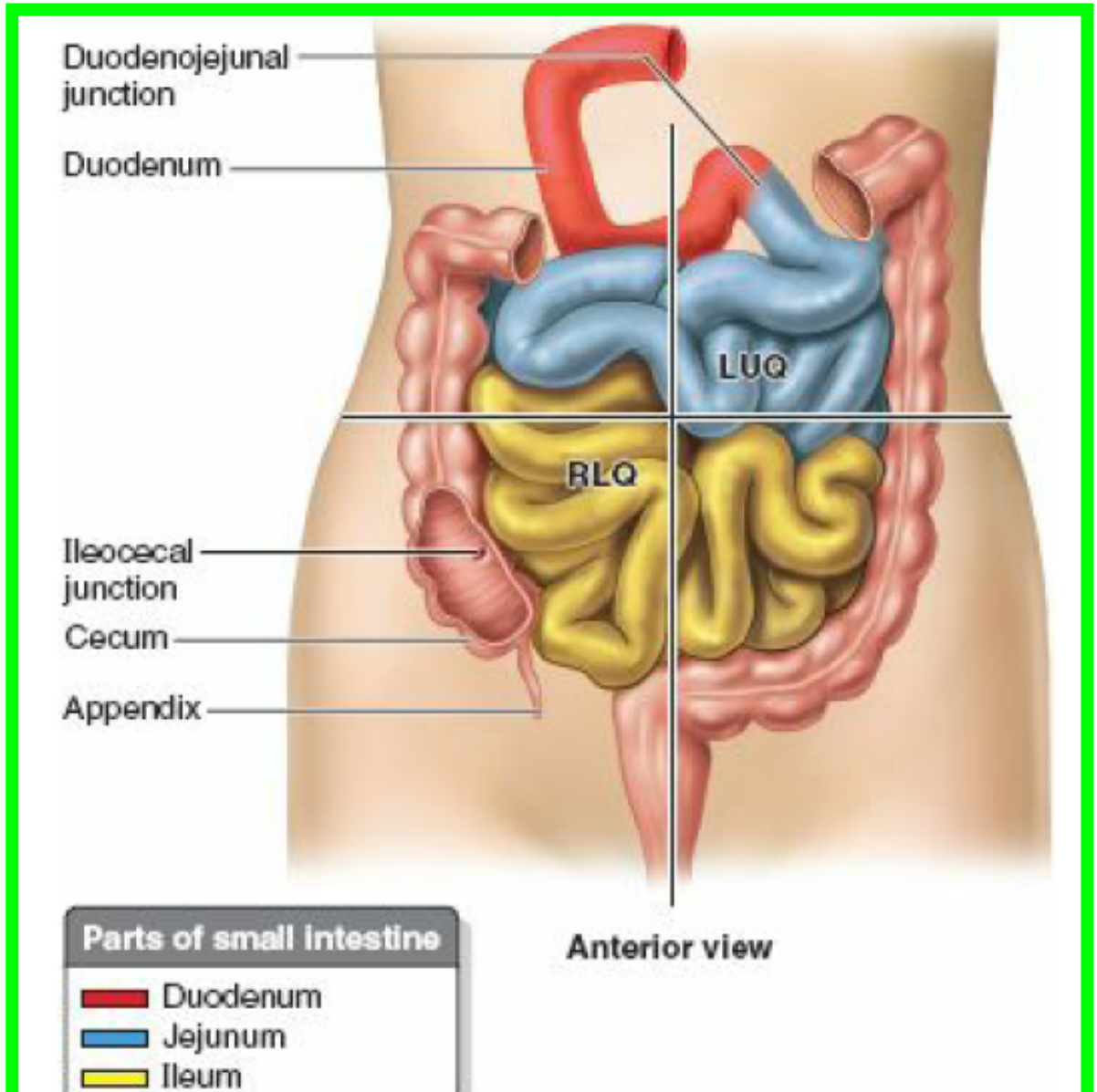
THE SMALL INTESTINE

Dr. Aiman Qais Afar
Surgical Anatomist

College of Medicine / University of Mutah

2022-2023

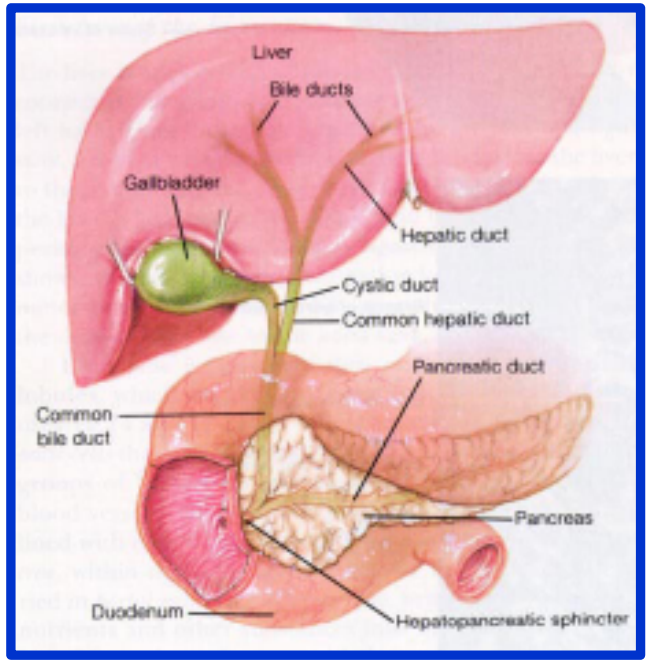
Wednesday 5 April 2023


Duodenojejunal junction
Duodenum
LUQ
RLQ
Ileocecal junction
Cecum
Appendix
Parts of small intestine
Duodenum
Jejunum
Ileum
Anterior view

Small Intestine

Duodenum

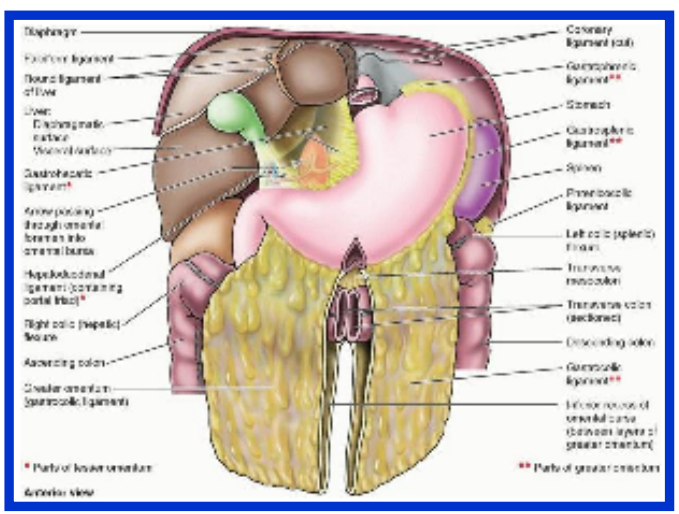
Dr Aiman Qais AL Maathidy
Wednesday 5 April 2023



❖The duodenum is a C-shaped tube, about 10 in. (25 cm) long, which joins the stomach to the jejunum.

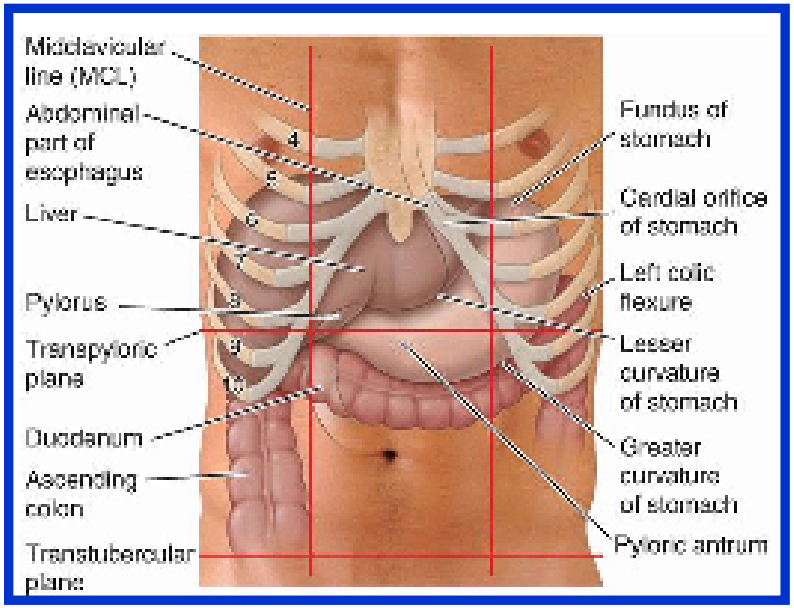
❖ It receives the openings of the bile and pancreatic ducts. The duodenum curves around the head of the pancreas

The first inch (2.5 cm) of the duodenum resembles the stomach in that it is covered on its anterior and posterior surfaces with peritoneum and has the lesser omentum attached to its upper border and the greater omentum attached to its lower border



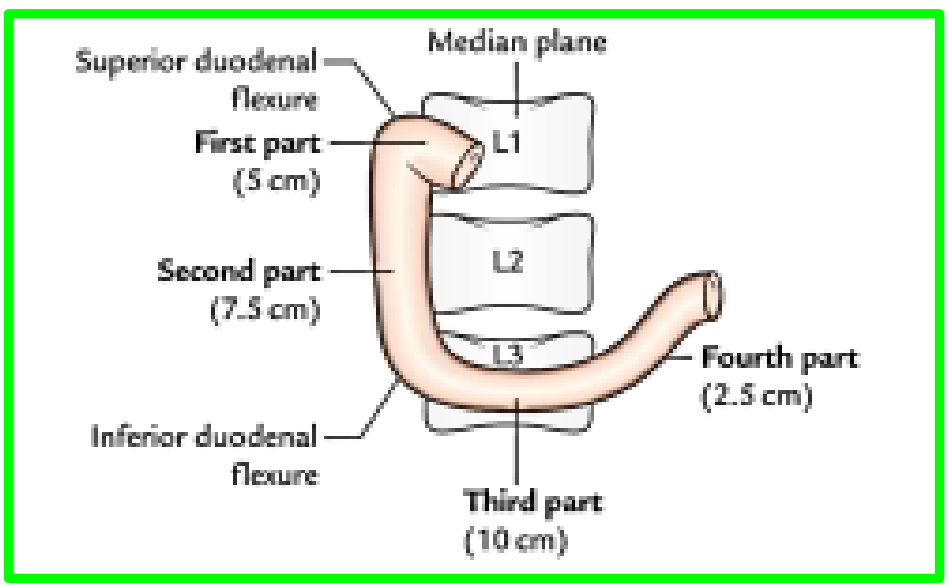
Duodenum

The remainder of the duodenum is retroperitoneal, being only partially covered by peritoneum.



Parts of the Duodenum

❖The duodenum is situated in the epigastric and umbilical regions and, for purposes of description, is divided into four parts:



❑First Part of the Duodenum

begins at the pylorus and runs upward and backward on the transpyloric plane at the level of the first lumbar vertebra.

