Lecture-8-

Anatomy of spleen and pancreas

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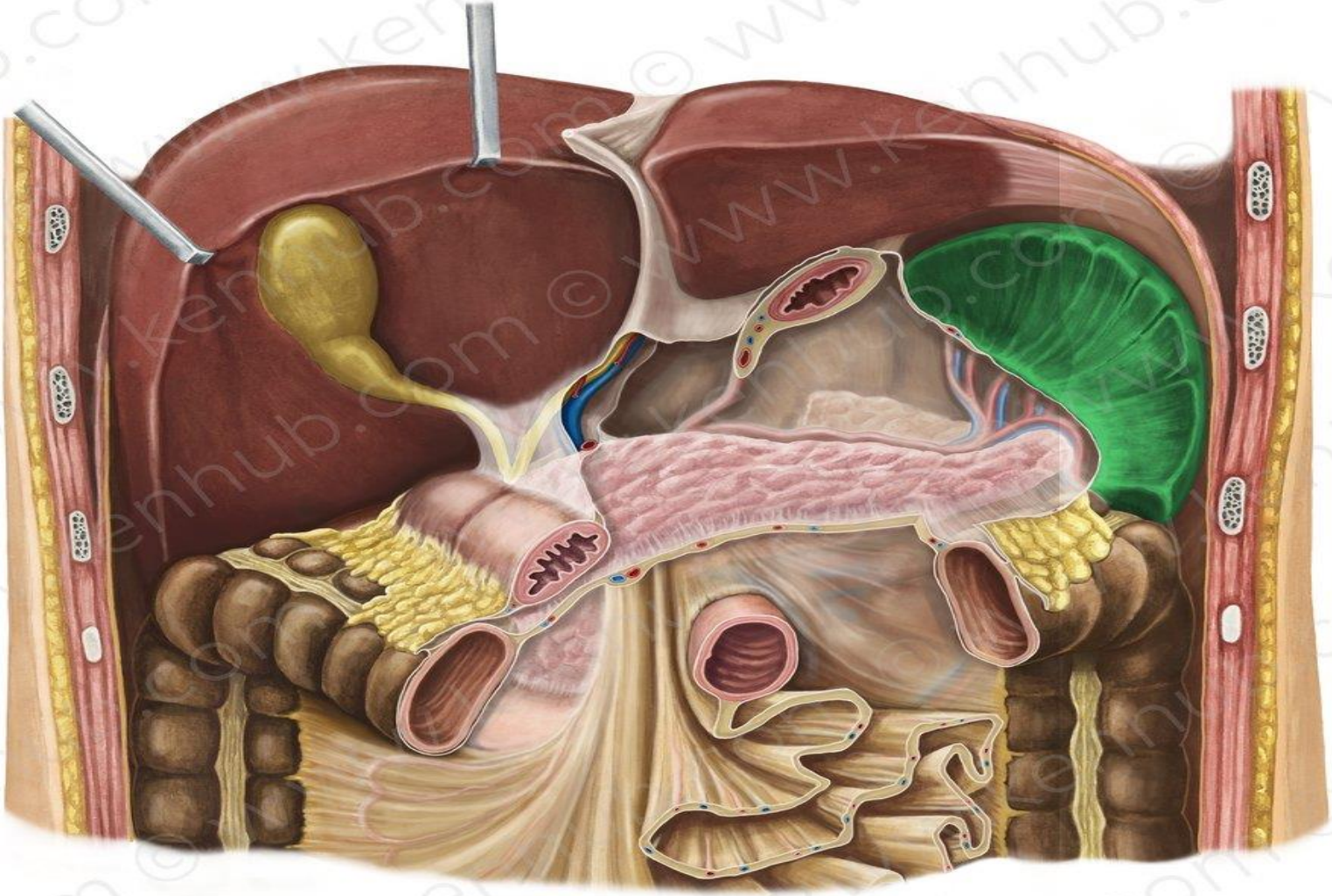
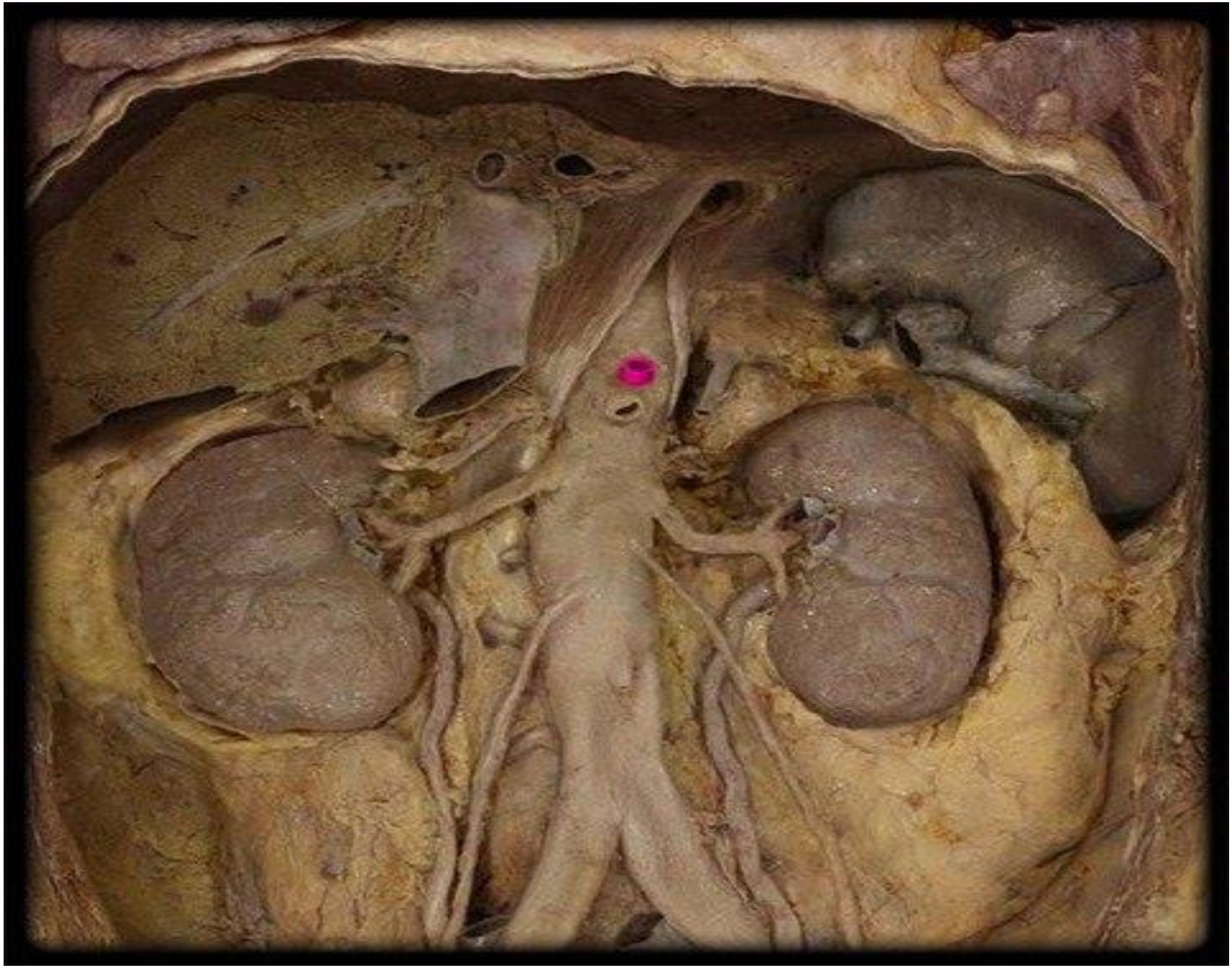
- The spleen is the largest single mass of lymphoid tissue in the body.
- The spleen is very vascular and reddish purple in color; its size and weight vary. A healthy spleen is not palpable.
- It is oval shaped and has a notched anteriorborder.
- It lies just beneath the left half of the diaphragm close to the 9th, l0th, and 11th ribs.

Location

The spleen is found in the left hypo chondrial region of the abdomen (left upper quadrant). More precisely, the spleen is located posterior to the stomach and anterior to the left hemidiaphragm at the level of ribs 9-10and 11 th ,

Medial to the spleen is the left kidney superior is the diaphragm while inferiorly it rests directly on the left colic flexure (splenic flexure).

