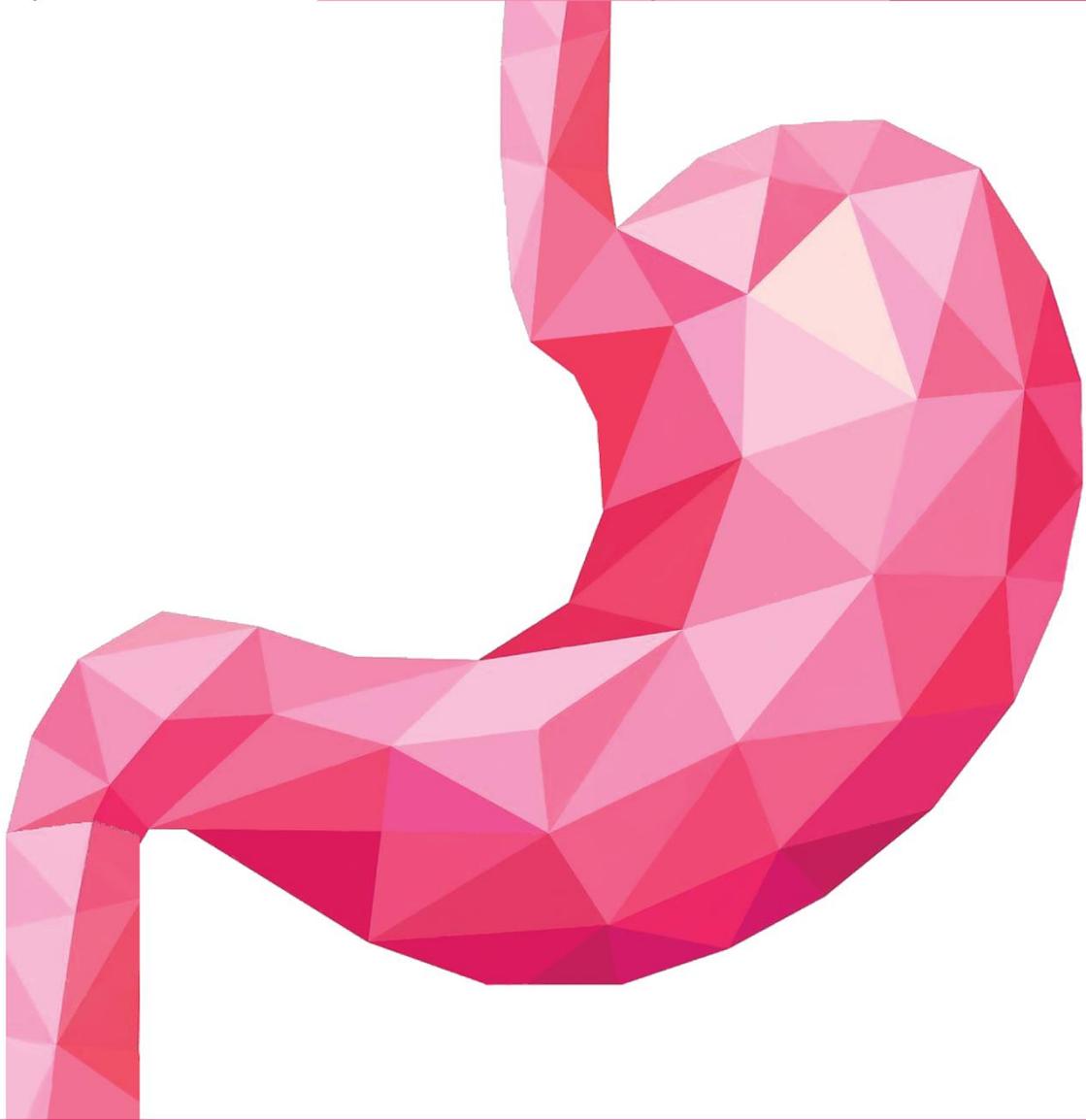




# GIS 11#

ANATOMY



**Done by:** Tarteel Sabrah

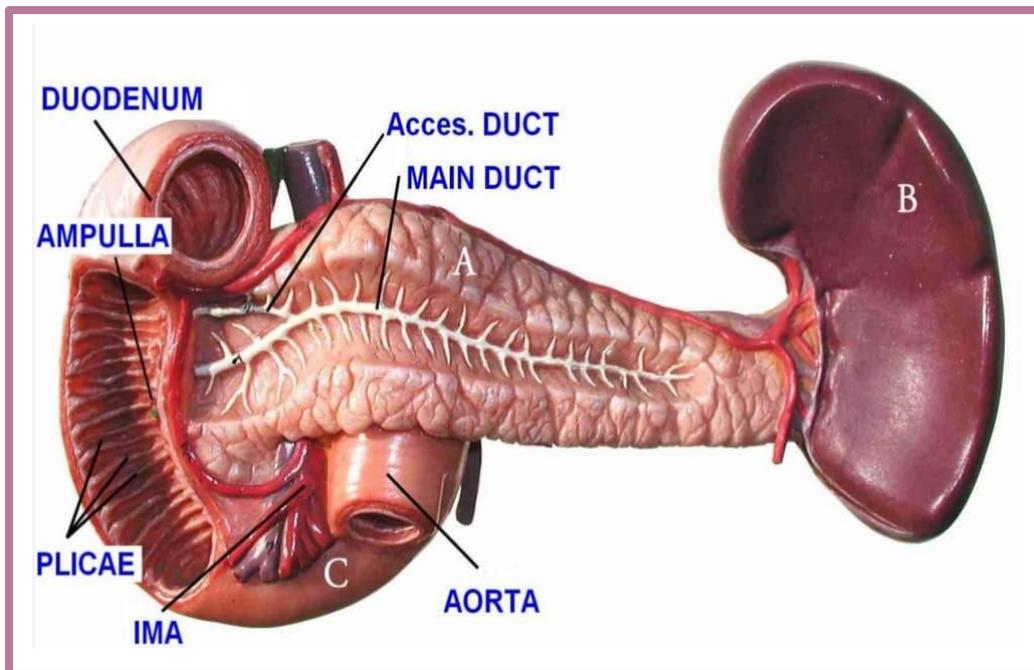
**Scientific Correction:** Tarteel Sabrah