The relations of this part are as follows:

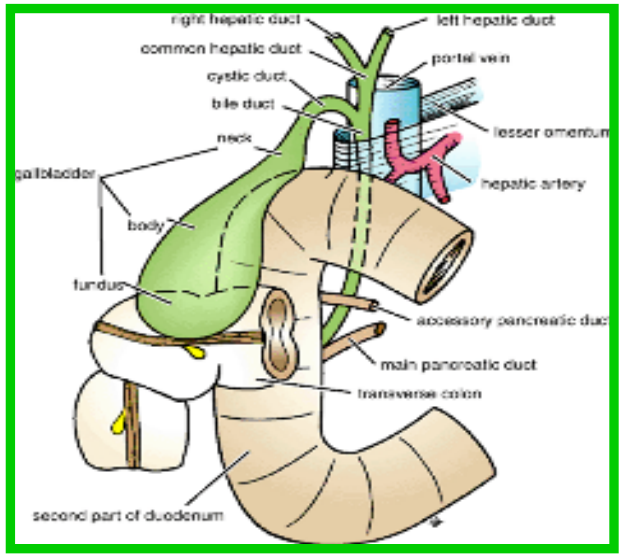
Duodenum

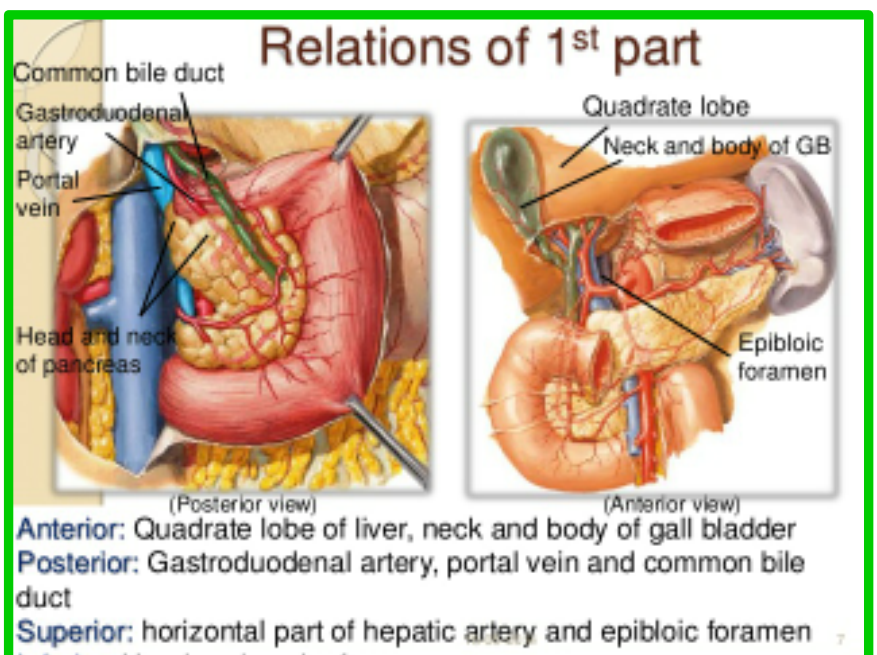
Anteriorly: The quadrate lobe of the liver and the gallbladder

Posteriorly: The lesser sac (first inch only), the gastroduodenal artery, the bile duct and portal vein, and the inferior vena cava.

Superiorly: The entrance into the lesser sac (the epiploic foramen)

Inferiorly: The head of the pancreas.





Dr Aiman Qais AL Maathidy
Wednesday 5 April 2023

Duodenum

Dr Aiman Qais AL Maathidy
Wednesday 5 April 2023

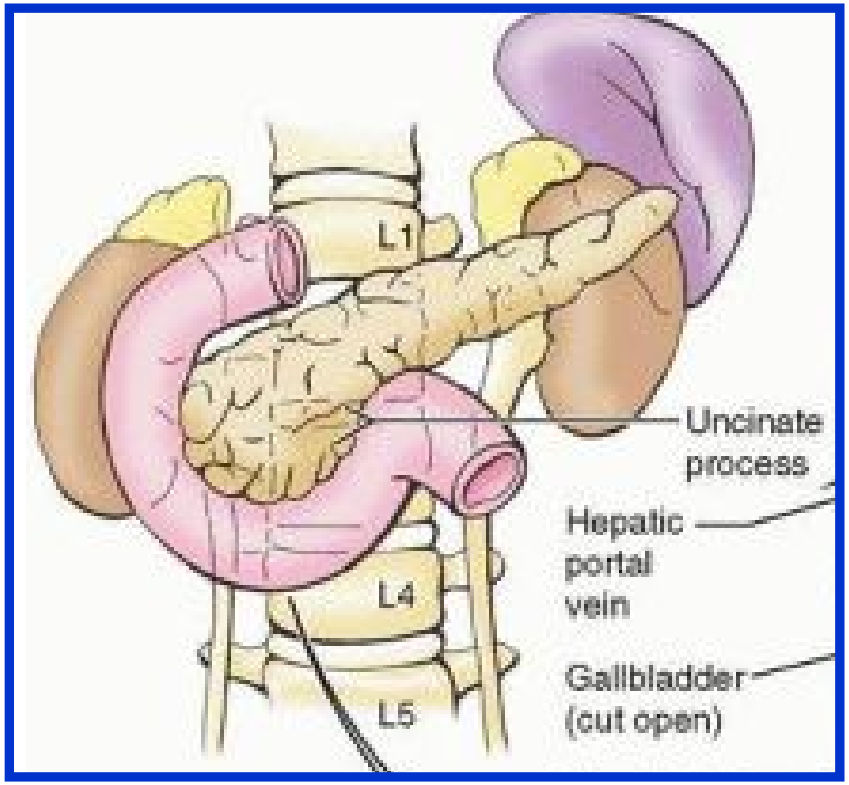
❑Second Part of the Duodenum

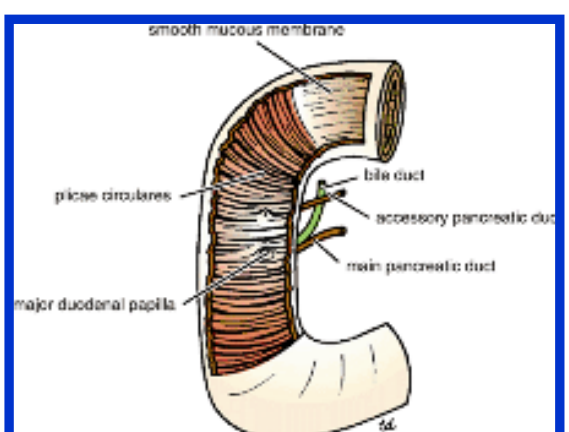
❖Runs vertically downward in front of the hilum of the right kidney on the right side of the second and third lumbar vertebrae.

❖About halfway down its medial border, the bile duct and the main pancreatic duct pierce the duodenal wall

❖They unite to form the ampulla that opens on the summit of the major duodenal papilla.

❖The accessory pancreatic duct, if present, opens into the duodenum a little higher up on the minor duodenal papilla.





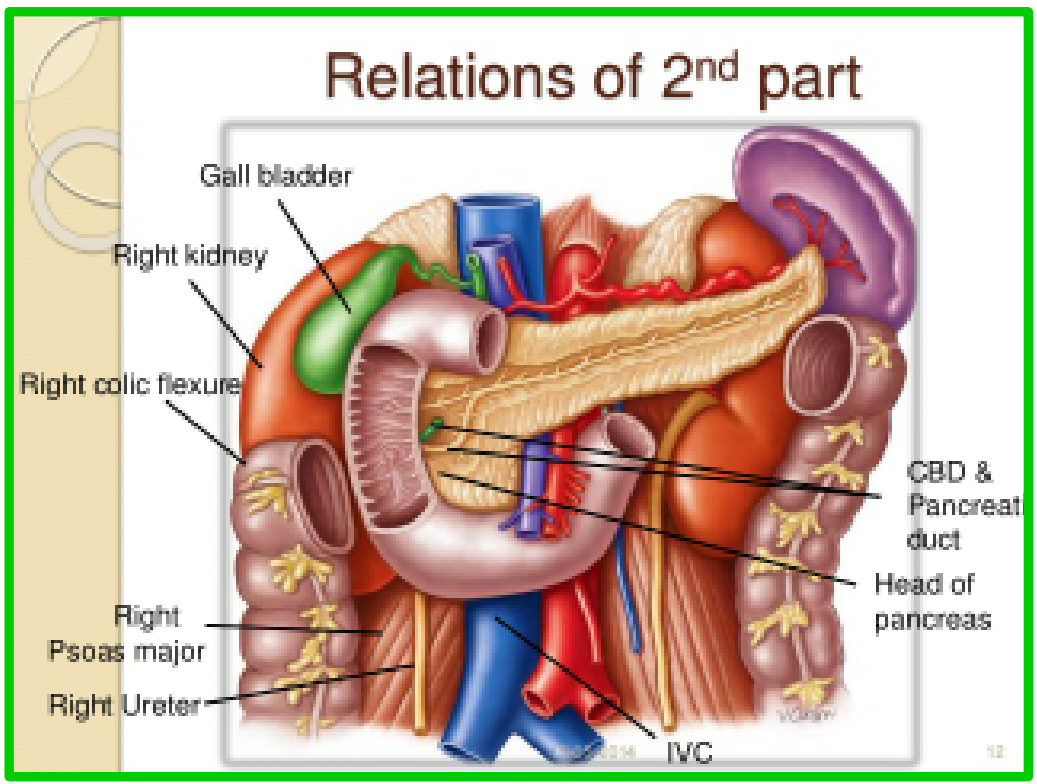
Duodenum

The relations 2nd part are as follows:

- **Anteriorly:** The fundus of the gallbladder and the right lobe of the liver, the transverse colon, and the coils of the small intestine
- **Posteriorly:** The hilum of the right kidney and the right ureter.

- **Laterally:** The ascending colon, the right colic flexure, and the right lobe of the liver.

- **Medially:** The head of the pancreas, the bile duct, and the main pancreatic duct.