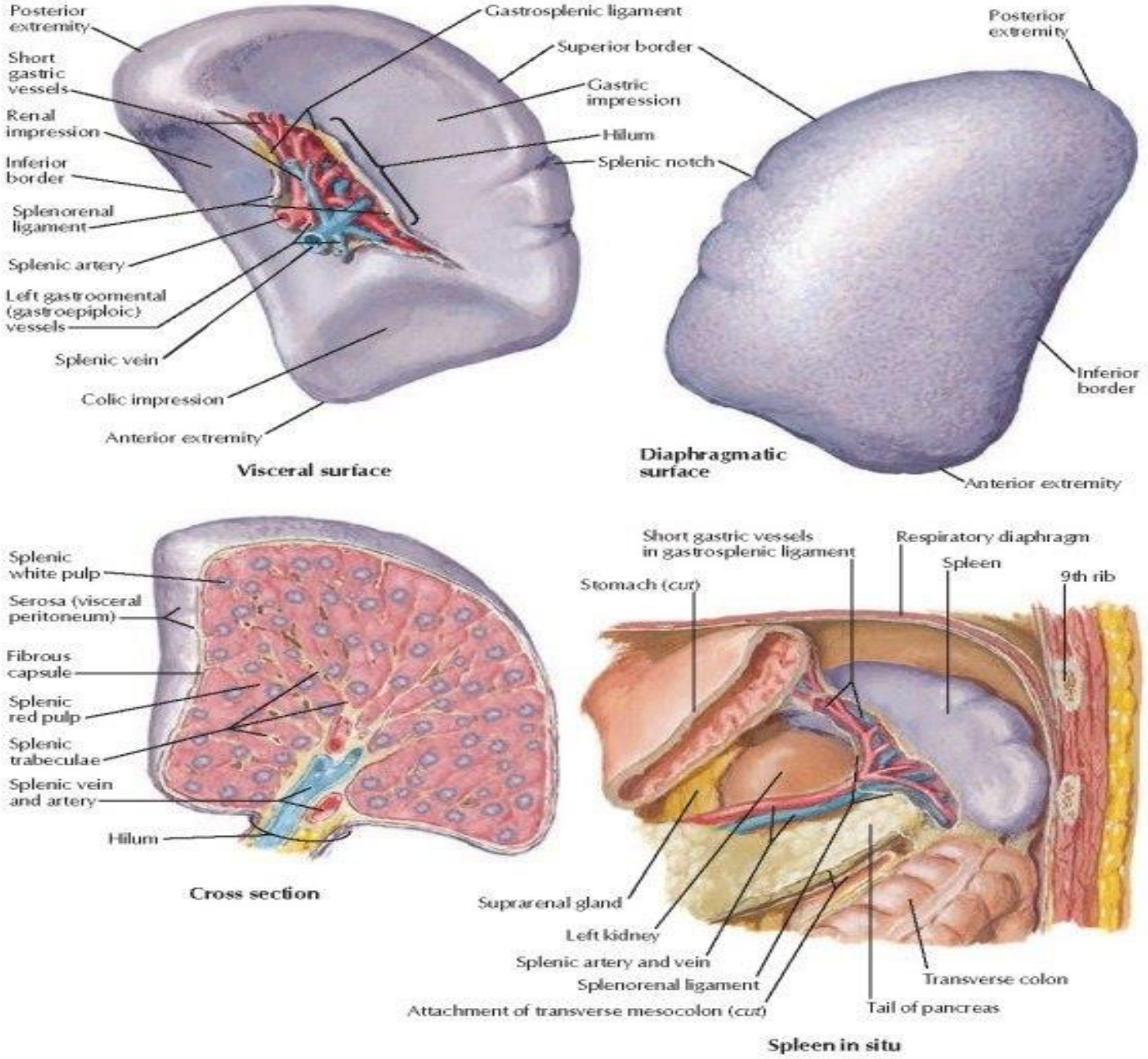




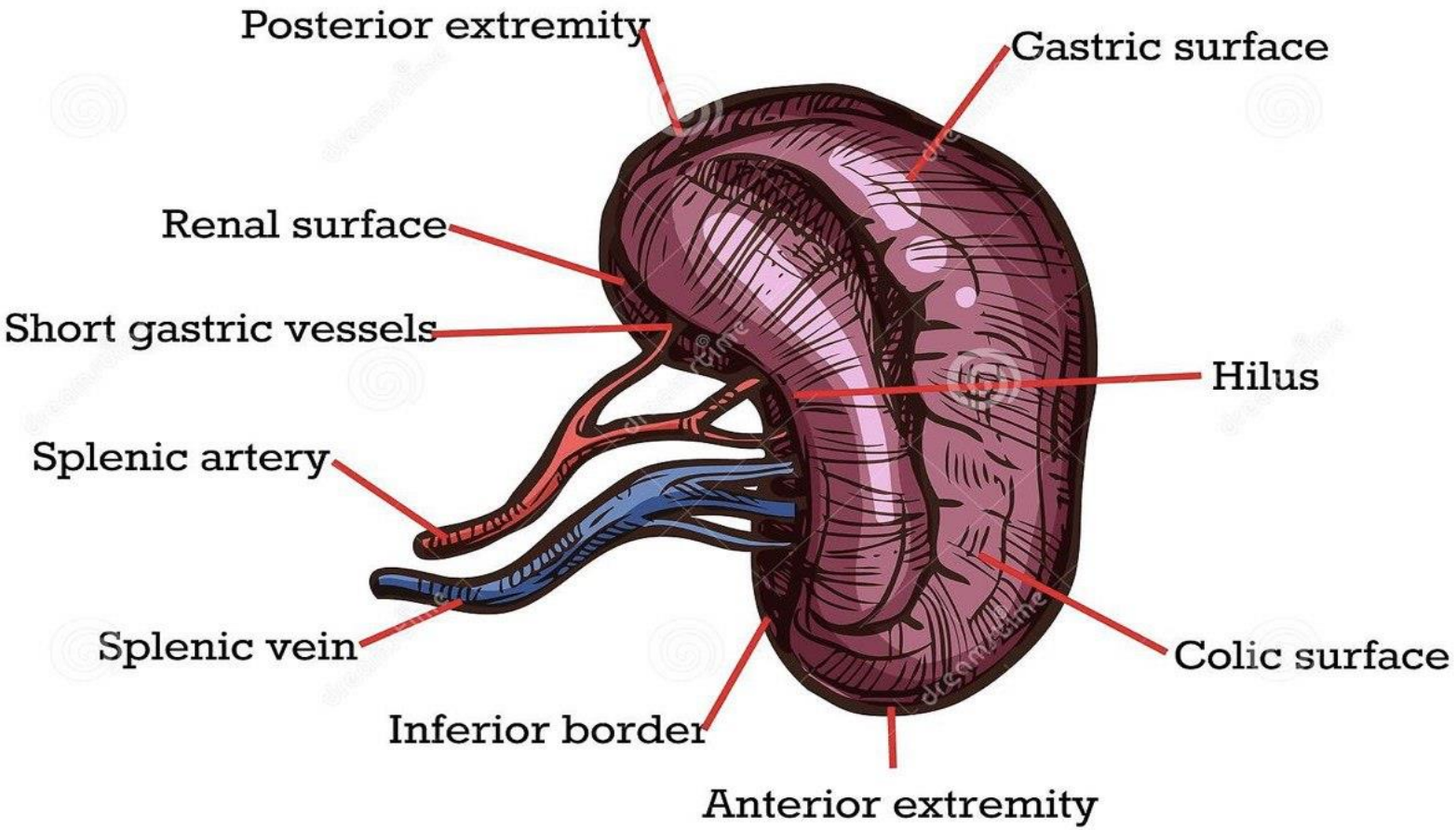
- The spleen is a fist-sized organ.
- It is wrapped by a fibroelastic capsule which allows the spleen to significantly increase its size when necessary.
- The spleen is an intraperitoneal organ, so all of its surfaces are covered with visceral peritoneum Except the hilum of the spleen, the site through which the splenic artery and vein pass, is peritoneum-free.

- Organs near to the spleen leave their impressions on its surfaces which, together with spleen borders, can easily be observed and described.
- Diaphragmatic (lateral) surface leans onto the adjacent part of the diaphragm, thus it is slightly convexed to perfectly fit into the concavity of the left hemidiaphragm. This surface also shows impressions from ribs 9-11.
- Medial surface of the spleen shows three areas of impression.
- The colic area is the impression of the left colic flexure,
- the gastric area is the impression of the stomach, and
- the renal area is the impression of the left kidney.
- The splenic hilum is found in the central part of this surface.

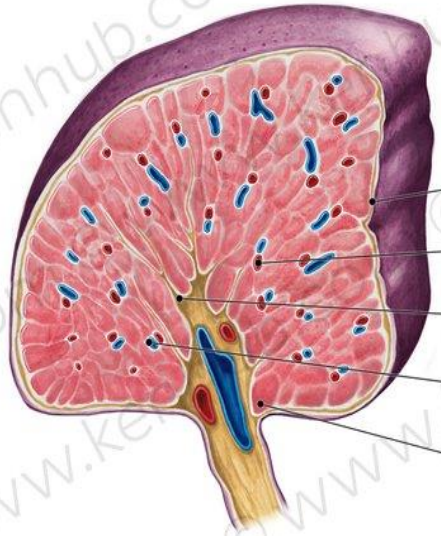
- The spleen has three borders (superior, inferior, and anterior) as well as two extremities (anterior and posterior).
- The superior border bounds the gastric area, the inferior border bounds the renal area and the anterior border bounds the colic area.