**Gramatical Correction:** Tarteel Sabrah

**Doctor:** MOHTASEB

## Pancreas

- ❁ Pancreas is a **retroperitoneal organ** in the posterior abdominal wall and pancreas is a **mixed gland** ( endocrine and exocrine ) so we will learn today histology of pancreas  
Parts of the pancreas ( picture )
- ❁ Pancreas **begins at tail** where it has an **impression** on the hilum of the spleen  
Body
- ❁ **Neck** (portal vein starts **behind it**)
- ❁ **Head** in the concavity on the duodenum
- ❁ **Uncinate** process ( extension from the head to the left side ) and what makes it special is the superior mesenteric vessels **in front of it**



### Importance of pancreas

- ❁ **Main pancreatic duct** opens in the 2nd part of duodenum
- ❁ **Accessory duct** sometimes present and sometimes absent

### Location of pancreas

- ❁ As you can see pancreas extends from the spleen to the concavity of the duodenum
- ❁ Anatomical position
  - Epigastric
  - left upper hypochondriac region
- ❁ Very important **relation of pancreas to the duodenum**
- ❁ Head of pancreas is in the concavity of the duodenum
- ❁ Duodenum receives secretions from pancreas and gallbladder

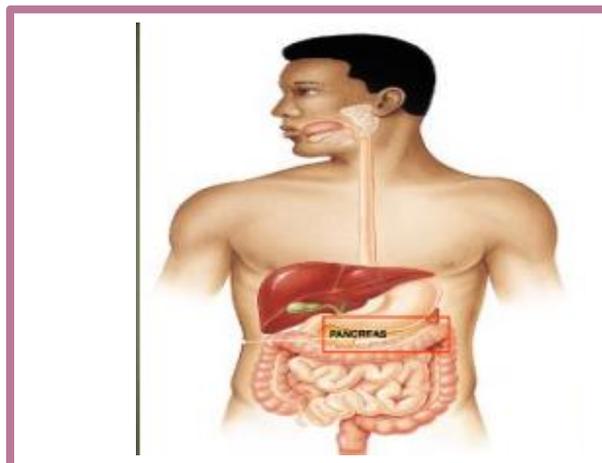
### Common relations

- ❁ Pancreas is behind the stomach so it considers from stomach bed
- ❁ and it has relation to the transverse colon and mesocolon
- ❁ Anterior

- Transverse colon
  - Transvers mesocolon
  - Lesser sac
  - Stomach
- ❁ Posterior what is behind pancreas ( remember pancreas retroperitoneal exists in the posterior abdominal wall)
- Bile duct and portal vein pierce the head and open in the 2nd part of the duodenum
  - Splenic vein runs in the posterior surface of the pancreas
  - IVC
  - Aorta
  - origin of Sup.mesentric.a behind the body
  - Lt.Psoas muscle
  - Lt.Suprarenal gland
  - Left kidney
  - Hilum of the spleen pancreas ends at it

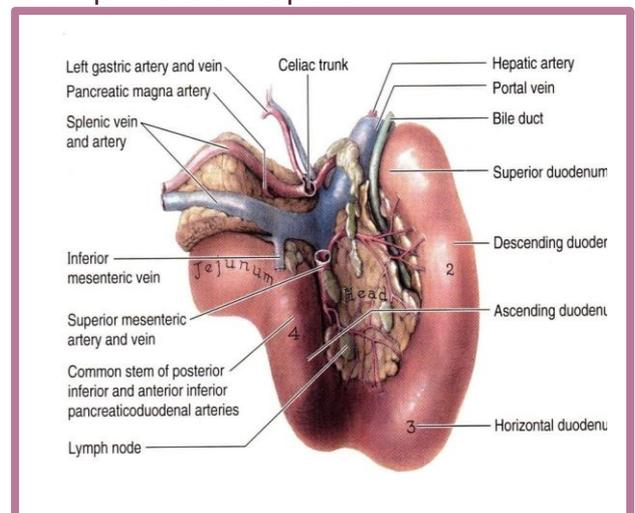


**An easy question** that always comes mentioned by the doctor : all of the following lies posterior to pancreas except one .



- ❁ the posterior relation of pancreas duodenum
  - ❁ head of the pancreas and
  - ❁ some lymph node on the head of pancreas
- "pancreatic lymph nodes"**
- ❁ common bile duct pierces the head and opens in the ampulla of Vater –bulge and also pancreatic duct
  - ❁ Behind the neck of pancreas, portal vein comes from splenic and superior mesenteric vein
  - ❁ Celiac trunk it lies above the body of pancreas and gives three branches **splenic artery** tortious and runs in the upper border of pancreas

This picture below explains



❁ **Pay attention !!**

artery in the upper border but vein in the posterior surface that's why when we talked about stomach bed that artery exists there but vein doesn't because it lies behind the pancreas.