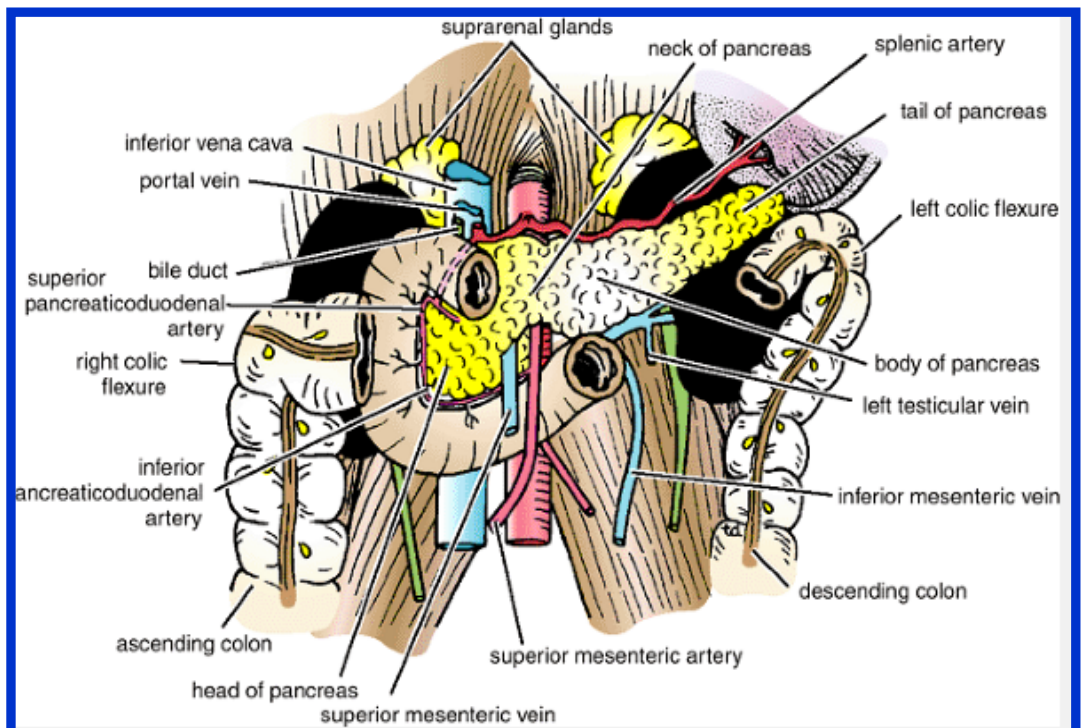


Duodenum

Dr Aiman Qais AL Maathidy
Wednesday 5 April 2023

❑Third Part of the Duodenum

Passing in front of the vertebral column and following the lower margin of the head of the pancreas



The relations :

- ✓ Anteriorly: The root of the mesentery of the small intestine, the superior mesenteric vessels (contained within it), and coils of jejunum.

- ✓ Posteriorly: The right ureter, the right psoas muscle, the inferior vena cava, and the aorta

- ✓ Superiorly: The head of the pancreas
- ✓ Inferiorly: Coils of jejunum

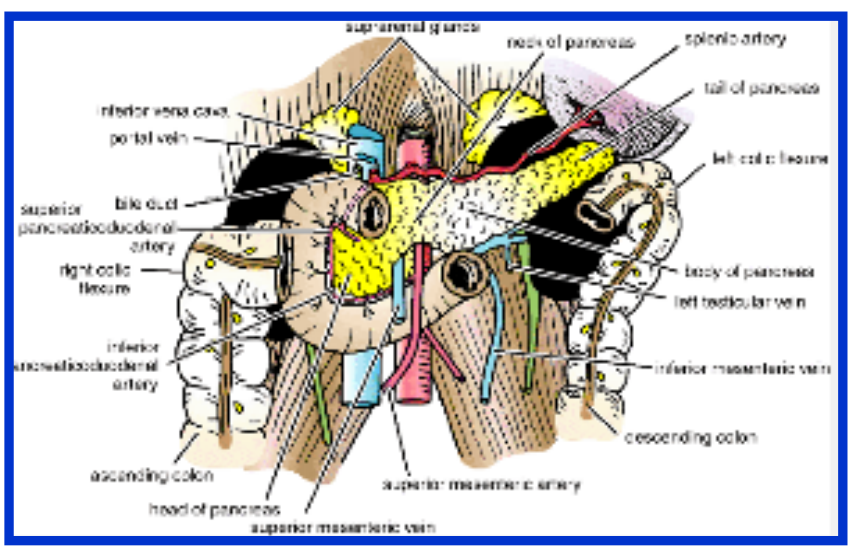
Duodenum

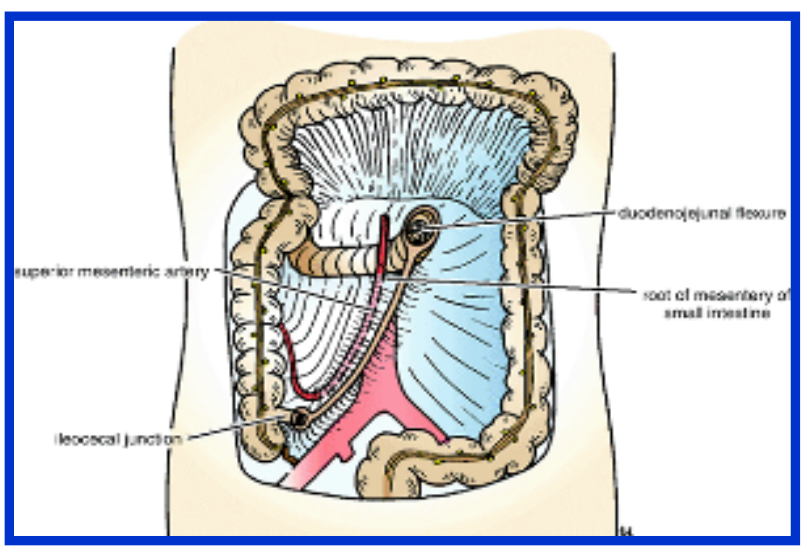
Dr Aiman Qais AL Maathidy
Wednesday 5 April 2023

❑Fourth Part of the Duodenum

runs upward and to the left to the duodenojejunal flexure.
The flexure is held in position by a peritoneal fold, the ligament of Treitz, which is attached to the right crus of the diaphragm.

The relations are as follows:
Anteriorly: The beginning of the root of the mesentery and coils of jejunum
Posteriorly: The left margin of the aorta and the medial border of the left psoas muscle

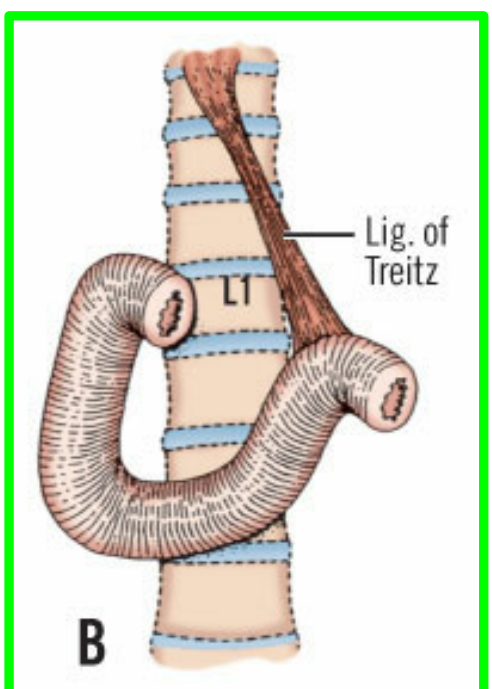


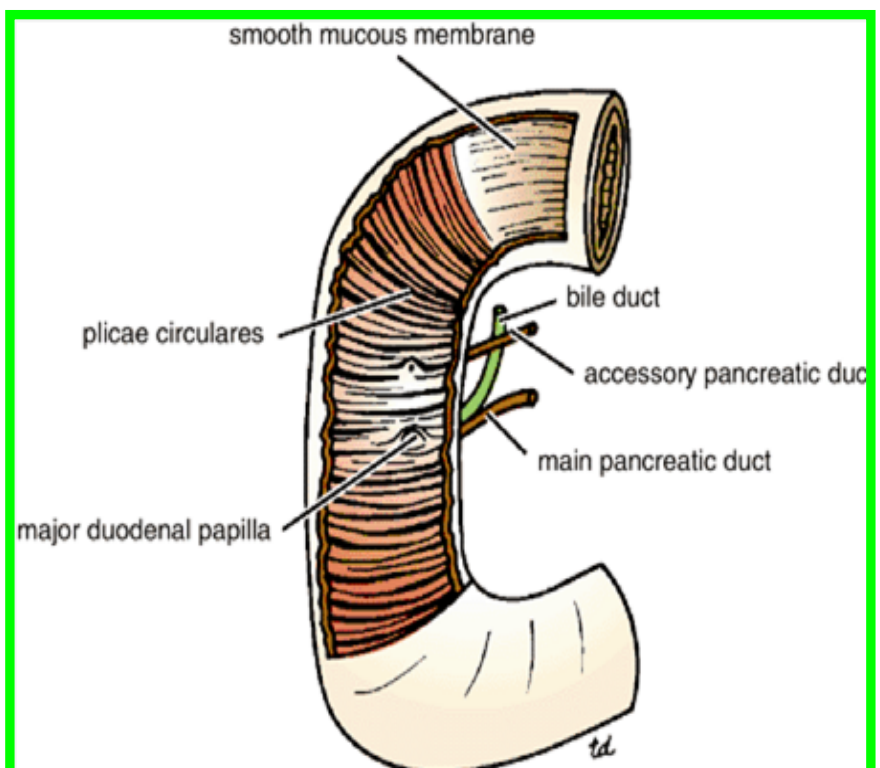


Duodenum

Mucous Membrane and Duodenal Papillae

- The mucous membrane of the duodenum is thick.
- In the first part of the duodenum it is smooth.
- In the remainder of the duodenum it is thrown into numerous circular folds called the plicae circulares.

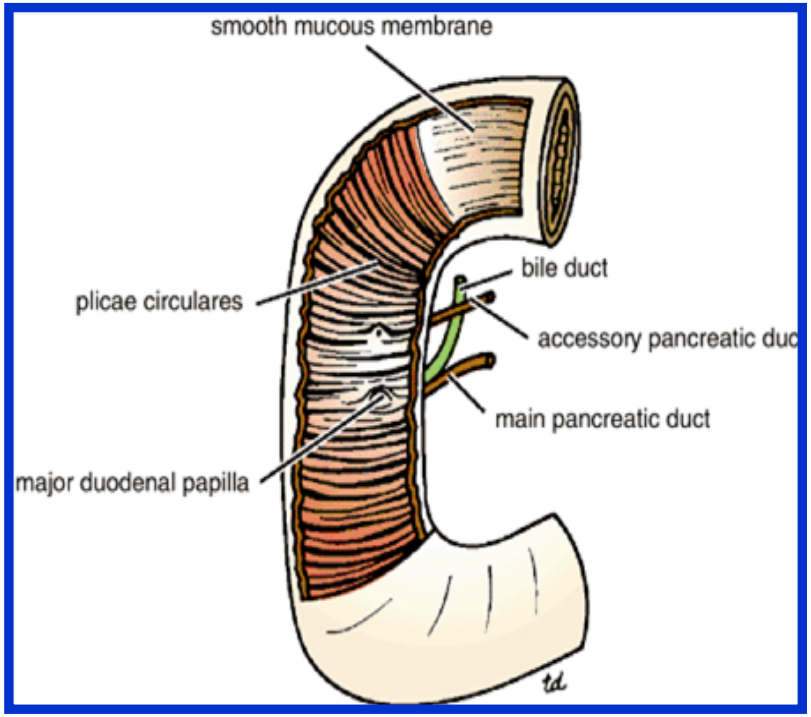




Duodenum

❖At the site where the bile duct and the main pancreatic duct pierce the medial wall of the second part is a small, rounded elevation called the major duodenal papilla

❖The accessory pancreatic duct, if present, opens into the duodenum on a smaller papilla about 0.75 in. (1.9 cm) above the major duodenal papilla called minor duodenal papilla.



