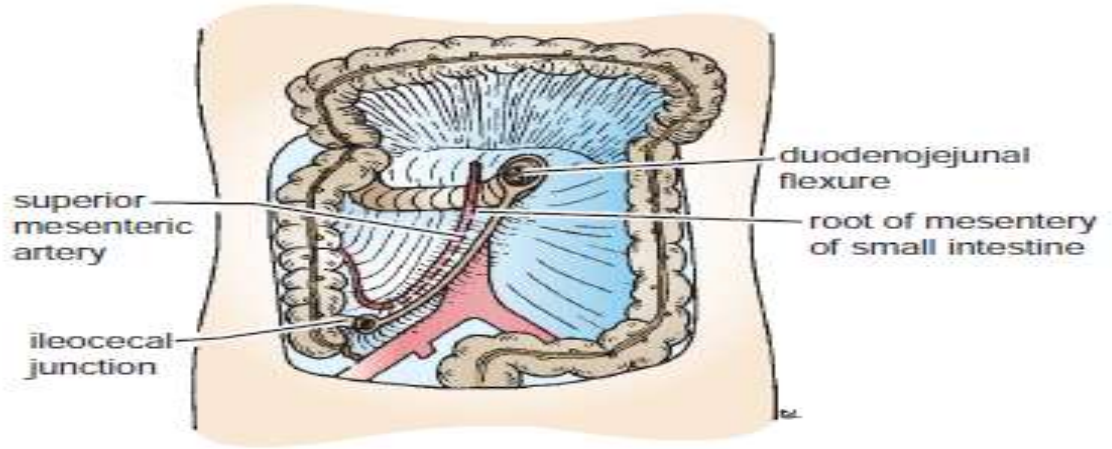


FIGURE 5.30 Attachment of the root of the mesentery of the small intestine to the posterior abdominal wall. Note that it extends from the duodenojejunal flexure on left of the aorta, downward, and to the right to the ileocecal junction. The superior mesenteric artery lies in the root of the mesentery.

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.

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. Attached to its posteromedial surface is the appendix.
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 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. The appendix communicates with the cavity of the cecum through an opening located below and behind the ileocecal opening.

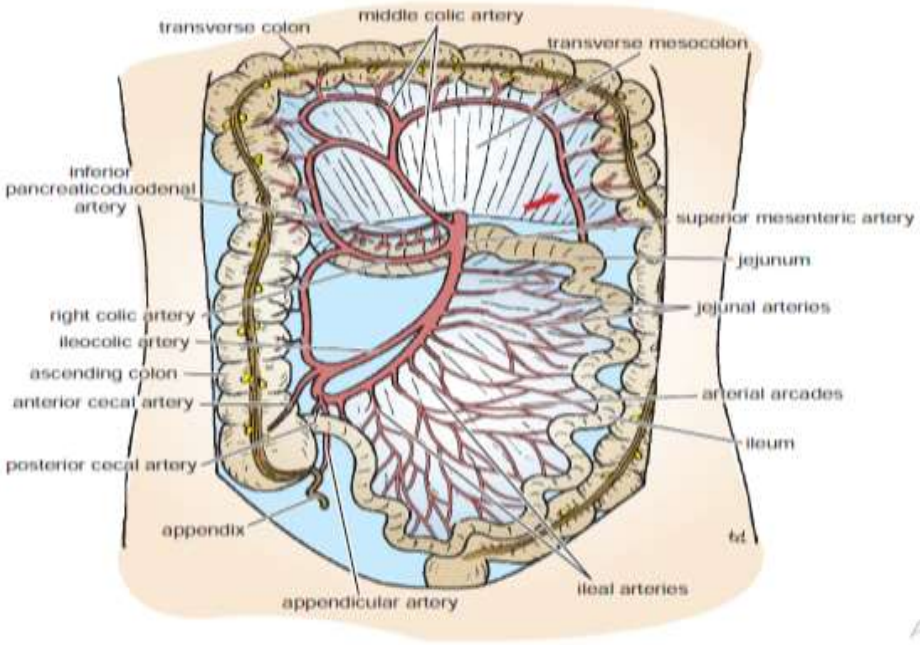


FIGURE 5.32 Superior mesenteric artery and its branches. Note that this artery supplies blood to the gut from halfway down the second part of the duodenum to the distal third of the transverse colon (*arrow*).