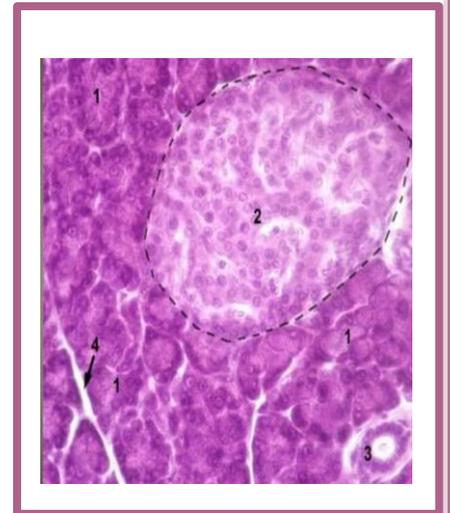
Now we will talk about

**The histology of pancreas**

- ❁ if we take a section from the pancreas " mixed gland previously mentioned"
- ❁ Endocrine → **Islets of Langerhans** that consist of
- ❁ **α cells** : large cells and usually lies peripherally on the periphery of islets
- ❁ **β cells** : small cells usually in the center of the islets of Langerhans

**What is the difference between them?**

- ❁ **Alpha** cells secrete **glucagon** – which increases sugar in the blood so glucose arises in the blood and when we need it? when a student in the exam and uses the brain so the majority of glucose was depleted
- ❁ glucagon converts fat into glucose and increases the concentration of glucose in the blood opposite to **beta** cells which secrete **insulin** !" that decreases the concentration of glucose in the blood "
- ❁ when someone eats **knafeh** for example immediately insulin is secreted and decreases glucose concentration in the blood



- ❁ Now anyone of you if we take a sample of blood and we test the concentration of glucose we will find it between (70-90) mg/dL if someone eats a lot of sugar and sweets the concentration **remains** between (70-90)mg/dL if he goes to the exam and ends it , the concentration also **stays the same**
- ❁ During this period , hormones were secreted and these hormones keep the normal concentration in healthy person
- ❁ so healthy person always his glucose concentration is between (70-90)mg/dL
- ❁ if raised or decreased immediately these cells α and β have something like **sensors** when blood comes
- ❁ Cells know that glucose is **elevated** so immediately secrete **insulin** and vice versa .
  
- ❁ so the body **controls itself by itself** doesn't need anything and that is one of the **miracles of the creator in his creation !!**  
all of the things inside you are organized and controlled **automatically without you feel !**

One of the famous diseases and the commonest in our region is **diabetes mellitus**

- ❁ Weakness in beta cells islets results in a small amount of insulin secreted
- ❁ so when you eat a lot of sugar your glucose level will not return to its normal level and remains high

- ✿ Any patient we expect to have diabetes we advise him to make **fasting blood sugar** test, fasting all night and the day after in the morning do the test.
- ✿ If glucose level is high it may, unfortunately, have diabetes more than 90mg/dL for example 120 or 200 or 300mg/dL and sometimes 400!
- ✿ So that patient has diabetes mellitus – treatment will be mentioned later inshallah in the endocrine system

We finished endocrine part now the

### **exocrine portion of pancreas**

- ✿ we call it **pancreatic acini** singular *acinus* like parotid gland we had said a parotid's majority secretion is from **the serous acini**
- ✿ The most important thing that cells lie on a **basement membrane** and in the **center** cells have a lumen so secretions aggregate in the lumen after that go to the pancreatic duct and finally reach the 2nd part of the duodenum
- ✿ **Secretions of pancreatic acini:** pancreatic enzymes like **lipase** for example that helps in the digestion of fat in the second part of the duodenum.

You should study the histology of pancreas and know types of ducts that finally reach pancreatic duct and characteristics of acinar cells like **polarity**

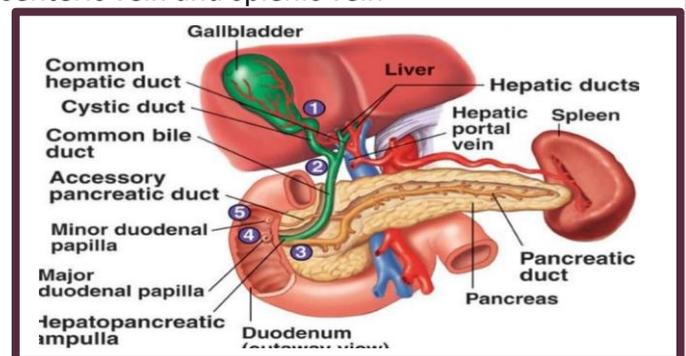
### **Histology of pancreas** From slides