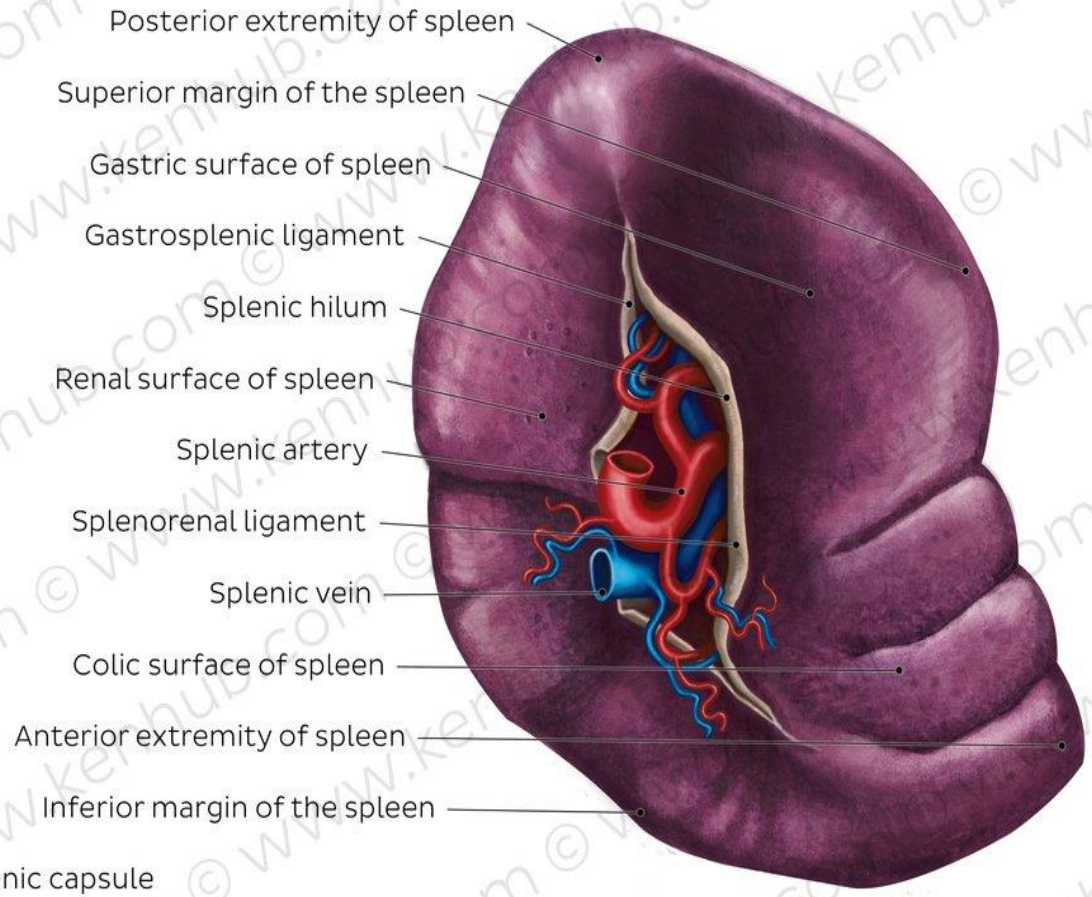

Posterior extremity
Short gastric vessels
Renal impression
Inferior border
Splenorenal ligament
Splenic artery
Left gastroomental (gastroepiploic) vessels
Splenic vein
Colic impression
Anterior extremity
Gastrosplenic ligament
Superior border
Gastric impression
Hilum
Splenic notch
Visceral surface
Posterior extremity
Inferior border
Anterior extremity
Diaphragmatic surface
Splenic white pulp
Serosa (visceral peritoneum)
Fibrous capsule
Splenic red pulp
Splenic trabeculae
Splenic vein and artery
Hilum
Cross section
Short gastric vessels in gastrosplenic ligament
Respiratory diaphragm
Spleen
9th rib
Stomach (cut)
Suprarenal gland
Left kidney
Splenic artery and vein
Splenorenal ligament
Attachment of transverse mesocolon (cut)
Transverse colon
Tail of pancreas
Spleen in situ

SPLEEN ANATOMY



Diaphragmatic surface of spleen





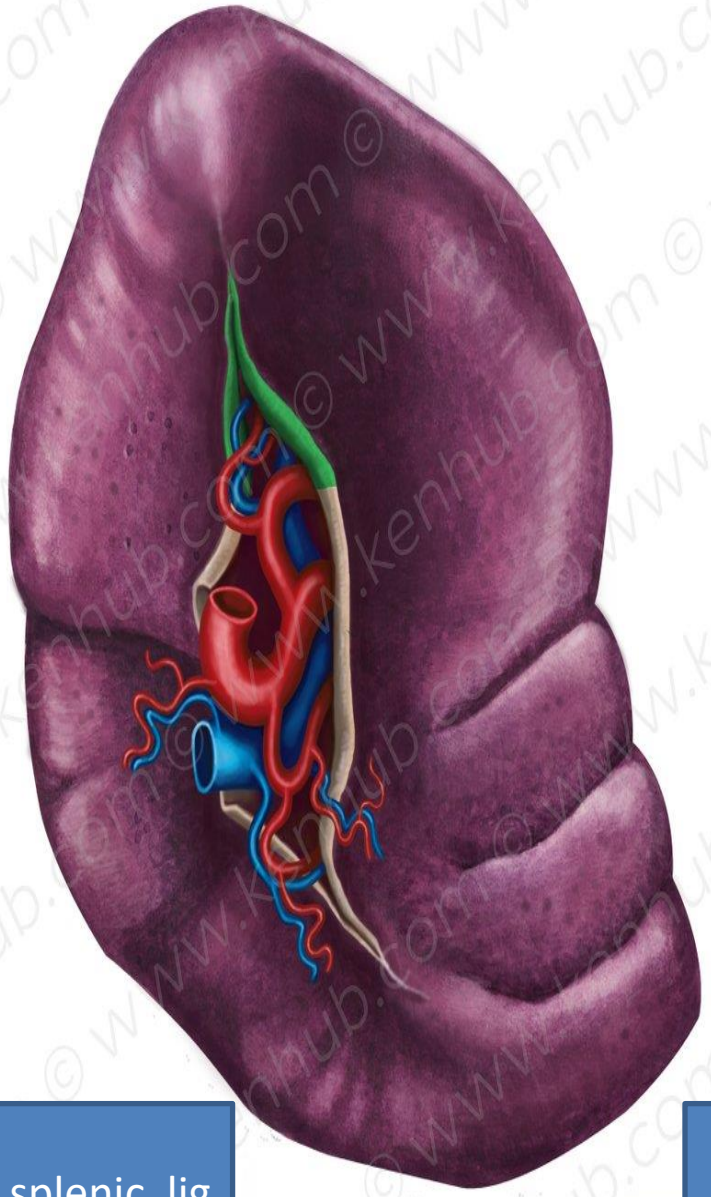
Splenic ligaments

Three ligaments originating from the surrounding structures attach to the spleen. Two of these ligaments connect to the splenic hilum and are traversed by the transmitted splenic vessels.

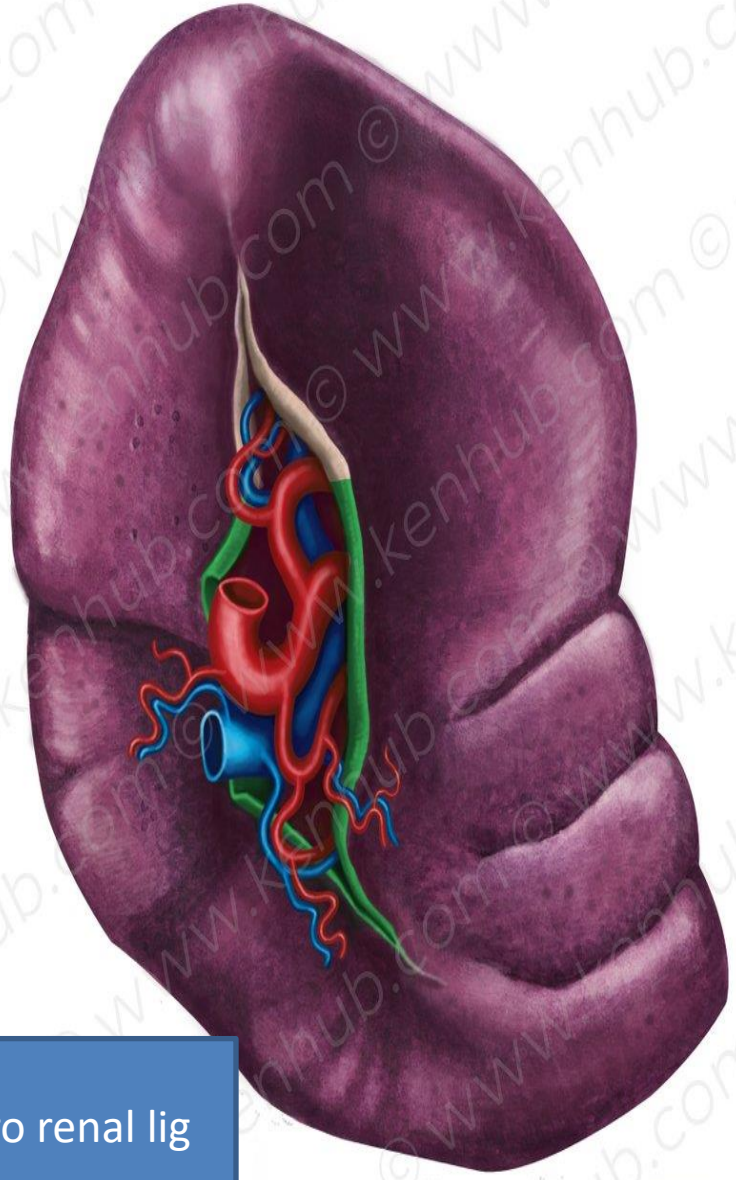
The gastrosplenic ligament connects the hilum with the greater curvature of the stomach. It contains the short gastric vessels and left _gastro omental (gastro epiploic) arteries_and veins.