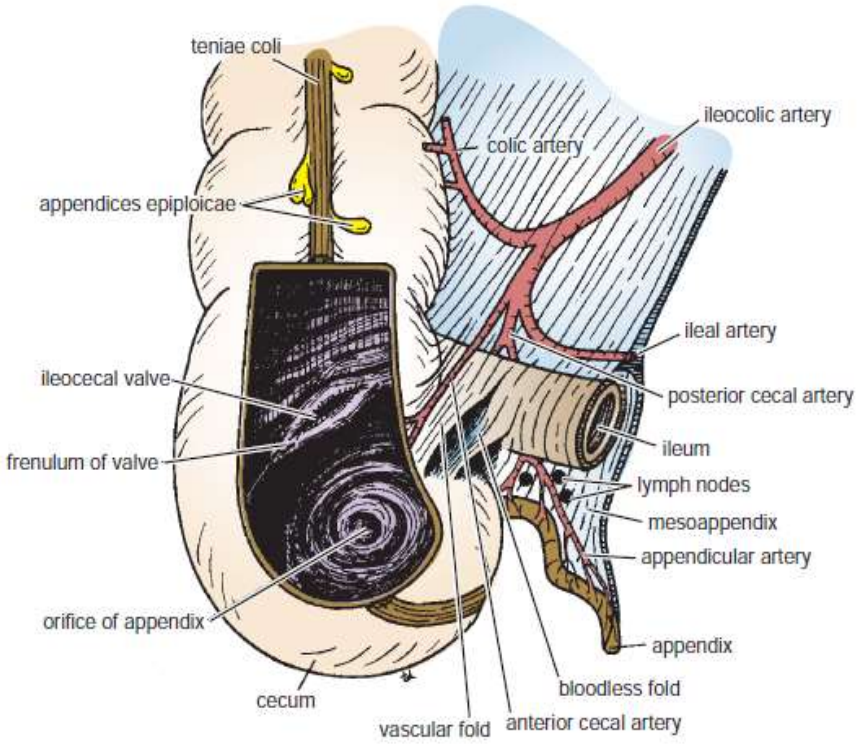


FIGURE 5.33 Cecum and appendix. Note that the appendicular artery is a branch of the posterior cecal artery. The edge of the mesoappendix has been cut to show the peritoneal layers.

Three Accessory Organs

Pancreas

Location and Description

The pancreas is both an exocrine and endocrine gland. The pancreas is an elongated structure that lies in the epigastrium and the left upper quadrant. It is soft and lobulated and situated on the posterior abdominal wall behind the peritoneum. It crosses the transpyloric plane. The pancreas is divided into a head, neck, body, and tail (Fig. 5.58). The **head** of the pancreas is disc shaped and lies within the concavity of the duodenum (Fig. 5.58). A part of the head extends to the left behind the superior mesenteric vessels and is called the **uncinate process.** The **neck** is the constricted portion of the pancreas and connects the head to the body. (Fig. 5.26). The **body** runs upward and to the left across the midline (Fig. 5.4). It is somewhat triangular in cross section. The **tail** passes forward in the splenicorenal ligament.

Gallbladder

Location and Description

The gallbladder is a pear-shaped sac lying on the undersurface of the liver (Figs. 5.8, 5.9, and 5.29). It has a capacity of 30 to 50 mL and stores bile, which it concentrates by absorbing water. The gallbladder is divided into the fundus, body, and neck. The **fundus** is rounded and projects below the inferior margin of the liver. The **body** lies in contact with the visceral surface of the liver and is directed upward, backward, and to the left. The **neck** becomes continuous with the cystic duct, which turns to join the common hepatic duct, to form the bile duct (Fig. 5.29). The peritoneum completely surrounds the fundus of the gallbladder and binds the body and neck to the visceral surface of the liver.