Exocrine part → Pancreatic juice

Endocrine part → Insulin, glucagon and somatostatin

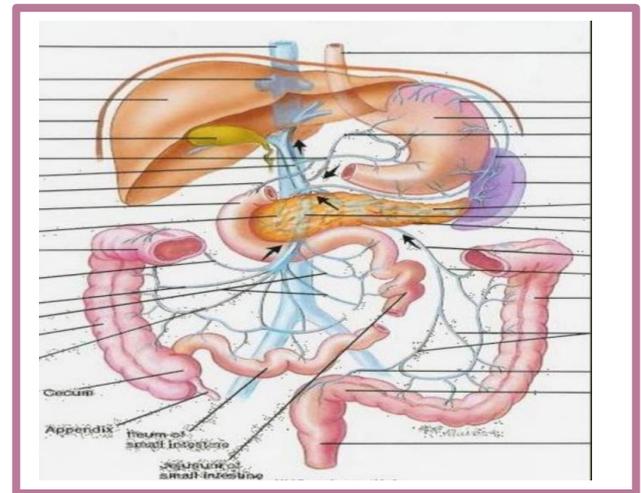
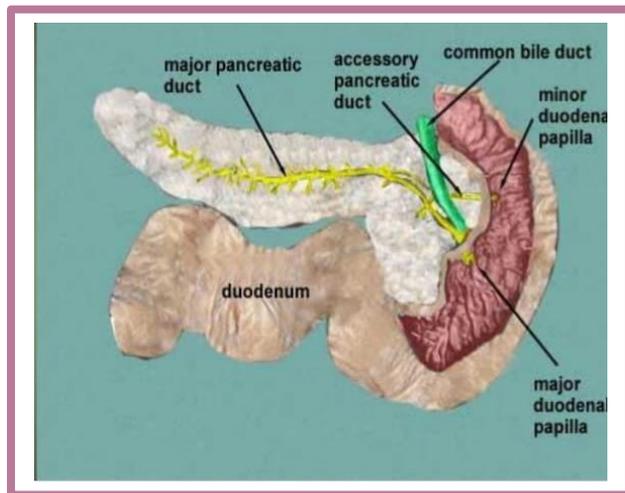
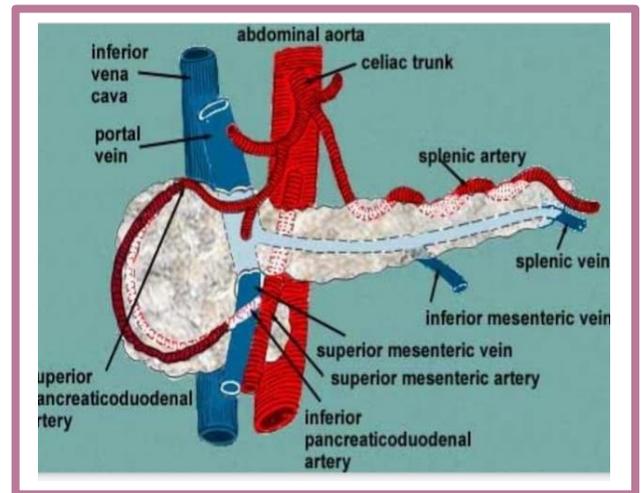
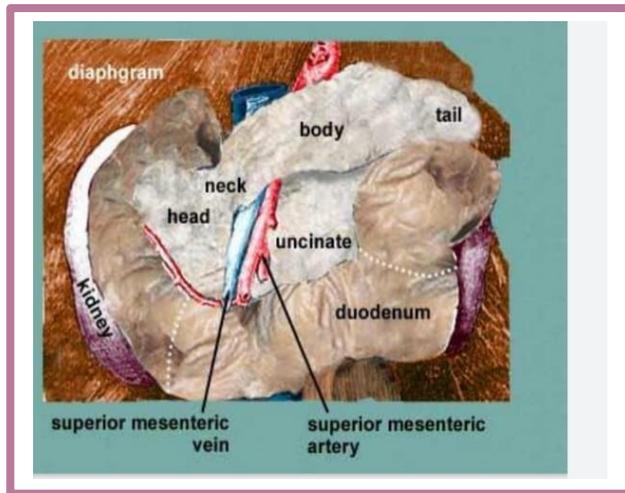
### **Part of pancreas**

- ✿ Tail: exist in the **spleno renal ligament** "lienorenal ligament"
- ✿ Reaches hilum and does impression
- ✿ Body: posterior to it
  - splenic vein
  - the origin of superior mesenteric artery
  - behind the body from the abdominal aorta
- ✿ Neck; behind the neck we have
  - portal vein starts there and ends in the liver
  - Portal vein : union of superior mesenteric vein and splenic vein
- ✿ Head: in the concavity of duodenum



- ✿ Uncinate process
  - process from the head to left side
  - pass in front of it superior mesenteric vessels
  - Behind these vessels "superior mesenteric vessels" – artery and vein uncinat process exists **don't forget** that common bile duct pierces the head and opens in the major duodenal papilla with main pancreatic duct if accessory pancreatic duct exists one inch above, it opens in the minor duodenal papilla .

- ⚙️ Splenic artery tortuous and in the upper border of pancreas but
- ⚙️ vein is behind the body



**Don't forget**

- ⚙️ above the body we find **celiac trunk** : first branch of the abdominal aorta and appears from the anterior surface of the aorta
- ⚙️ celiac trunk gives three branches
  - **hepatic**
  - **left gastric**
  - **then the splenic artery**

**Very general question**

What are the tortuous arteries in the body?

- in addition to splenic artery
- facial artery in the face and
- uterine artery in the uterus.

**The most important one** is the **uterine artery** in the uterus because uterus in female in case of pregnancy it becomes very big so uterine artery becomes elongated

## Slide five

- ⚙ The head ( From the slides )
  - It is disc shaped
  - lies within the concavity of the duodenum
  - A part of the head extends to the left behind the superior mesenteric vessels and is called the Uncinate process.
- ⚙ **Uncinate process and its relation to superior mesenteric arteries**
  - that pass anterior to it
  - so what pass posterior to it? abdominal aorta.
  - so it comes between the abdominal aorta and superior mesenteric vessels
- ⚙ In the picture you can see
  - SMA
  - origin of it and abdominal aorta
  - celiac trunk
  - portal vein -from splenic vein and SMV
  - inferior vena cava behind the head

### *from the commonest diseases that we see it a lot*

- ⚙ Tumour/cancer in pancreas
- ⚙ either happens in the **head of the pancreas** thus it affects **common bile duct and pancreatic duct** which come from the head to the 2nd part of the duodenum
- ⚙ sometimes cancer happens in the **body of pancreas** if happens in the body it affects mainly **portal vein and inferior vena cava** it causes pressure on them at the beginning
- ⚙ "pressure word" indicates portal hypertension or it causes invagination (*tumour pierces blood vessels and causes bleeding*) so that's from the common cases and we see it a lot

### **The neck** (From the slide )

- It is the constricted portion of the pancreas
- connects the head to the body.
- It lies in front of the beginning of the portal vein the origin of the

### **The body** (from the slides )

- -Runs upward and to the left across the midline
- It is somewhat triangular in cross section.