Duodenum

Arteries

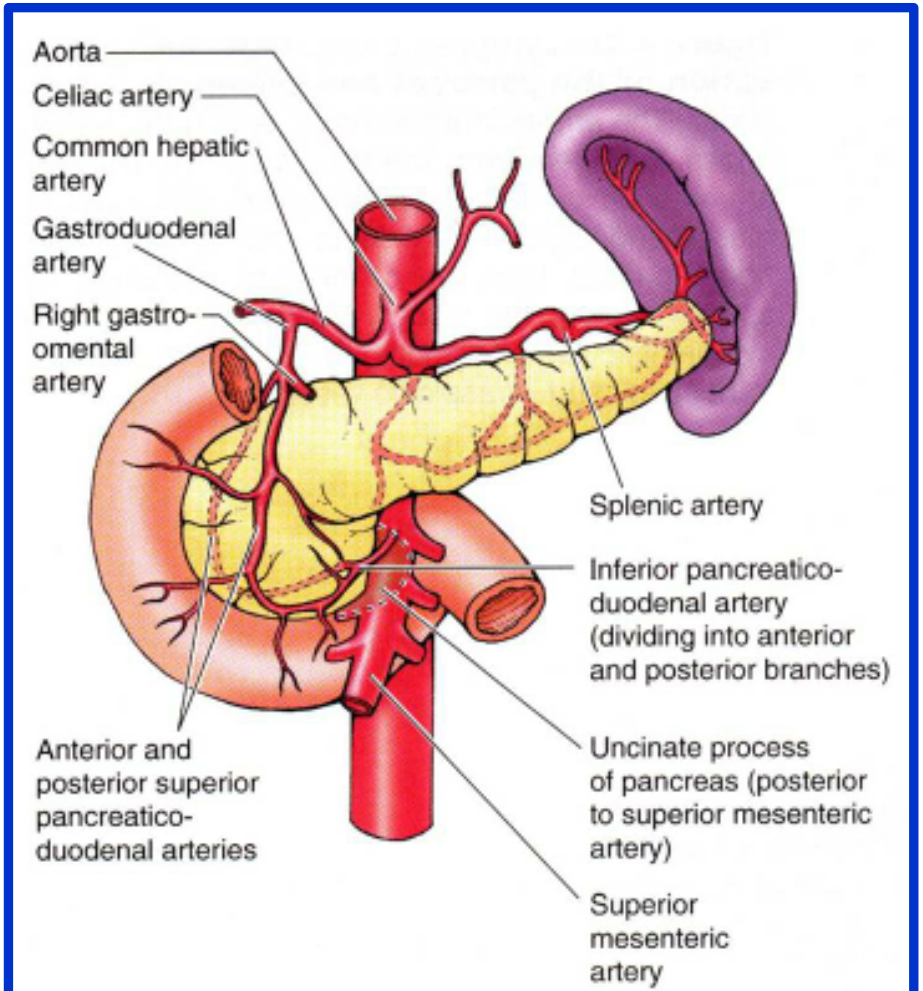
- The upper half is supplied by the superior pancreaticoduodenal artery, a branch of the gastroduodenal artery.

- The lower half is supplied by the inferior pancreaticoduodenal artery, a branch of the superior mesenteric artery.

Veins:

The superior pancreaticoduodenal vein drains into the portal vein

The inferior vein joins the superior mesenteric vein .



Duodenum

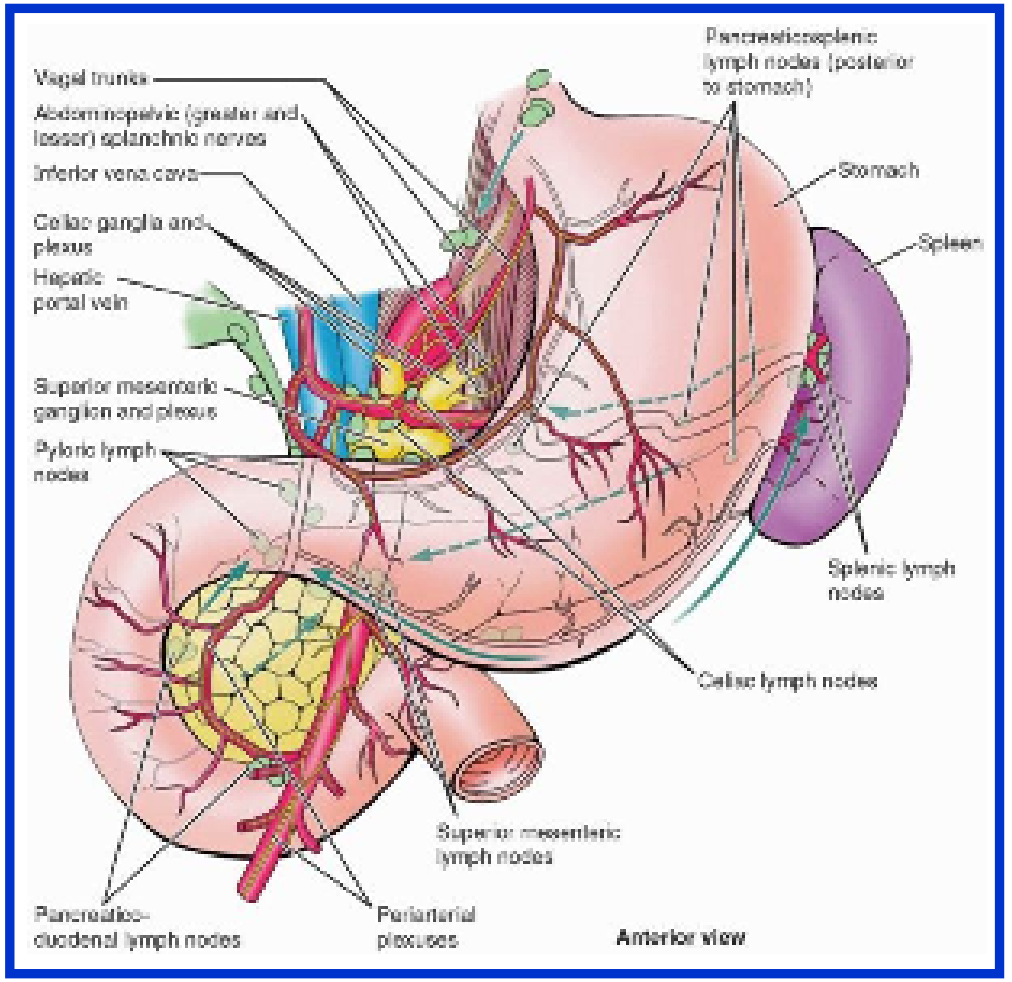
Lymph Drainage

The lymph vessels follow the arteries and drain upward via pancreaticoduodenal nodes to the gastroduodenal nodes and then to the celiac nodes and

Downward via pancreaticoduodenal nodes to the superior mesenteric nodes around the origin of the superior mesenteric artery.

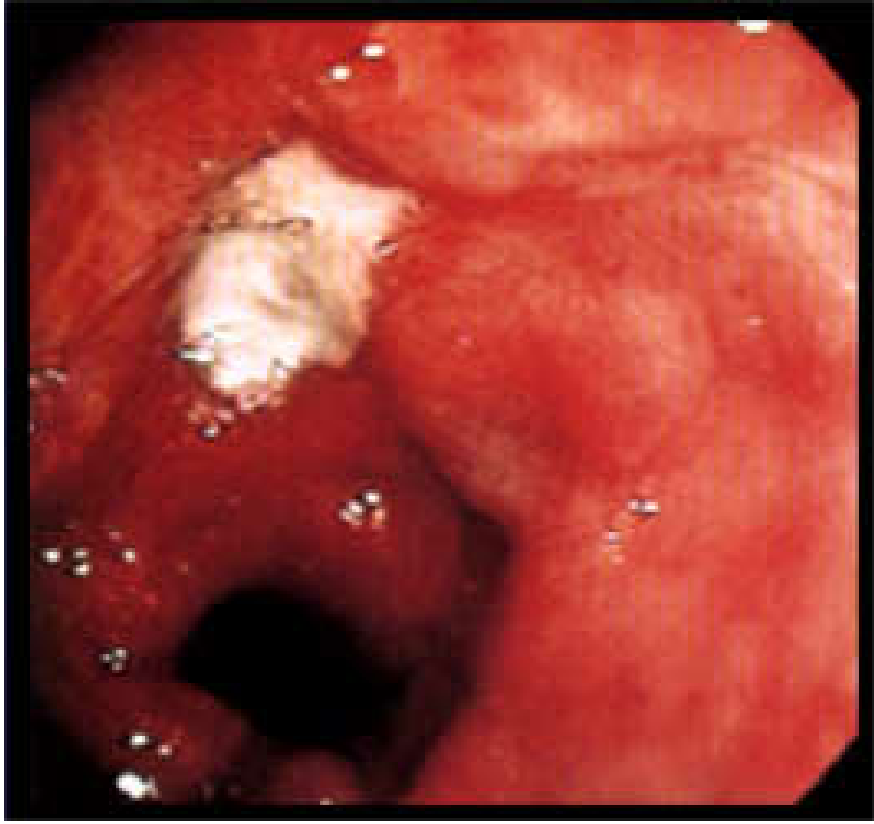
Nerve Supply

The nerves are derived from sympathetic from the celiac and superior mesenteric plexuses and parasympathetic (vagus) nerves



Duodenal ulcers (peptic ulcers) are inflammatory erosions of the duodenal mucosa. Most (65%) duodenal ulcers occur in the posterior wall of the superior part of the duodenum within 3 cm of the pylorus.

Occasionally, an ulcer perforates the duodenal wall, permitting the contents to enter the peritoneal cavity and causing peritonitis.

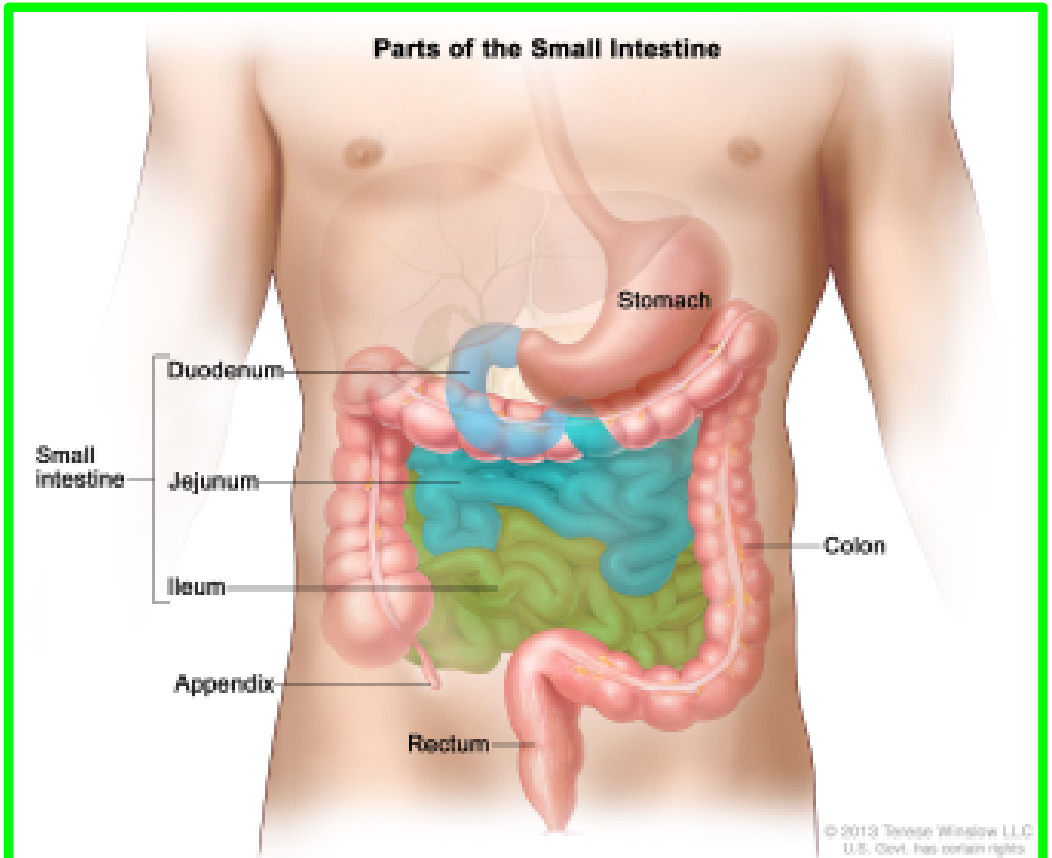


Although bleeding from duodenal ulcers commonly occurs, erosion of the gastroduodenal artery (a posterior relation of the superior part of the duodenum) by a duodenal ulcer results in severe hemorrhage into the peritoneal cavity and subsequent peritonitis

