

Digest 3 Checklist Liver, Gallbladder, and Pancreas

Accessory digestive organs	Accessory digestive organs are essential for the process of digestion because they release substances that function in the chemical breakdown of food. The accessory digestive organs are the salivary glands, liver, gallbladder, and pancreas.
Liver	<p>The liver is located in the abdominal cavity and is mostly covered by the diaphragm. The liver is a gland weighing approximately 1.36 kg (3 lb).</p> <p>The liver produces a secretion called bile. Bile contains bile salts, which emulsify fats, that is, breaks fat globules into smaller pieces. This is important because it allows digestive enzymes to more effectively act on fat molecules.</p> <p>Bile contains bile pigments, which are breakdown products from old red blood cells. Bile pigments are responsible for the normal color of feces. Failure to secrete bile can result in bile movement into the blood, producing the condition of jaundice.</p> <p>The liver has many other functions. It stores substances, helps to regulate blood sugar levels, processes absorbed nutrients, detoxifies harmful substances, removes foreign substances from the blood, and synthesizes important blood proteins. Proper functioning of the liver is essential for life.</p> <p>Externally the liver is divided into four lobes based upon external fissures and the attachments of peritoneum.</p>
Falciform ligament	A double fold of peritoneum extending from the abdominal wall to the anterior surface of the liver. It marks the anterior division of the right and left lobes of the liver.
Gallbladder	<p>The gallbladder is a 7-10 cm (2.75-3.9 in) long sac. The gallbladder is located on the inferior, anterior surface of the liver.</p> <p>The gallbladder STORES 30-50 mL of bile produced by the liver. Following a meal, contraction of the gallbladder releases bile into the duodenum.</p> <p>Note that the gallbladder DOES NOT produce bile.</p>

Liver lobes

The right and left lobes of the liver are separated anteriorly by the falciform ligament.

The quadrate (meaning square) lobe is located between the gallbladder and the left lobe of the liver.

The caudate (meaning tail) lobe is between the inferior vena cava and the left lobe of the liver.

The remaining part of the liver to the right of the gallbladder and the inferior vena cava is the right lobe.

The "tail" of the caudate lobe extends toward the right lobe between the gallbladder and the inferior vena cava.

Note that the inferior end of the caudate lobe often has a small fissure.

Hepatic porta (porta hepatis)

The hepatic porta (meaning gate) is where arteries (red) enter the liver and veins (blue) and hepatic ducts (green) exit the liver.

The hepatic porta is located between the quadrate and caudate lobes.

External lobes

The EXTERNAL division of the liver into four lobes is based on surface markings formed by fissures and the attachment sites of peritoneum.

Internal lobes

The INTERNAL divisions of the liver are based on the branching patterns of blood vessels and ducts entering or exiting the liver. For example, the arterial blood supply to the liver divides into two branches, which supply the left and right "internal" lobes or halves of the liver.

The "external" left, caudate, and quadrate lobes belong to the left "internal" lobe.

Liver transplants typically involve transplanting the whole liver from a recently deceased person into a living person. Because of a scarcity of liver donors, the liver is sometimes split into "internal" right and left lobes (halves) to provide a liver transplant for two recipients.

There is an ever greater scarcity of liver donors for children. Sometimes, a liver is transplanted from an adult into a child. In order to achieve a better size match, the two segments from the adult "external" left lobe are used. In some cases, a living parent donates part of a liver.

In the adult, liver cells normally do not divide unless the liver is injured. In the case of a partial liver transplant, growth of liver tissue takes place.

Pancreas	<p>The pancreas is a 12-15 cm (4.7-5.9 in) long gland. The pancreas is located posterior to the stomach and between the duodenum and spleen.</p> <p>The pancreas is an exocrine gland, producing pancreatic juice, which is secreted through ducts into the duodenum. Pancreatic juice contains digestive enzymes that break down proteins, carbohydrates, lipids, and nucleic acids. Pancreatic juice also contains bicarbonate ions, which neutralize stomach acid entering the duodenum.</p> <p>The pancreas is also an endocrine gland, producing the hormones insulin and glucagon, which help to regulate blood sugar levels.</p>
Parts of the pancreas	<p>The pancreas has four main parts: head (located in the bend of the duodenum), neck (connects the head to the body), body (main part of the pancreas), tail (narrows and extends to the spleen).</p> <p>Memory aid: The head of the pancreas is held in the arms of the duodenum, but the tail of the pancreas is in the face of the spleen.</p>
Left hepatic duct	The left hepatic duct drains bile from the "internal" left lobe of the liver.
Right hepatic duct	The right hepatic duct drains bile from the "internal" right lobe of the liver.
Common hepatic duct	The common hepatic duct is formed by the union of the left and right hepatic ducts.
Cystic duct	The cystic duct drains bile from the gallbladder.
Common bile duct	The common bile duct is formed by the union of the common hepatic duct and the cystic duct.
Hepatopancreatic ampulla	The hepatopancreatic is an enlarged tube formed by the union of the common bile duct and the pancreatic duct.
Major duodenal papilla	The major duodenal papilla (meaning nipple), is a slightly raised area on the inner surface of the duodenum. It is where the hepatopancreatic ampulla empties into the duodenum.
Pancreatic duct	The pancreatic duct drains pancreatic juice from the pancreas. It joins the common bile duct at the hepatopancreatic ampulla.
Accessory pancreatic duct	The accessory pancreatic duct branches off the pancreatic duct and empties into the duodenum.

Minor duodenal papilla

The minor duodenal papilla is where the accessory pancreatic duct empties into the duodenum.

Duct sphincters

The hepatopancreatic ampulla, common bile duct, and pancreatic duct have sphincters that control the release of secretions.

During the time between the digestion of meals, the sphincters are closed. During meal digestion, the sphincters open, allowing bile and pancreatic juices to enter the duodenum.

Between meal digestion, the liver continues to produce bile, but at a slower rate than during meal digestion. Bile flows into the common bile duct, but because the sphincters are closed, it backs up through the cystic duct, causing the gallbladder to fill with bile. During meal digestion, the gallbladder contracts and releases the accumulated bile.