### **Body of pancreas**

- ⚙ if we take a section through the body we will find that it composed of three surfaces and three borders
- ⚙ Surfaces
  - Posterior surface: lie behind it splenic vein and the posterior surface is retroperitoneal lies in the posterior abdominal wall no peritoneum
  - Also, we have Anterior surface
  - And Inferior surface

- ❁ Borders
  - Anterior border of pancreas: mesocolon attached to it
  - mesocolon composed from 2 layers one goes upward to cover the anterior surface and the other goes downward to cover the inferior surface
  - Upper or superior border: splenic artery runs on it
  - Cross-section makes 3 borders and 3 surfaces of the body
- ❁ From the slides
- ❁ The anterior surface
  - Covered by the peritoneum of the post. Wall of lesser sac
  - lesser sac in front of the anterior surface
  - thus the type of peritoneum is peritoneum of lesser sac
- ❁ Tuberosity: where the ant. surface of pancreas joins the neck
- ❁ The posterior surface
  - devoid of peritoneum
  - in contact with
    - the aorta
    - the splenic vein
    - the left kidney and its vessels
    - the left suprarenal gland
    - the origin of the superior mesenteric artery
    - the crura of the diaphragm

origin of the diaphragm has two crura right and left. right crus is longer for sure because it arises from three lumbar vertebrae where the left arises from two lumbar vertebrae .
- ❁ The inferior surface (mixed slide and lecture)
  - Narrow on the right but broader on the left
  - Covered by the peritoneum of greater omentum - 2 layers one of them goes upward and the other goes downwards
  - the downward one 's origin is greater omentum
  - lies upon the duodenojejunal flexure
  - Some coils of the jejunum
  - its left extremity rests on the left colic flexure
- ❁ The superior border (mixed slides and lecture )
  - Blunt and flat to the right;
  - Narrow and sharp to the left near the tail
  - It commences on the right in the omental tuberosity
  - In relation with
    - The celiac artery
    - Hepatic artery
    - important !The splenic artery runs toward the left in a groove along this border
- ❁ The anterior border (from slides)
  - separates the anterior surface from the inferior surface

- along this border the two layers of the transverse mesocolon diverge from one another
- one passing upward over the anterior surface
- the other backward over the inferior surface.

### **Doctor's explanation**

- ✿ always told us that greater omentum that descends as 2 layers from the greater curvature then ascend as two layers and after that, it covers the transverse colon ( inferior and superior surface ) after covering it continues as 2 layers to the anterior border of the pancreas

### **Where other books**

- ✿ state that greater omentum ends on the transverse colon just covers the upper and lower surface of the transverse colon but then from the anterior border of pancreas appear two layers when reaching transverse these two layers blend with greater omentum

### **Not matter what is the true theory**

- ✿ the most important conclusion is that transverse colon intraperitoneal covered completely by peritoneum and gave extension called mesocolon and mesocolon reached the anterior border of the pancreas so the two theories complete each other.

## **Regarding the inferior border**

The inferior border

- ✿ separates the posterior from the inferior surface
- ✿ the superior mesenteric vessels *from the abdominal aorta* emerge under its right extremity of the inferior border

### **The Tail** *mixed from the slides & lecture*

- ✿ Passes forward in the Splenorenal ligament *lienorenal ligament* (contains in addition to the tail also splenic vessels ) and comes in contact with the hilum of the spleen and it contains splenic vessels artery and vein and tail of pancreas
- ✿ when we said about splenectomy we must keep tail of pancreas intact because any trauma make it secretes and finally causes peritonitis and comes in contact with the hilum of the spleen
- ✿ The splenic artery divides in the hilum of spleen into 5-6 branches
- ✿ in opposite to it the vein which receives 5-6 tributaries

## **Pancreatic ducts** *from the slides*

- ✿ The main duct
  - Begins in the tail and runs the length of the gland
  - Receiving numerous tributaries on the way.
  - It opens into the second part of the duodenum with the bile duct on the major duodenal papilla

- ⚙️ Accessory duct
  - When present, drains the upper part of the head
  - Then opens into the duodenum a short distance above the main duct on the minor duodenal papilla.
  - The accessory duct frequently communicates with the main duct

### **What is the importance of that?**

- ⚙️ You should know whether accessory duct exists or not if it exists that means we have secretions come from it and that helps us in case of pancreatitis and obstructions
- ⚙️ in ultrasounds it appears clearly - report from radiology comes and tells you whether it exists or not!