Jejunum and Ileum

❖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

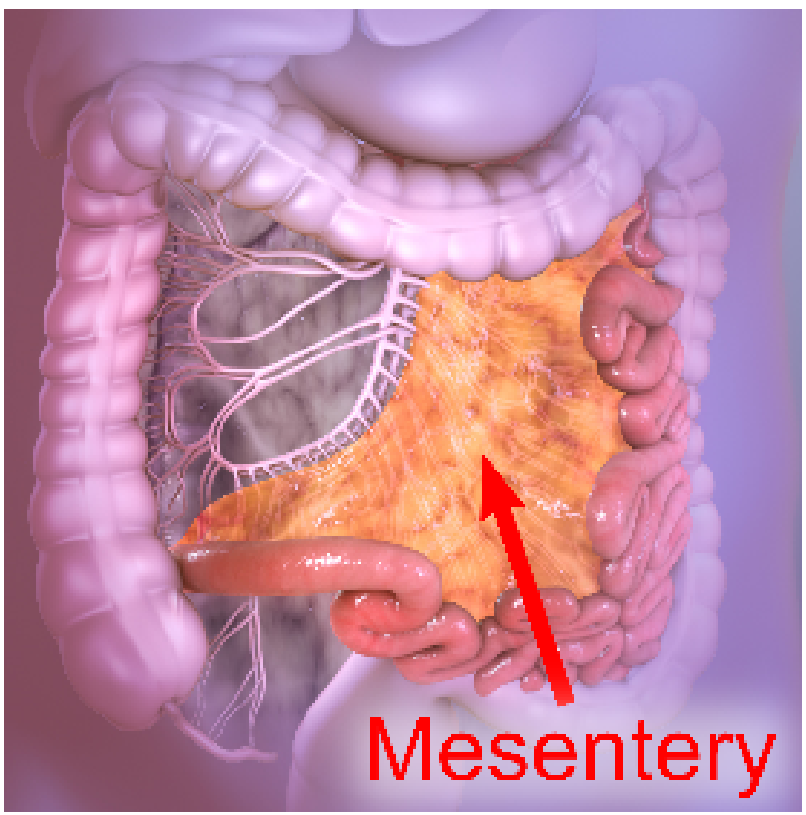


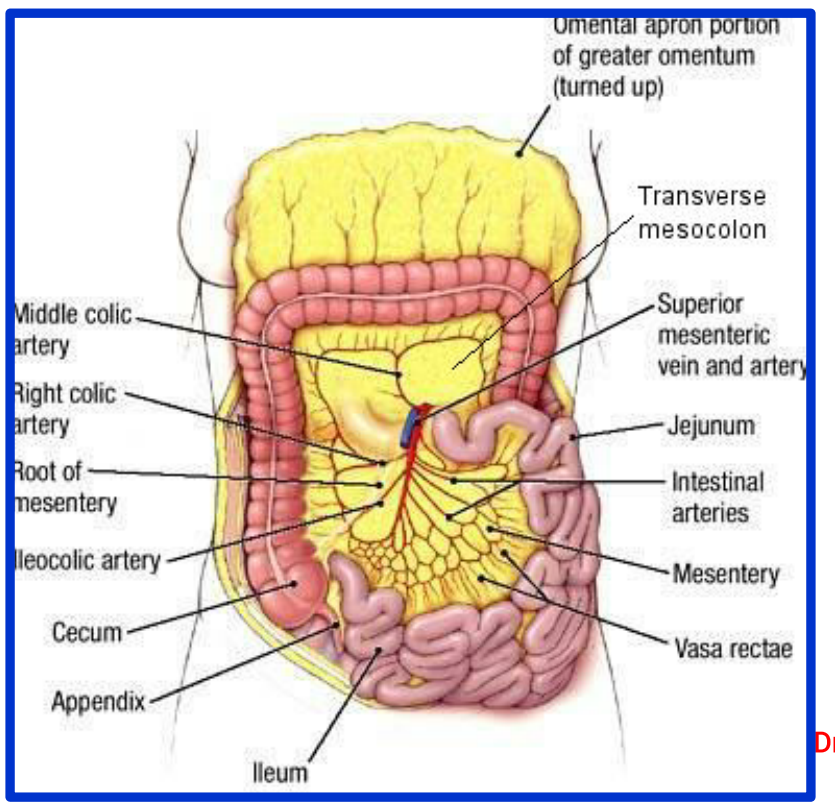
❖The coils of jejunum and ileum are freely mobile and are attached to the posterior abdominal wall by a fan-shaped fold of peritoneum known as the mesentery of the small intestine

Jejunum and Ileum

The root of the mesentery

permits the entrance and exit of the branches of the superior mesenteric artery and vein, lymph vessels, and nerves into the space between the two layers of peritoneum forming the mesentery



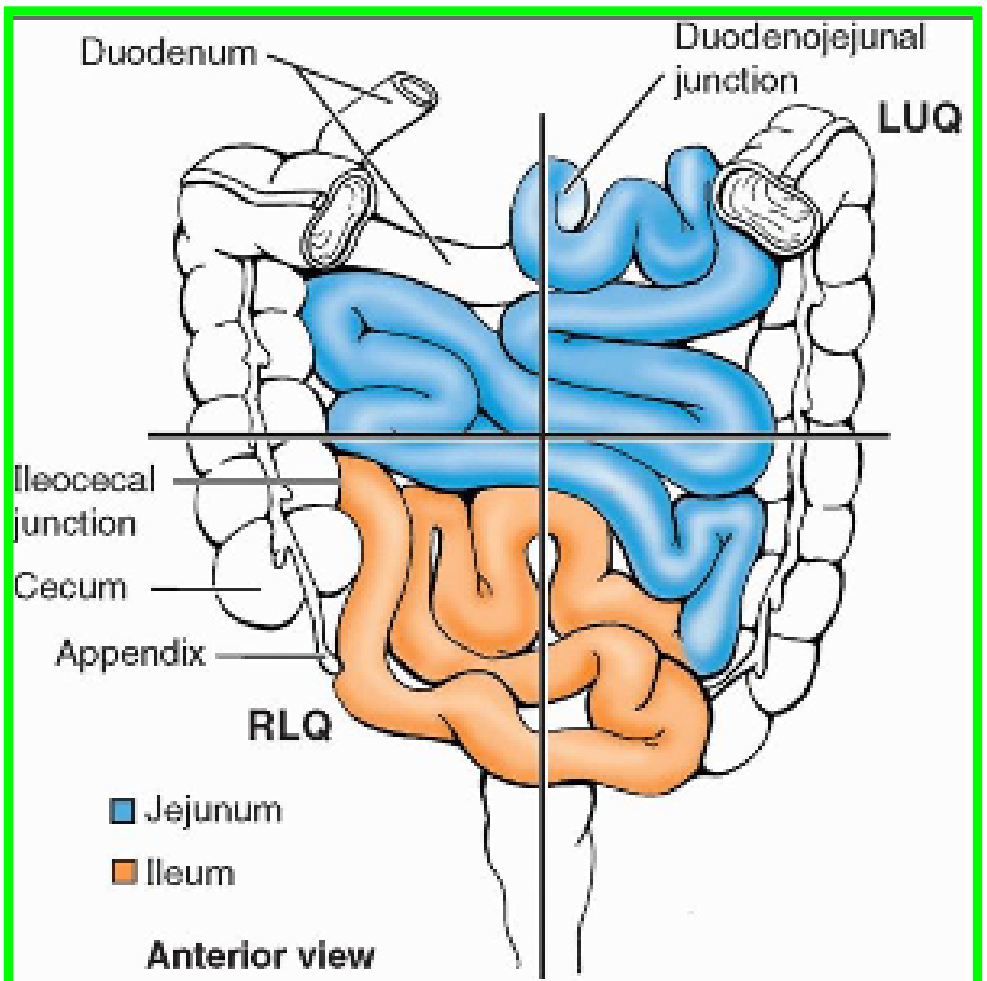


Dr Aiman Qais AL Maathidy
Wednesday 5 April 2023

Jejunum and Ileum

In the living, the jejunum can be distinguished from the ileum by the following features

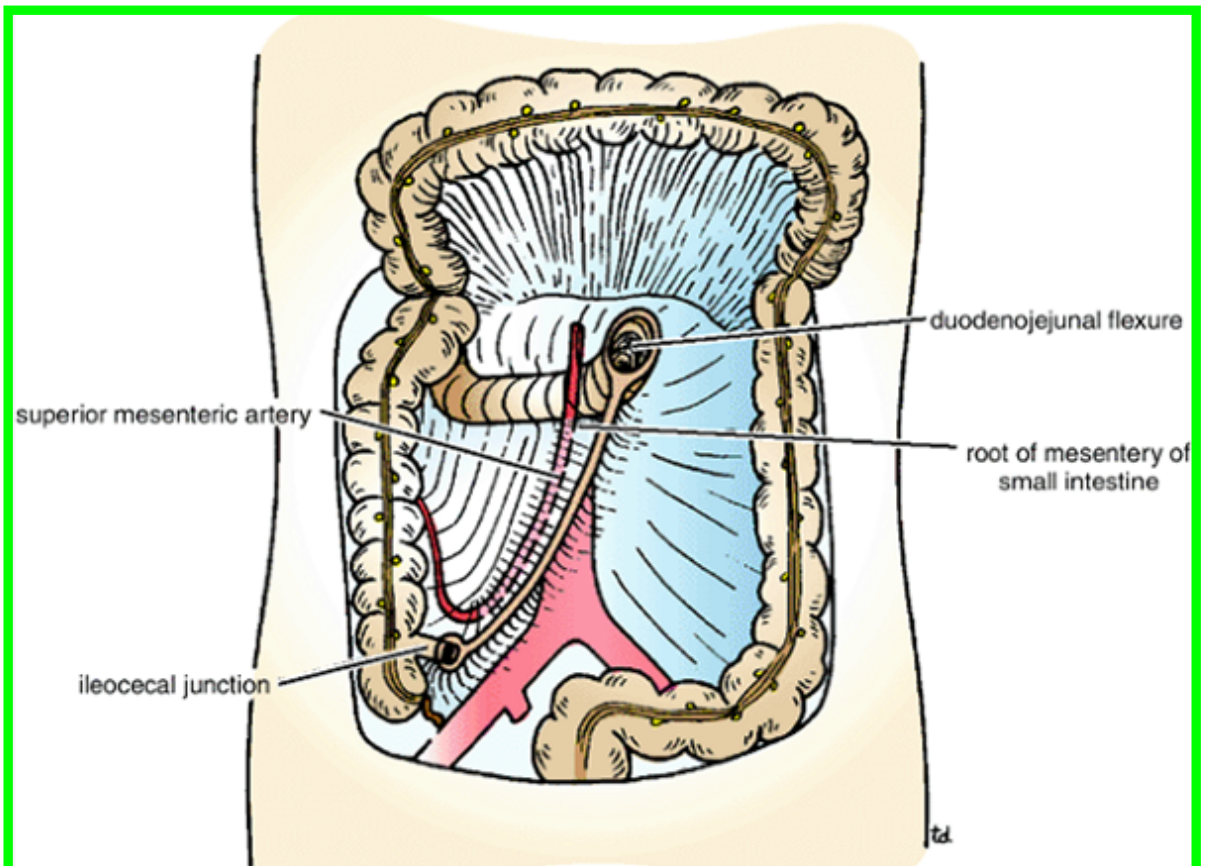
❖ The jejunum lies coiled in the upper part of the peritoneal cavity below the left side of the transverse mesocolon; the ileum is in the lower part of the cavity and in the pelvis