The spleno renal ligament connects the hilum of the spleen with the left kidney. It transmits the splenic artery and vein.

Lastly, the spleen sits on the phrenicocolic ligament which originates from the colon_and is also known as the sustentaculum lienis.



Gastro splenic lig

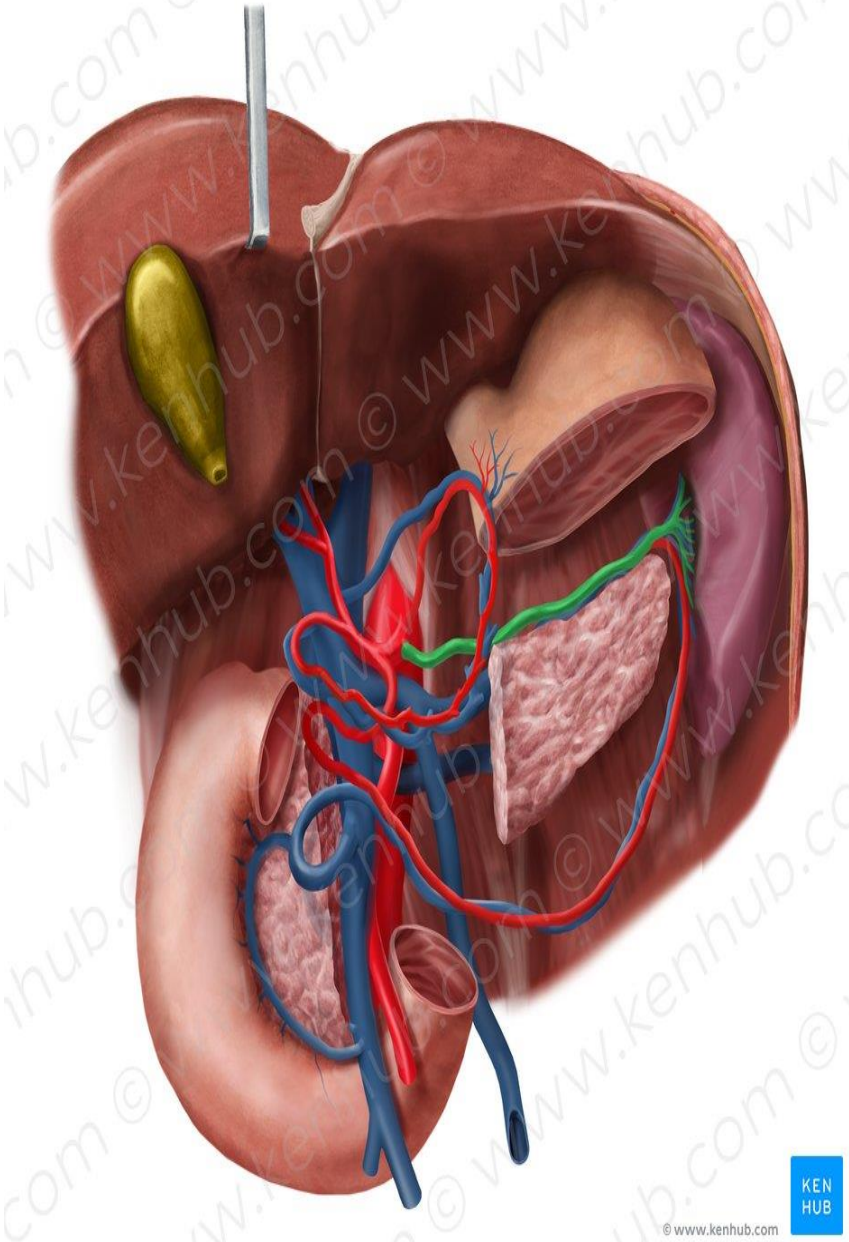


Gastro renal lig

Blood vessels

-**The arterial supply** of the spleen comes from the tortuous splenic artery, which reaches the spleen as it travels through the splenorenal ligament. This artery emerges from the celiac trunk ,which is a branch of the abdominal aorta .