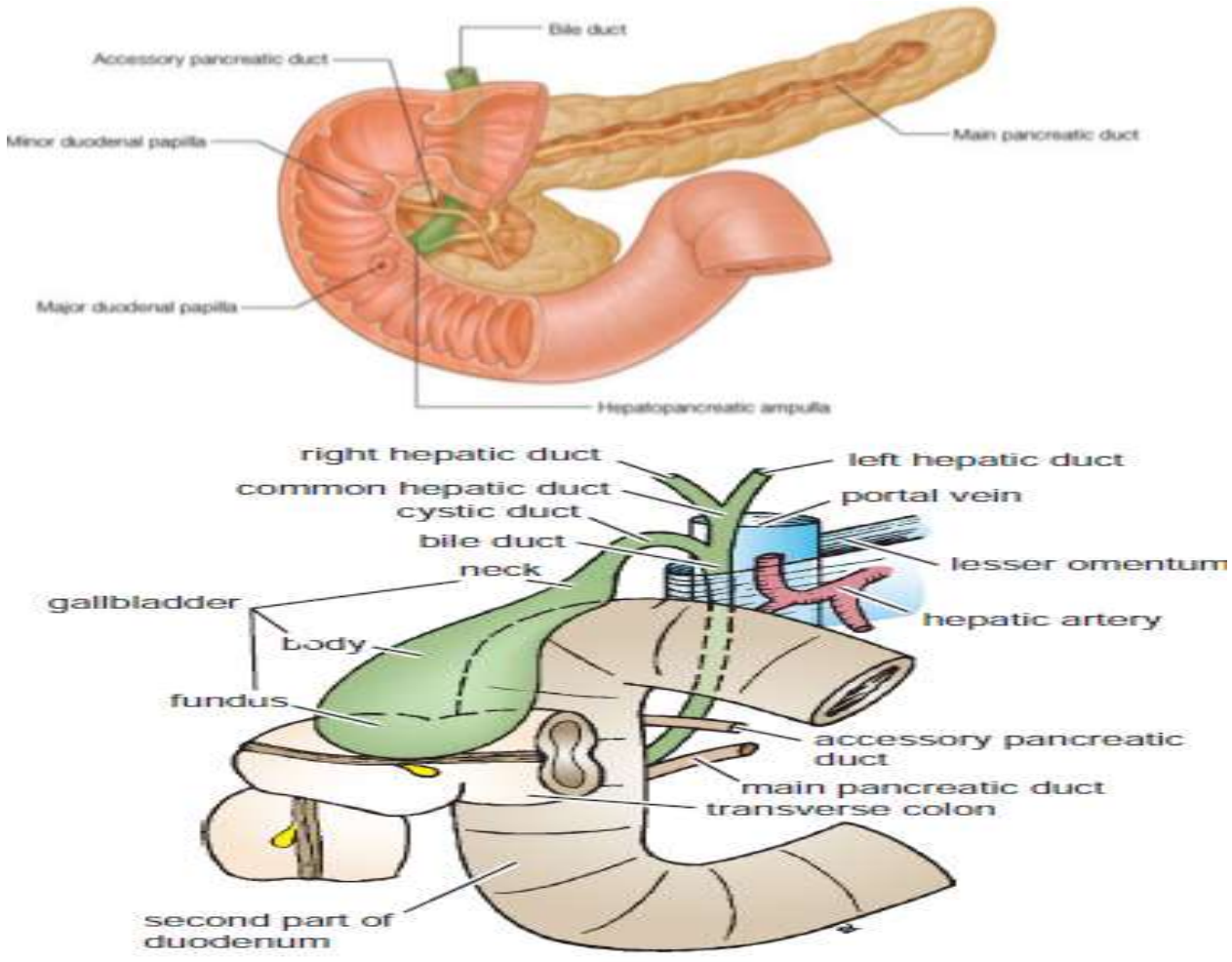


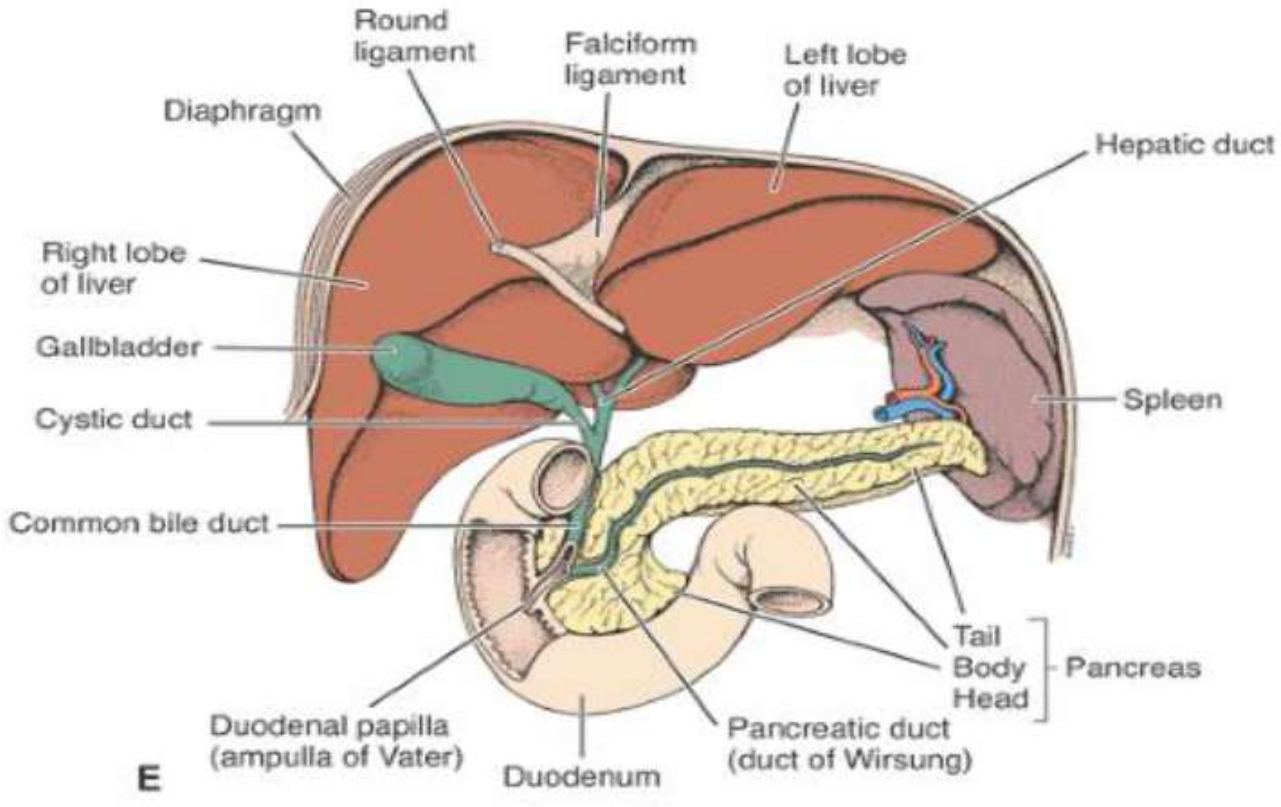
FIGURE 5.29 The bile ducts and the gallbladder. Note the relation of the gallbladder to the transverse colon and the duodenum.

Liver

Location and Description

The liver is soft and pliable and occupies the upper part of the abdominal cavity just beneath the diaphragm (Fig. 5.1). The convex upper surface of the liver is molded to the undersurface of the domes of the diaphragm. The **visceral surface,** is molded to adjacent viscera and is therefore irregular in shape; it lies in contact with the abdominal part of the esophagus, the stomach, the duodenum, the right colic flexure, the right kidney and suprarenal gland, and the gallbladder.

The liver may be divided into a large **right lobe** and a small **left lobe** by the attachment of the peritoneum of the falciform ligament. The right lobe is further divided into a **quadrate lobe** and a **caudate lobe** by the presence of the gallbladder. The **porta hepatis,** or hilum of the liver, is found on the **visceral surface**. The upper part of the free edge of the lesser omentum is attached to its margins. In it lie the right and left hepatic ducts, the right The liver is completely surrounded by a fibrous capsule but only partially covered by peritoneum. The liver is made up of **liver lobules.** The **central vein** of each lobule is a tributary of the hepatic veins. In the spaces between the lobules are the **portal canals,** which contain branches of the hepatic artery, portal vein, and a tributary of a bile duct (portal triad). The arterial and venous blood passes between the liver cells by means of **sinusoids** and drains into the central vein.



Peritoneal Ligaments of the Liver

falciform ligament
coronary ligament
left and right triangular ligament
round ligament