Dr Aiman Qais AL Maathidy
Wednesday 5 April 2023

Jejunum and Ileum

- The jejunal mesentery is attached to the posterior abdominal wall above and to the left of the aorta, whereas
- The ileal mesentery is attached below and to the right of the aorta



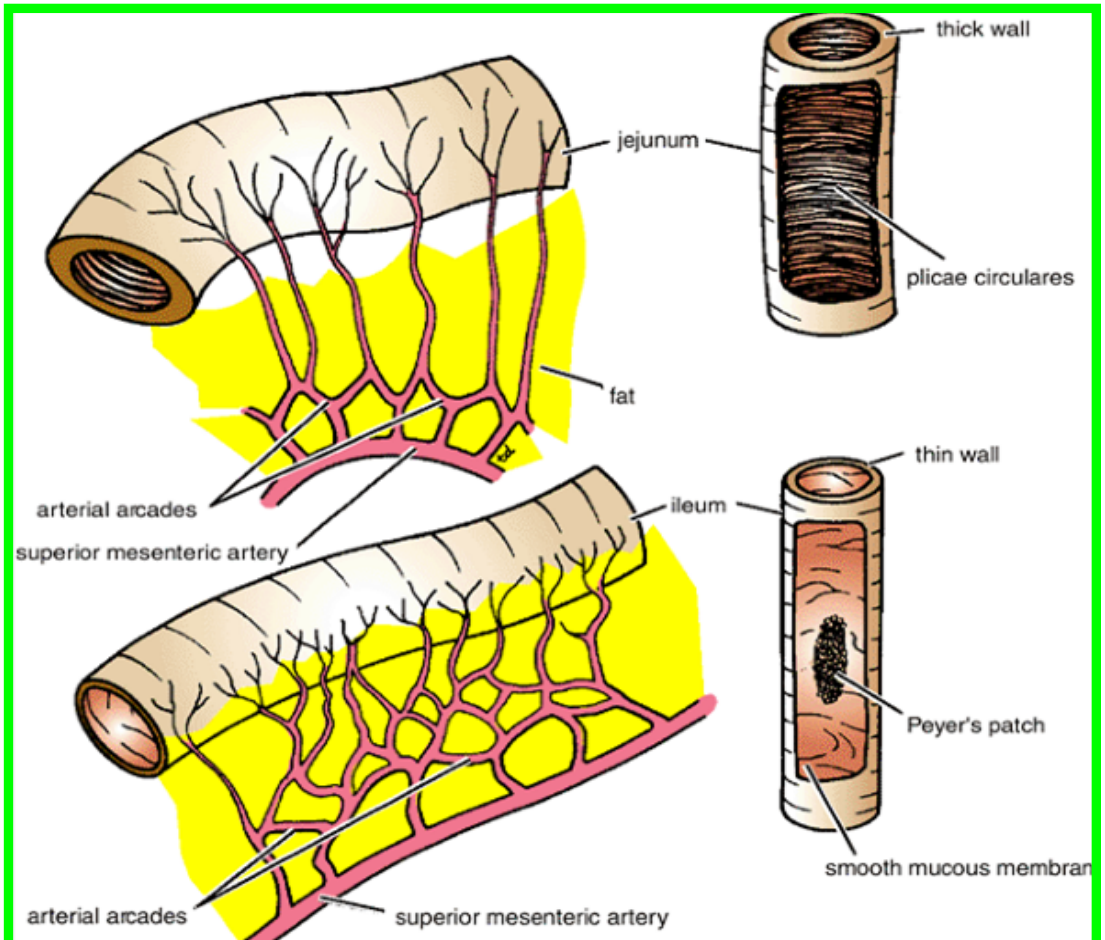
Dr Aiman Qais AL Maathidy

Wednesday 5 April 2023

Jejunum and Ileum

- The jejunal mesenteric vessels form only one or two arcades, with long and infrequent branches passing to the intestinal wall.

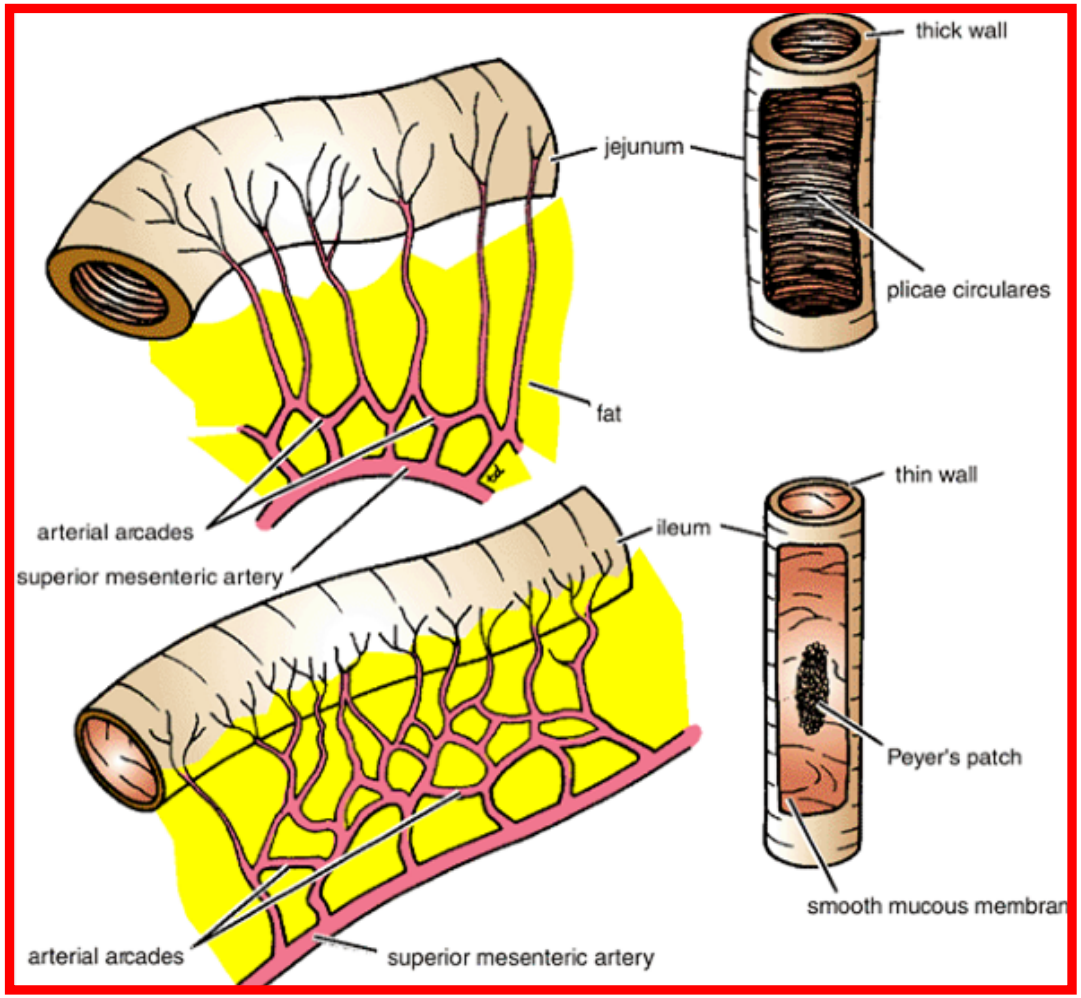
- The ileum receives numerous short terminal vessels that arise from a series of three or four or even more arcades



Dr Aiman Qais AL Maathidy
Wednesday 5 April 2023

Jejunum and Ileum

❖The jejunum is wider bored, thicker walled, and redder than the ileum. The jejunal wall feels thicker because the plicae circulares, are larger, more numerous, and closely set in the jejunum, whereas in the upper part of the ileum they are smaller and more widely separated and in the lower part they are absent