-**The venous drainage** of the spleen occurs via the splenic vein ,. Posterior to the neck of the pancreas , the splenic vein unites with the superior mesenteric vein to form the hepatic portal vein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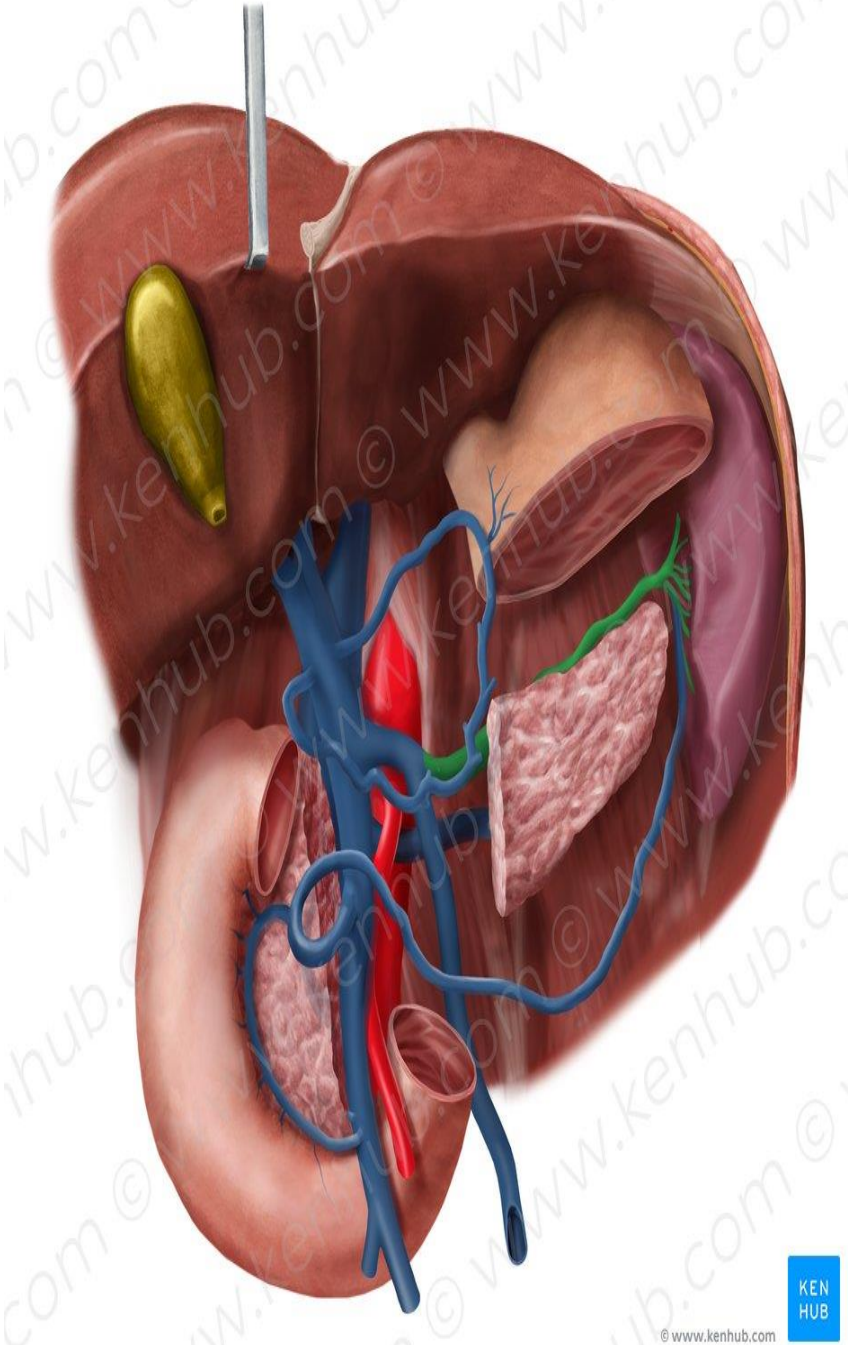
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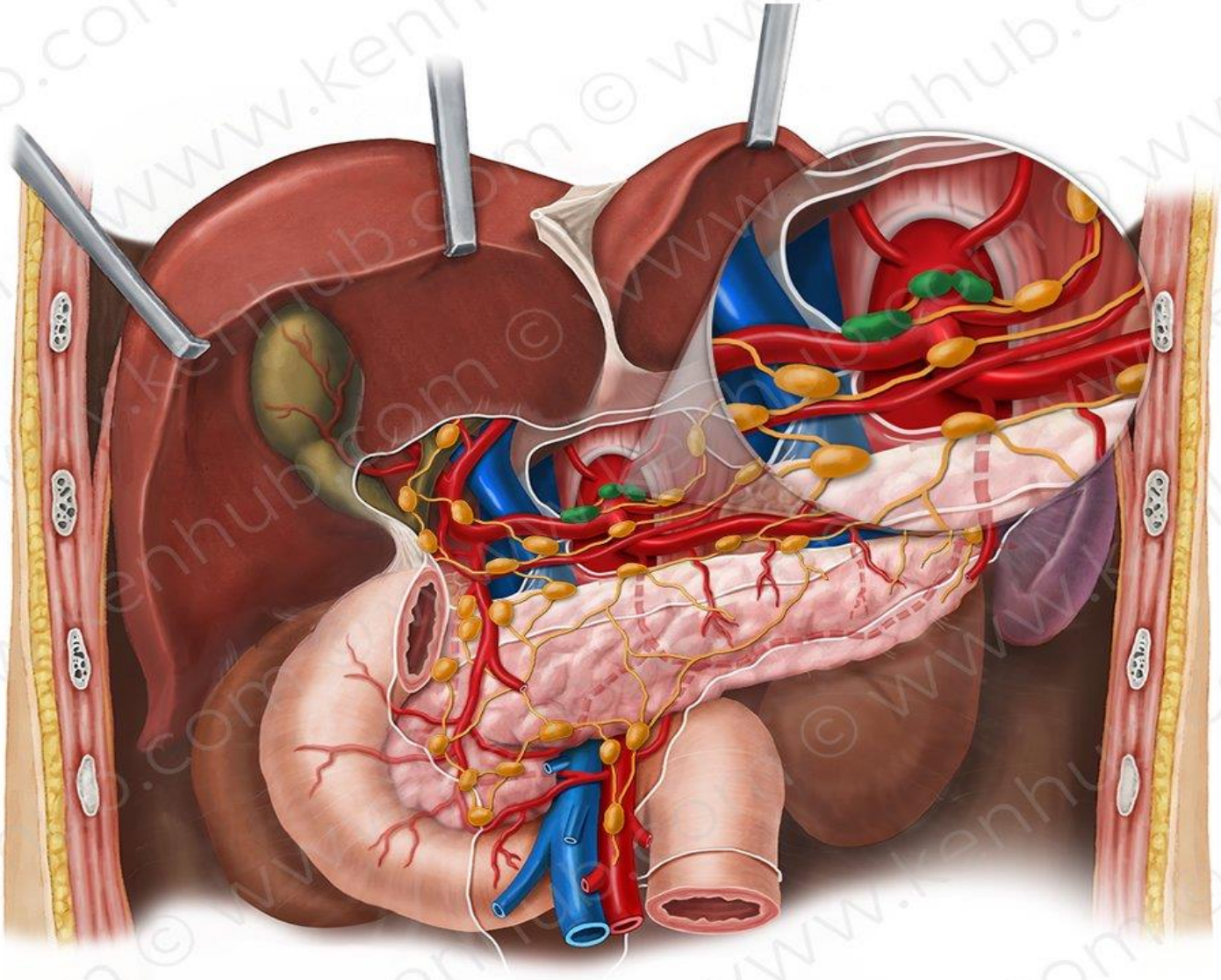
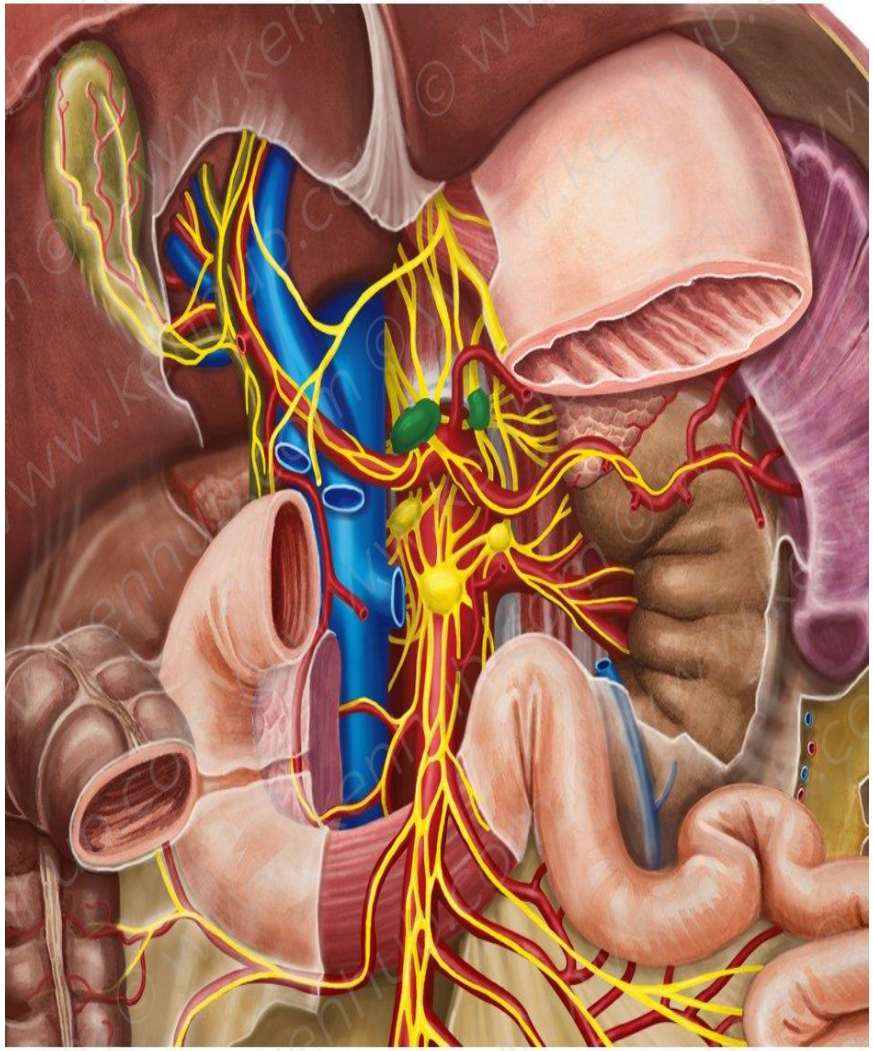
Lymphatic drainage

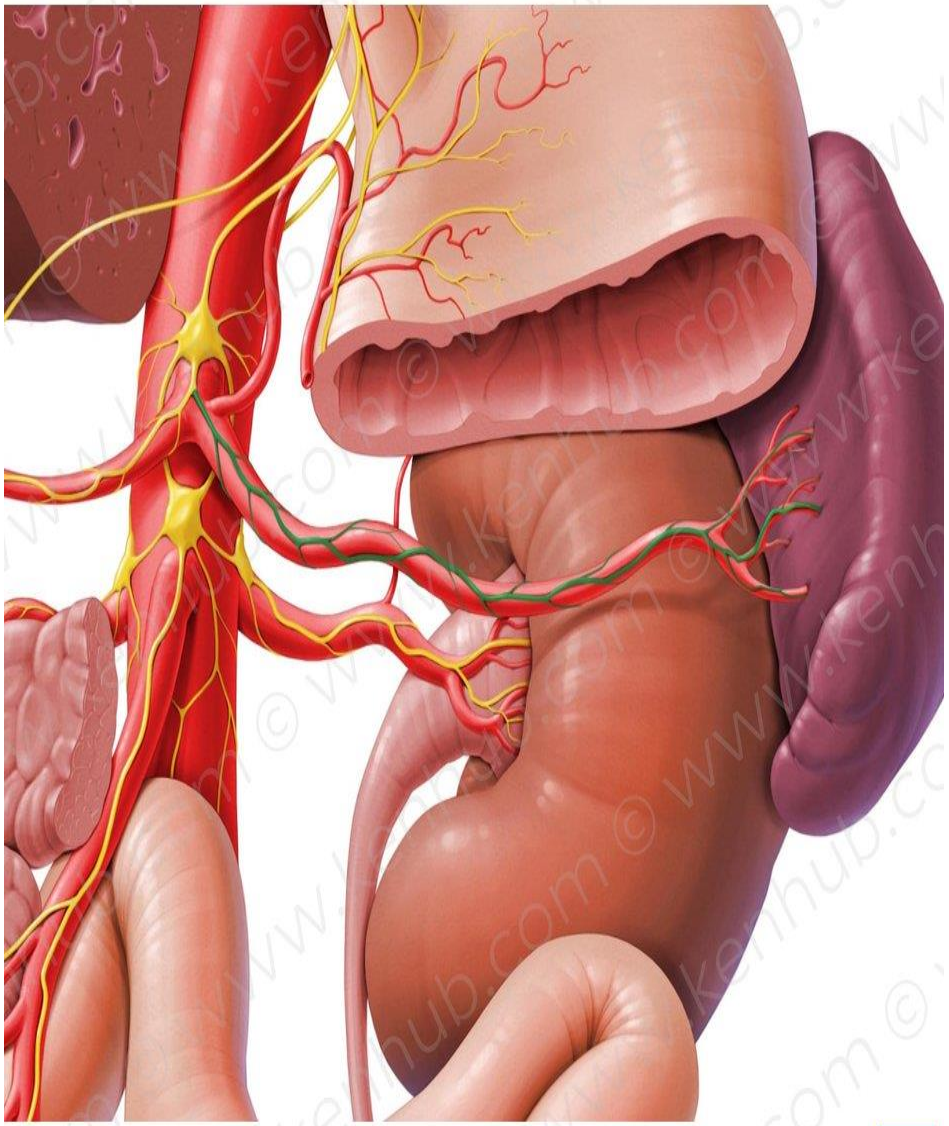
- The splenic lymph nodes lie at the hilum and receive lymph via perivascular and subcapsular lymphatic vessels. It is then drained to the superior pancreatic (pancreaticosplenic) lymph nodes found at the superior surface of the pancreas. From there, the lymph is drained to the celiac lymph nodes.