### **Blood Supply of pancreas**

Remember we have talked about duodenum that upper half follows foregut and receives its blood supply from celiac trunk and the lower half follows midgut and receives its blood supply from superior mesenteric artery

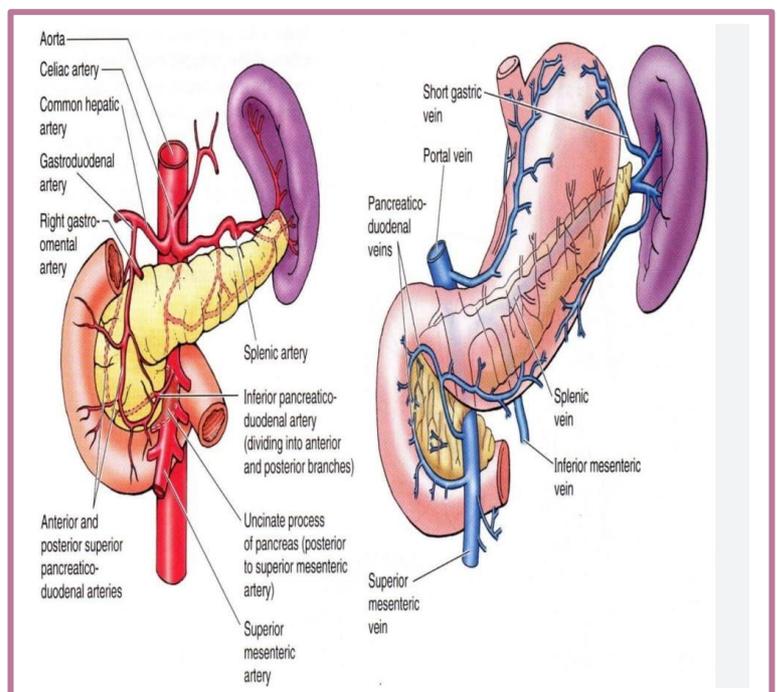
- ⚙️ Pancreas the same thing the tail, body, neck and the *upper half of the head* follow foregut so they receive gastroduodenal artery from the hepatic artery
- ⚙️ **Gastroduodenal** divides into *anterior* and *posterior superior pancreaticoduodenal artery*
- ⚙️ So superior pancreaticoduodenal anterior and posterior from the gastroduodenal artery of hepatic
- ⚙️ hepatic artery as you know it comes from celiac trunk

In regard to the

- ⚙️ *lower part of the head* with the uncinete process receives a branch from superior mesenteric and its name is the inferior pancreaticoduodenal artery

### **Venous drainage**

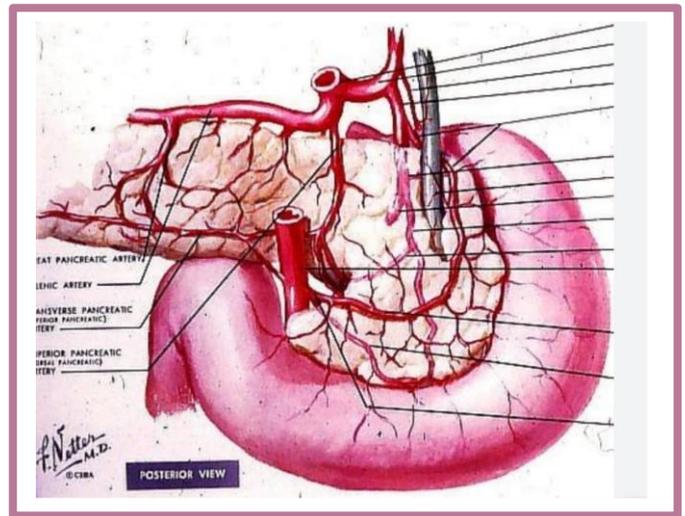
- ⚙️ in the end, all of them drain into portal vein
- ⚙️ The upper part - body and tail go to the splenic vein.
- ⚙️ the remaining head goes to the superior mesenteric vein and after that, they meet and make the portal vein so all venous drainage go to the portal vein through the splenic and superior mesenteric vein



## Blood supply *From the slide*

- Arteries
  - The splenic.a
  - The superior pancreaticoduodenal .a
  - Inferior pancreaticoduodenal arteries.a
- Veins
  - The corresponding veins drain into the portal system.

In the picture you can see celiac trunk and the superior pancreaticoduodenal and from superior mesenteric artery gives inferior pancreaticoduodenal

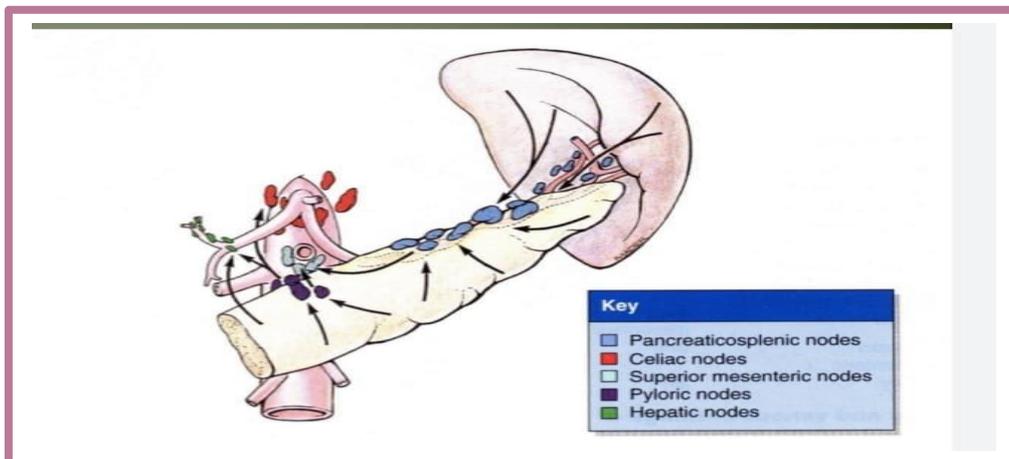


## Lymphatic drainage of pancreas- lecture

- Pancreatic lymph nodes around the artery and there is a connection with the splenic lymph node Together we called them pancreaticosplenic lymph nodes
- that drain finally to the superior mesenteric lymph node around the origin of superior mesenteric artery then to the celiac lymph node *lymph node around the origin of the celiac trunk*

## Lymphatic drainage of pancreas- slides

- Lymph nodes are situated along the arteries that supply the gland.
- The efferent vessels ultimately drain into the celiac and superior mesenteric lymph nodes.