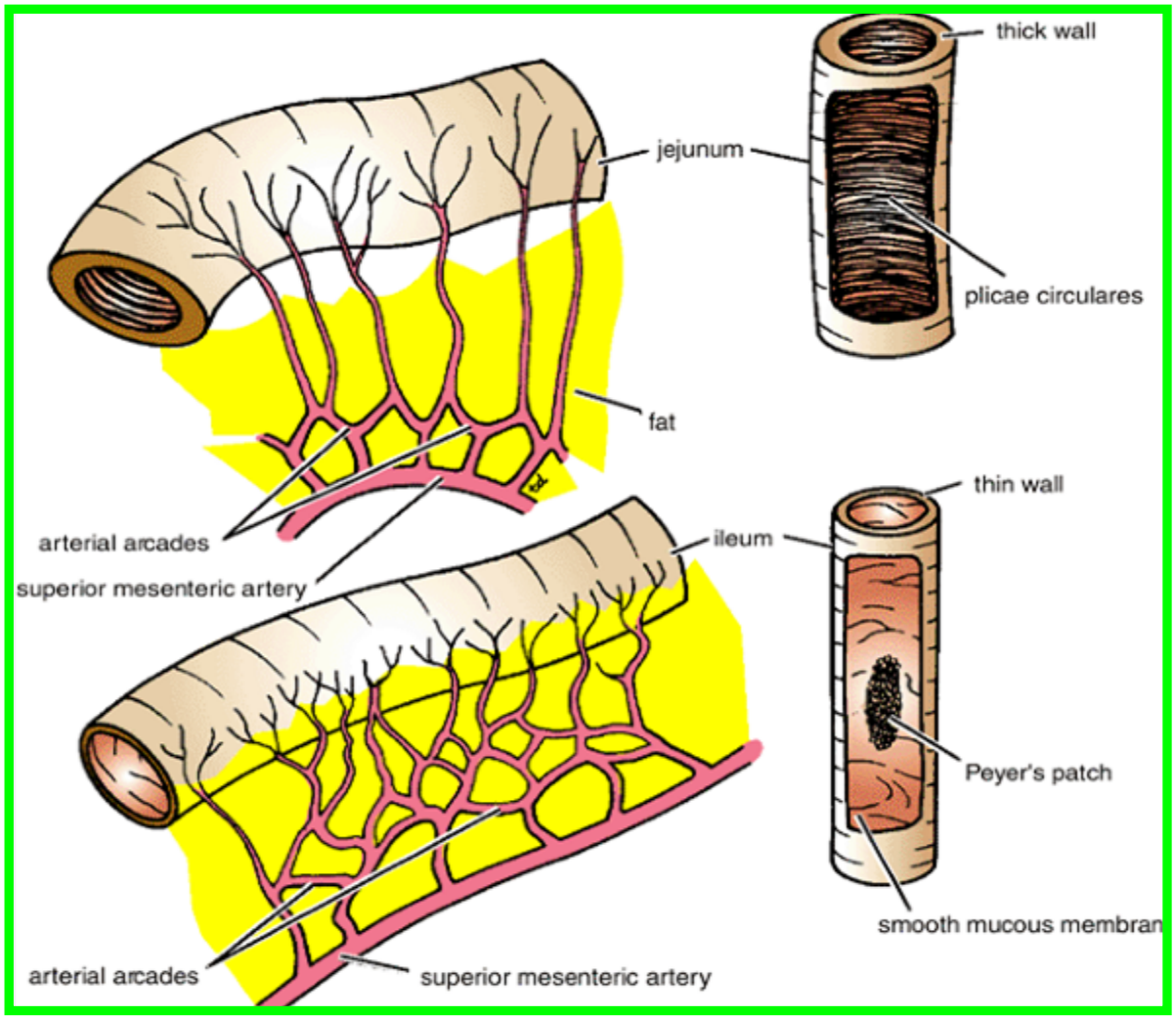


Dr Aiman Qais AL Maathidy
Wednesday 5 April 2023

Jejunum and Ileum

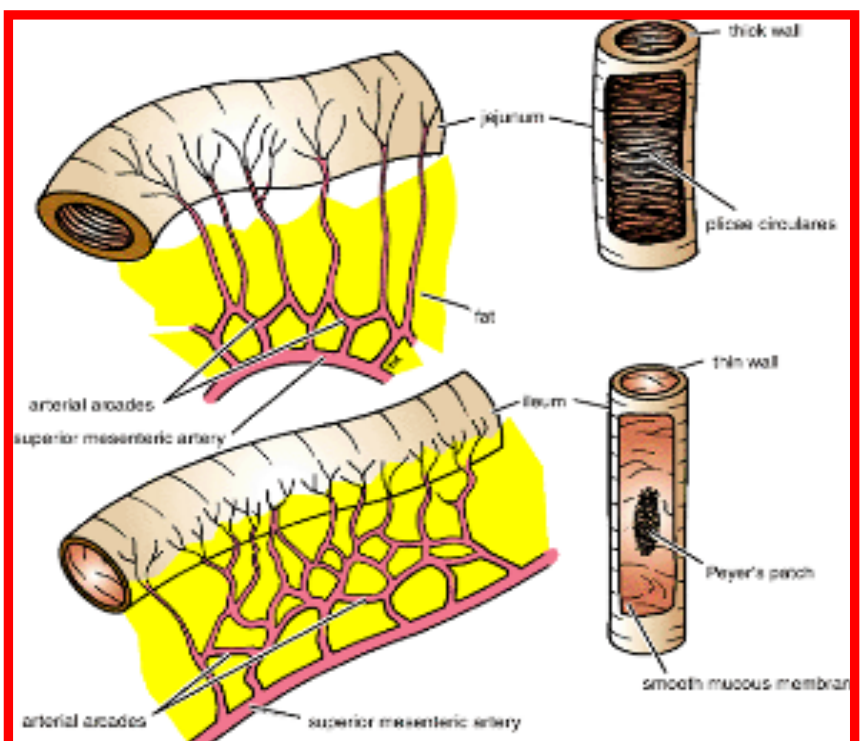
❖At the jejunal end of the mesentery, the fat is deposited near the root and is scanty near the intestinal wall.

❖At the ileal end of the mesentery the fat is deposited throughout so that it extends from the root to the intestinal wall



Jejunum and Ileum

❖Aggregations of lymphoid tissue (Peyer's patches) are present in the mucous membrane of the lower ileum along the antimesenteric border. In the living these may be visible through the wall of the ileum from the outside

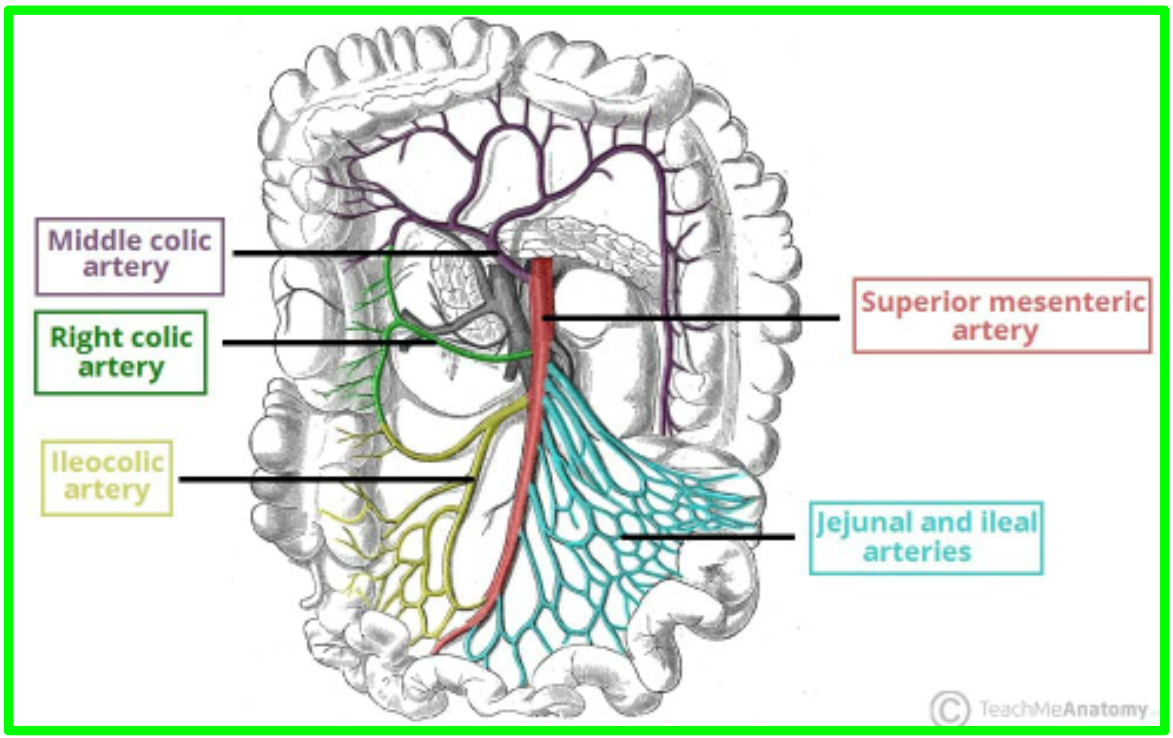


Jejunum and Ileum

Arteries

✓The arterial supply is from branches of the superior mesenteric artery

✓The intestinal branches arise from the left side of the artery and run in the mesentery to reach the gut.



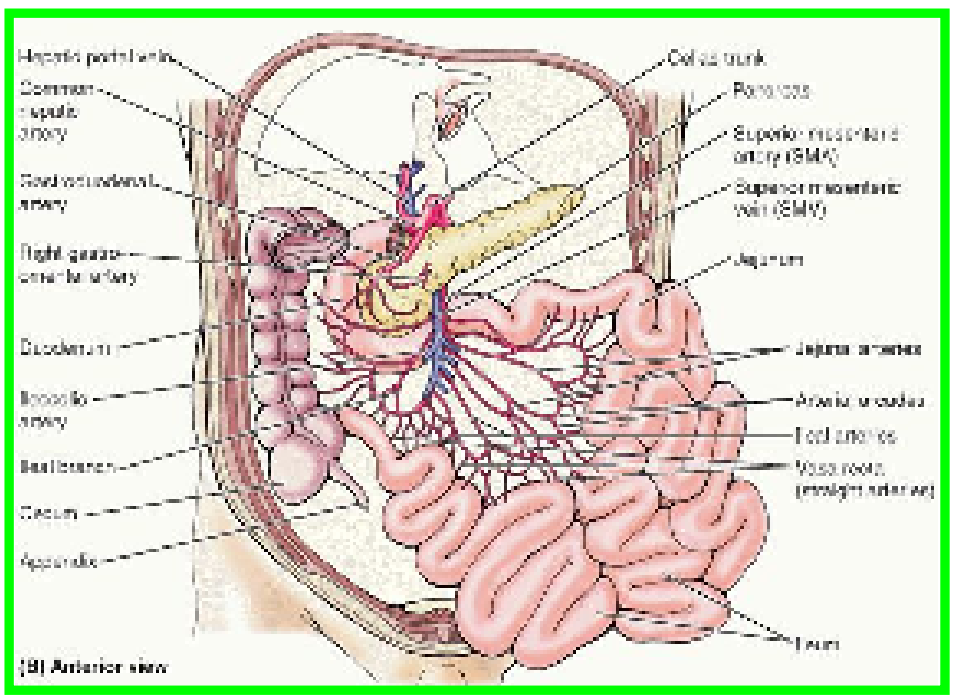
✓They anastomose with one another to form a series of arcades.