Innervation

- The spleen is innervated by autonomic nerves from the celiac plexus, which supply the spleen with both sympathetic and parasympathetic nerves. These nerves form the splenic plexus which reaches the splenic hilum traveling along the splenic artery and its branches.







Anatomy of pancreas

The pancreas is an abdominal glandular organ with both **digestive** (exocrine) and **hormonal** (endocrine) functions.

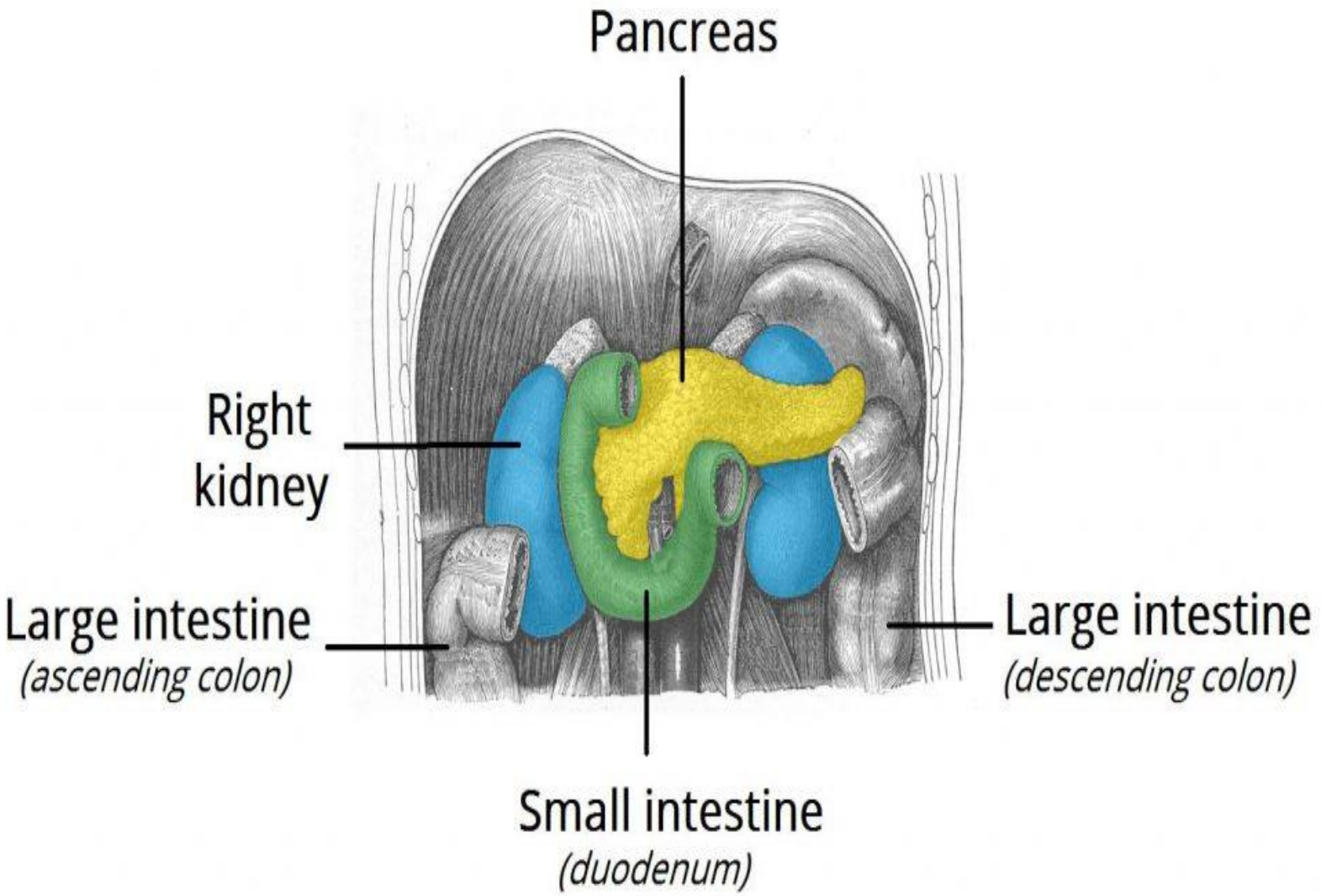
- Its exocrine function includes the synthesis and release of digestive enzymes into the duodenum of the small intestine Its endocrine function involves the release of hormones responsible for regulating glucose, lipid, and protein metabolism.
- The pancreas is an oblong-shaped organ positioned at the level of the **transpyloric plane** (L1).
- It is approximately 15 cm ..
- With the exception of the tail of the pancreas, it is a retroperitoneal organ, located deep within the upper abdomen in the epigastrium and left hypochondrium regions.
- Within the abdomen, the pancreas has direct anatomical relations to several structures

Anatomical relations of the pancreas	
Anterior	Stomach, lesser sac (omental bursa), transverse mesocolon, superior mesenteric artery
Posterior	Aorta, inferior vena cava, right renal artery , right and left renal veins, superior mesenteric vessels, splenic vein, hepatic portal vein, left kidney, left suprarenal gland
Superior	Splenic artery
Lateral	Spleen
Medial	Duodenum (descending and horizontal parts)

- **Organs related to pancreas :**
- **Stomach** – Separated from the pancreas by the lesser sac, the stomach and pylorus lie anterior and to the pancreas.
- **Duodenum** – The “C” shaped duodenum curves around and outlines the head of the pancreas. The first part of the duodenum lies anteriorly whereas the second part of the duodenum including the ampulla of Vater lies laterally to the right of the pancreatic head
- **Transverse mesocolon** – Attaches to the anterior surface of the pancreas
- **Common bile duct** – Descends behind the head of the pancreas before opening into the second part of the duodenum alongside the major pancreatic duct through the major duodenal papilla
- **Spleen** – located posteriorly and laterally. The lienorenal ligament is formed from peritoneum and connects the spleen to the tail of the pancreas.