## Nerve supply *mixed slides and lecture*

- Sympathetic *from celiac ganglia around the celiac trunk and also from superior mesenteric ganglia around the origin of the superior mesenteric artery and parasympathetic chain*
- Parasympathetic = vagus nerve

## Some scientific published papers

- that discuss the innervation of pancreas previous papers said that vagus (parasympathetic ) goes mainly to the **exocrine parts = pancreatic acini** responsible for the secretion of enzymes which go to the pancreatic duct and duodenum
- sympathetic responsible for the endocrine part especially blood vessels of endocrine And hormones

- ✿ And that theory **was rejected** and now we have researchers that state on both sympathetic and parasympathetic responsible for both endocrine and exocrine portions of the pancreas
- ✿ And **enteric plexuses of nerves** exist in the wall of the organ which do direct response especially when sugar elevate immediately stimulus produced to increase secretion of insulin to decrease sugar **this direct reflex** doesn't wait until reaching the center so we have something called enteric plexus in the wall of organ and it works **both** sympathetic and parasympathetic and this was improved and now we have a lot of researches regarding it

### **Congenital defects of pancreas** *mixed slides and lecture*

- ✿ **Annular Pancreas** because it comes from two buds and these two buds meet each other and make head ,neck ,body and tail
- ✿ Sometimes! pancreas encircles duodenum (**rare**) when pancreas forms, it obstructs duodenum
- ✿ so it surrounds and causes obstruction in the duodenum
- ✿ on it which causes complications which need a solution
- ✿ **Ectopic Pancreas** (very common)= Outside the gastrointestinal tract cells of pancreas either endocrine or exocrine in an abnormal site

### **Clinical notes** *mixed slides and lecture*

- ✿ **Cancer head of pancreas** Obstruction jaundice
- ✿ **Cancer body of pancreas** pressure I.V.C & portal vein
- ✿ **Acute pancreatitis**= *inflammation of pancreas* here we use **ERCP** endoscope retrogradely that much helps in the treatment of acute pancreatitis in cases of obstructed jaundice if stones present or mud *thickening in the secretions and causes obstructions*

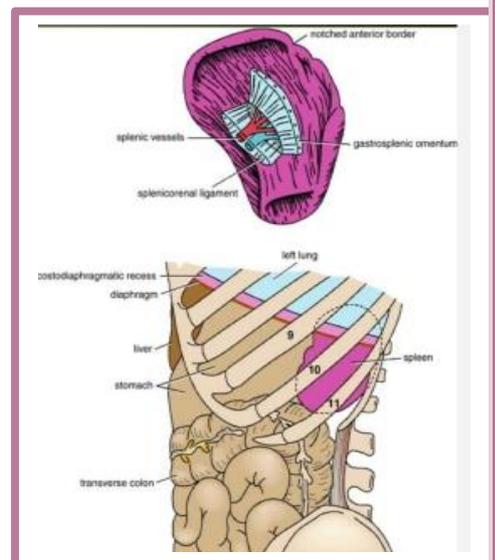
## **Spleen**

### **Location** *lecture*

- ✿ in the left side of *hypochondriac region*
- ✿ related to the left ribs # 9 , 10 , 11
- ✿ And the axis of spleen parallel to the 9th rib ( *run with it* ) so any trauma in the left side and has fracture ribs 9 , 10 , 11 immediately we fear of *rupture of spleen* easy to rupture because it is a *reservoir of blood* full of blood ( *مملوء بالدم* )

### **Spleen Location and Description** *slides*

- ✿ it is reddish & oval shaped
- ✿ the largest single mass of lymphoid tissue in the body.
- ✿ has a notched anterior border.
- ✿ location:
  - Lt hypochondrium



- It lies just beneath the left half of the diaphragm
- under the 9th, 10th, and 11th ribs.
- Its long axis parallel to the 10th rib
- Medial end is 4 cm away from mid line post
- Lat.end is in left mid axillary line

### **What is the type of spleen between organs?**

- ⊗ Lymphatic or lymphoid tissue *if we remove it like the appendix*, for example, we have another lymphatic tissue that can do the function and compensate
- ⊗ but the **main function of the spleen** is to break down of RBCs and WBCs and we have a disease that manifested by bluish coloration in the place of minor trauma in hand, leg, anywhere in the body due to the sudden breaking of platelets and this blue color indicates **that there is no coagulation** due to the decrease in platelets and when he goes to test his blood the normal range (250 - 500000)per microliter (μL) of blood he finds the concentration 4000μL or 5000μLr even 6000μL and that prevents coagulation which is very **dangerous** and may someone has a trauma in his head which causes severe bleeding and finally death
- ⊗ when doctors do the test they may find spleen is the causative agent for the broken blood cells so they proceed to do **splenectomy** and then patient return to his normal health status so the spleen is very important and it is lymphoid tissue.