✓The lowest part of the ileum is also supplied by the ileocolic artery

Jejunum and Ileum

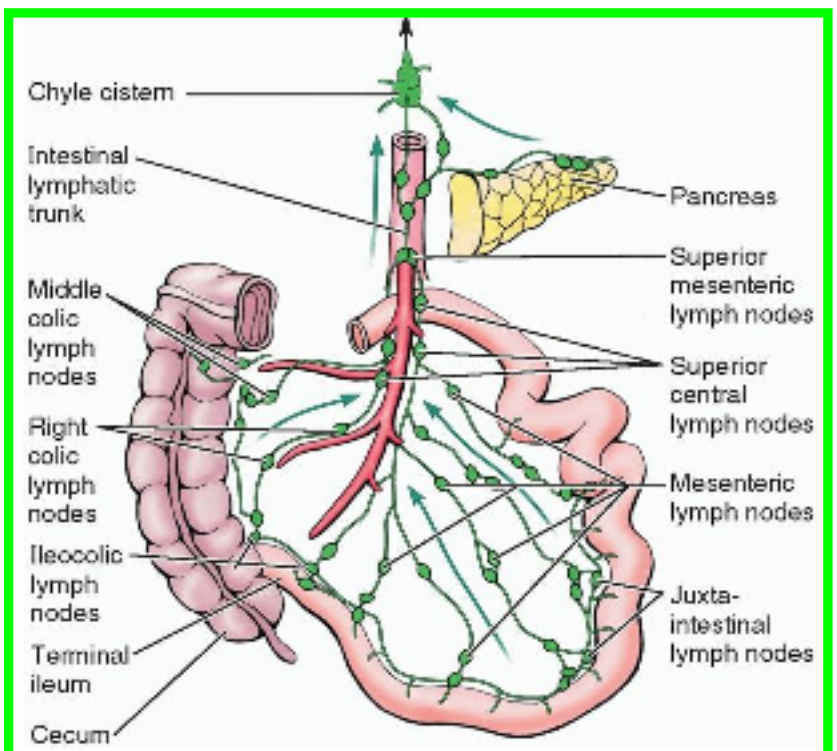
Veins

The veins correspond to the branches of the superior mesenteric artery and drain into the superior mesenteric vein



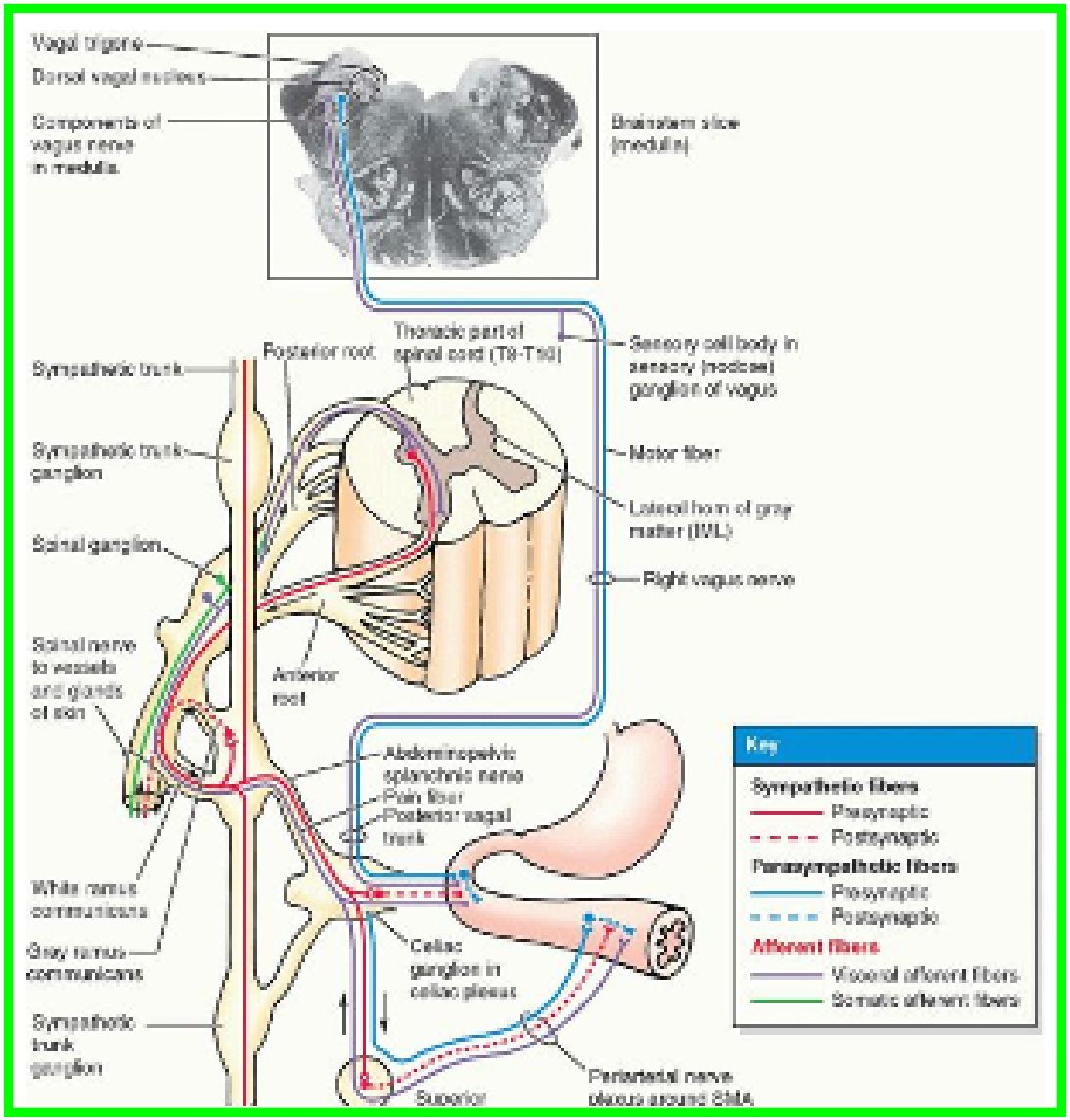
Lymph Drainage

The lymph vessels pass through many intermediate mesenteric nodes and finally reach the superior mesenteric nodes, which are situated around the origin of the superior mesenteric artery



Jejunum and Ileum

The nerves are derived from the sympathetic and parasympathetic (vagus) nerves from the superior mesenteric plexus

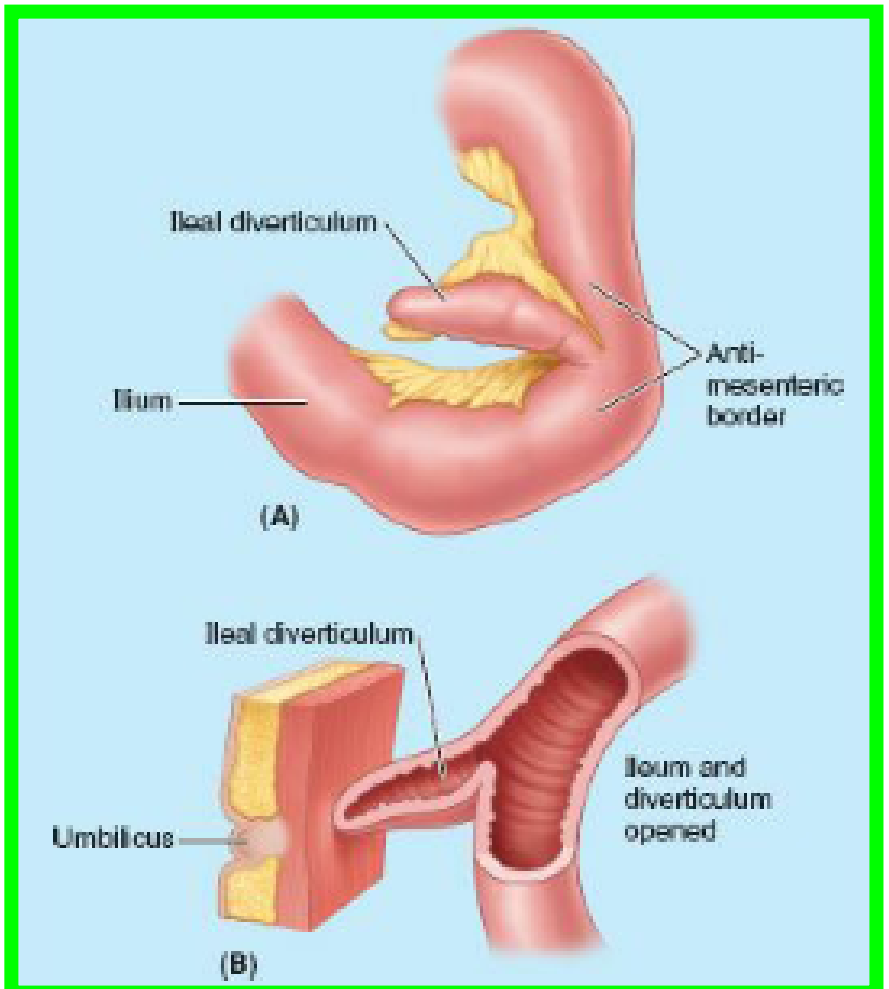


Ileal Diverticulum

(or Meckel diverticulum) is a congenital anomaly that occurs in 1–2% of the population. usually appears as a finger-like pouch
It is always at the site of the antimesenteric border of the ileum.

The diverticulum is usually located 30–60 cm from the ileocecal junction in infants and 50 cm in adults.

An ileal diverticulum may become inflamed and produce pain mimicking that produced by appendicitis.



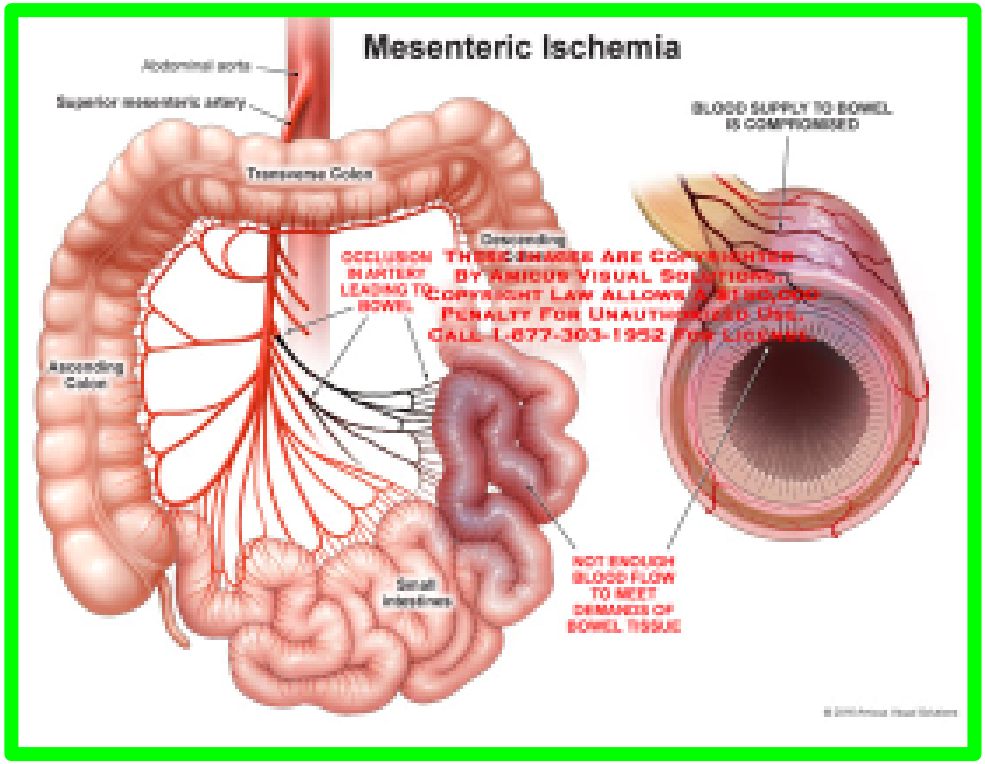
Dr Aiman Qais AL Maathidy

Ischemia of Intestine

Occlusion of the vasa recta by emboli (e.g., blood clots) results in ischemia of the part of the intestine concerned. If the ischemia is severe, necrosis (tissue death) of the involved segment results and ileus (obstruction of the intestine) of the paralytic type occurs.

Ileus is accompanied by a severe colicky pain, along with abdominal distension, vomiting, and often fever and dehydration.

If the condition is diagnosed early (e.g., using a superior mesenteric arteriogram), the obstructed part of the vessel may be cleared surgically.




Dr Aiman Q. AL Maathidy
Wednesday 5 April 2023