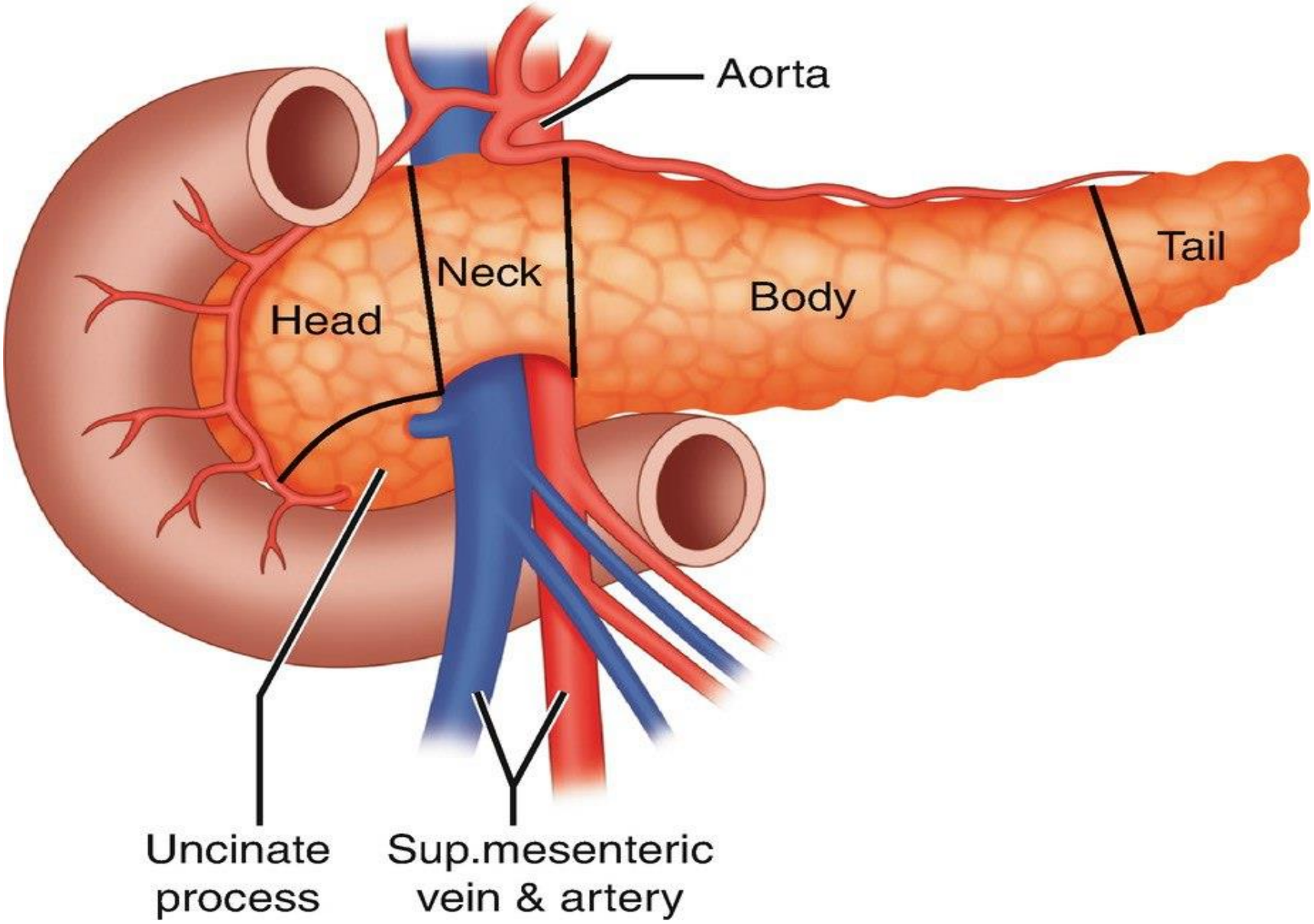
Vessels

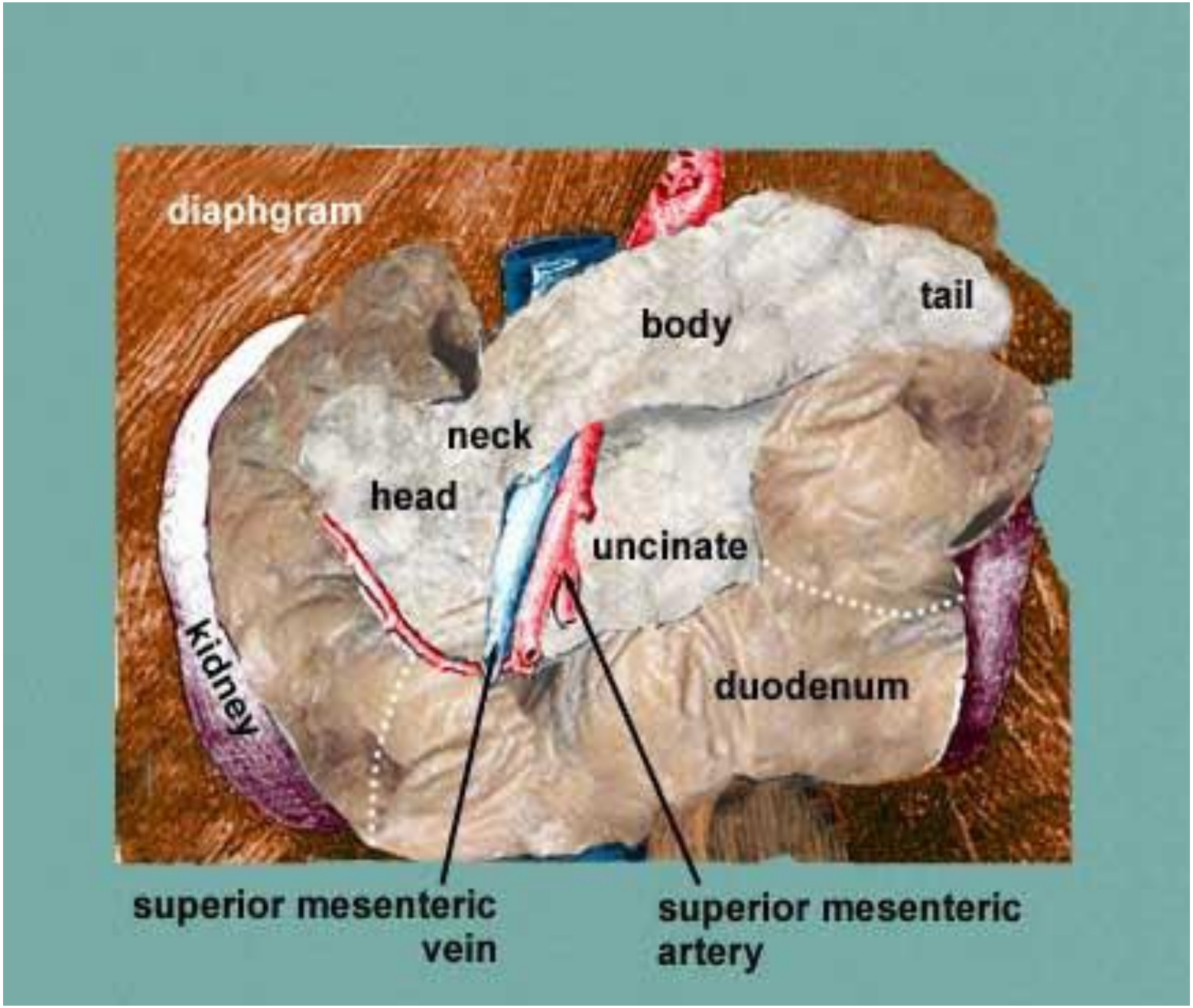
- The pancreas lies near several major vessels and significant landmarks in vascular anatomy:
- The aorta and inferior vena cava pass posteriorly to the head of the pancreas.
- The superior mesenteric artery lies behind the neck of the pancreas and anterior to the uncinate process.
- Posterior to the neck of the pancreas, the splenic and superior mesenteric veins unite to form the hepatic portal vein.
- As it journeys from its origin at the celiac plexus to the splenic hilum, the splenic artery traverses the superior border of the pancreas.



Anatomical Structure

- The pancreas is typically divided into five parts:
- **Head** – the widest part of the pancreas. It lies within the C-shaped curve created by the duodenum and is connected to it by connective tissue.
- **Uncinate process** – a projection arising from the lower part of the head and extending medially to lie beneath the body of the pancreas. It lies posterior to the superior mesenteric vessels.
- **Neck** – located between the head and the body of the pancreas. It overlies the superior mesenteric vessels which form a groove in its posterior aspect.
- **Body** – centrally located, crossing the midline of the human body to lie behind the stomach and to the left of the superior mesenteric vessels.
- **Tail** – the left end of the pancreas that lies within close proximity to the hilum of the spleen. It is contained within the splenorenal ligament with the splenic vessels. This is the only part of the pancreas that is intraperitoneal.


Aorta
Tail
Neck
Body
Head
Uncinate process
Sup.mesenteric vein & artery


diaphgram
tail
body
neck
head
uncinate
kidney
duodenum
superior mesenteric vein
superior mesenteric artery

Duct System of pancreas

Two ducts

1- main pancreatic duct (wirsung duct)

-Start from the tail and passes to the right to wards the head passing along the whole length of the gland.

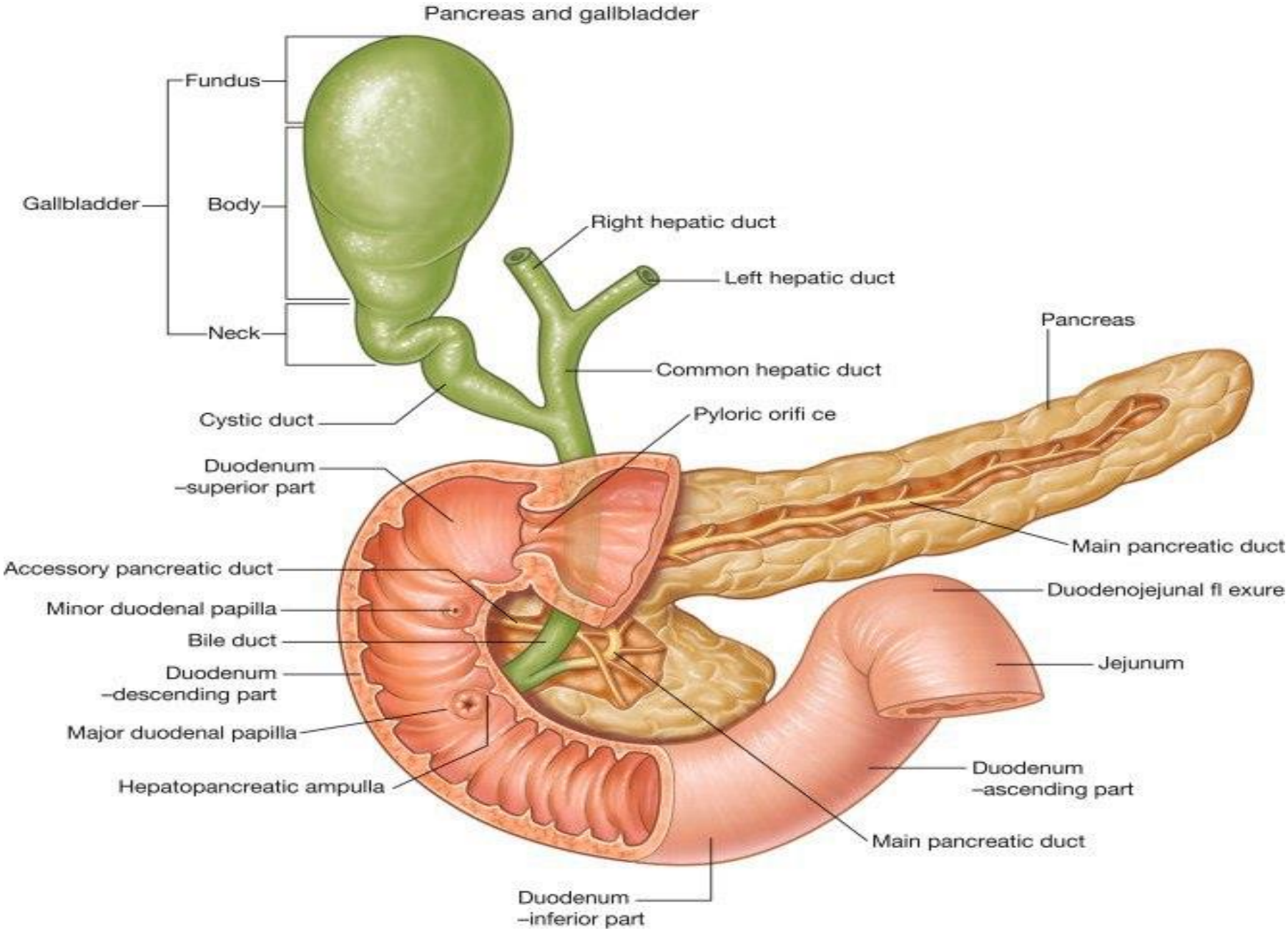
Emerge from the head and unite with C.B.D to open in ampulla of vator which open in 2nd part of dud.in summit of the major dud.papilla.

-Secretions into the duodenum are controlled by a muscular valve – the **sphincter of Oddi.** It surrounds the ampulla of Vater, acting as a valve.

2-Accessory pancreatic duct;(duct of santorini)

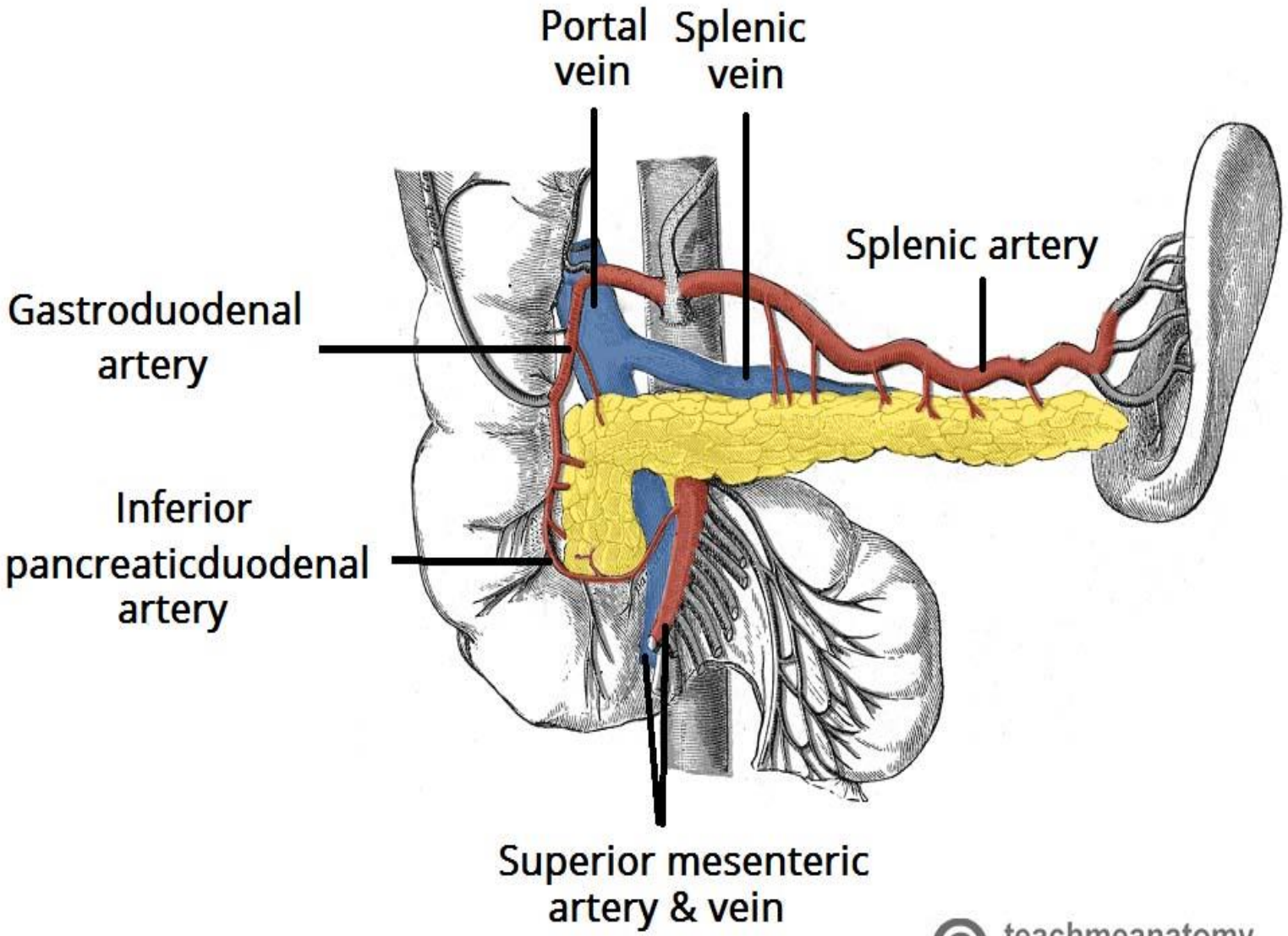
Small duct drain uncinate process and the lower part of the head .

It run up word in front of the main pancreatic duct to open separately in to the 2^{nd} part of dud. At a minor duodenal .papilli 1 inch (2.5 cm) above the major duodenal .papilli


Pancreas and gallbladder
Fundus
Gallbladder
Body
Neck
Right hepatic duct
Left hepatic duct
Pancreas
Common hepatic duct
Cystic duct
Pyloric orifi ce
Duodenum
–superior part
Main pancreatic duct
Accessory pancreatic duct
Duodenojejunal fl exure
Minor duodenal papilla
Bile duct
Jejunum
Duodenum
–descending part
Major duodenal papilla
Duodenum
–ascending part
Hepatopancreatic ampulla
Main pancreatic duct
Duodenum
–inferior part

Vasculature

- The uncinate process and head are supplied by the superior and inferior pancreaticodudenal arteries , which are branches of the gastroduodenal and superior mesenteric arteries respectively. Each pancreaticoduodenal artery has anterior and posterior branches that project along the respective faces of the pancreatic neck where they form pancreaticoduodenal arcades and supply them with arterial blood
- the body and tail of the pancreas are supplied by pancreatic arteries that aries from the splenic artery .
- Venous drainage of the head of the pancreas is into the **superior mesenteric branches** of the hepatic portal vein
- The pancreatic veins draining the rest of the pancreas (body and tail) do so via the splenic vein.



Lymphatics

- lymph is drained from the body and tail of the pancreas via lymphatic vessels that empty into the pancreaticosplenic lymph nodes located along the splenic artery. The vessels draining the head empty into pyloric lymph nodes. Subsequently, lymph is transported to the superior mesenteric or celiac lymph nodes.

Nerve supply

- the pancreas receives involuntary innervation via the autonomic nervous system
  Its parasympathetic_ innervation originates from the vagus nerve (CN X) and
  its sympathetic_ innervation from the greater and lesser splanchnic nerves (T5-T12).
- Both types of autonomic fibers travel until the celiac ganglion and superior mesenteric plexus, ultimately projecting onto the pancreas.


Thank you