### **Why do we study it in the GI system?**

- ⊗ Because it exists in the abdomen and
- ⊗ receives splenic vessels and
- ⊗ go outside of it vein and
- ⊗ lymphatic drainage on GI

*Spleen has two ends*

- ⊗ upper and lower & *two borders*
- ⊗ superior and inferior & *two surfaces*
- ⊗ coastal and visceral surface

### **What is the relation between spleen and peritoneum?**

- ⊗ It lies above the phrenicocolic ligament - *sleeps on the phrenicocolic ligament Zzz...*
- ⊗ Phrenicocolic ligament separates it above from the lower compartment and prevents infection to go upward ↑

### **Where does the spleen exist?**

- ⊗ In the left side of the lesser sac" *left boundary of lesser sac "*

*In the picture you can see epiploic foramen which we go through it to the lesser sac*

- ⊗ There are two ligaments attached to spleen and important
  - **Splenorenal ligament** or **lienorenal ligament** between the spleen and left kidney which its contents are
    - tail of pancreas and
    - splenic vessels
  - The 2nd one gastrosplenic between stomach and spleen and especially the most upper part of greater omentum we call it gastrosplenic ligament and its contents include
    - 5-7 short gastric vessels ( *artery and veins* ) branches from the splenic artery

- also include left gastroepiploic vessels (artery and vein ) the artery also branch of splenic artery exist in the greater omentum, in the beginning, they appear in this ligament and then continue in the greater omentum and give blood and venous supply to the stomach

## Spleen slides



### Peritoneum

- The spleen is completely covered with peritoneum
- intraperitoneal organ
- Two ligaments
  - the gastrosplenic omentum (ligament) → between the spleen & the greater curvature of the stomach (*carrying the short gastric and left gastroepiploic vessels*)
  - splenicorenal ligament → between spleen & kidney (*carrying the splenic vessels and the tail of the pancreas*)



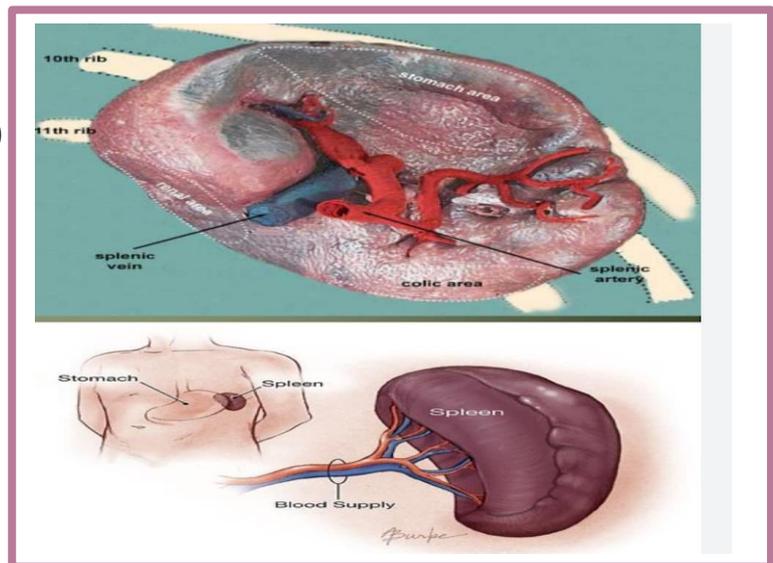
## About Spleen



### Size ↓

it takes the odd numbers

- 1 inch thick
- 3 inch broad (width)
- 5 inch long Weight
- 7 ounce اوقيه



### Shape ↓

- Variable
- 2 ends
- 2 borders
- 2 surfaces
- Notched (*notch in the upper border*) - Due to lobulation in embryo



When the spleen formed in the beginning it appears in the forms of lobules and these lobules do lobulation and in the end, it leaves remnants on the upper border so we find on the top on it notches



These *notches make upper border* special from another border we can discriminate it from the lower border which is rounded in shape "*rounded border*"

- Surfaces we have
  - a **visceral surface** with **hilum** which enter inside it splenic vessels  
*Note : splenic artery and vein are posterior to the pancreas*
  - Another surface which is **coastal or diaphragmatic** related to 9, 10, 11 ribs and diaphragm separate it from left pleura and lung

### **Surfaces of spleen slides**

- 2 surfaces
  - Diaphragmatic surface
  - Visceral surface
- Diaphragmatic surface
  - Has Post- lat.relation
  - Convex
  - Smooth
  - Diaphragm separates it from
    - Pleura & lung
    - Ribs 9,10 ,11
- Visceral surface
  - Has Ant- med. Relations
  - It is divided by a ridge into
    - An anterior or gastric
    - A posterior or renal portion.

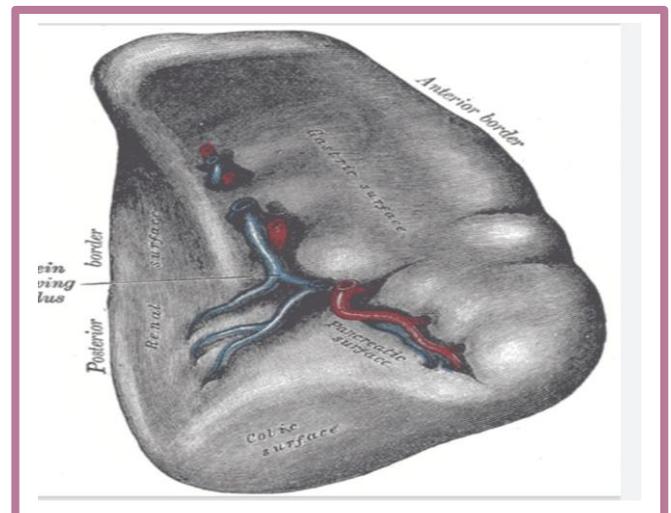
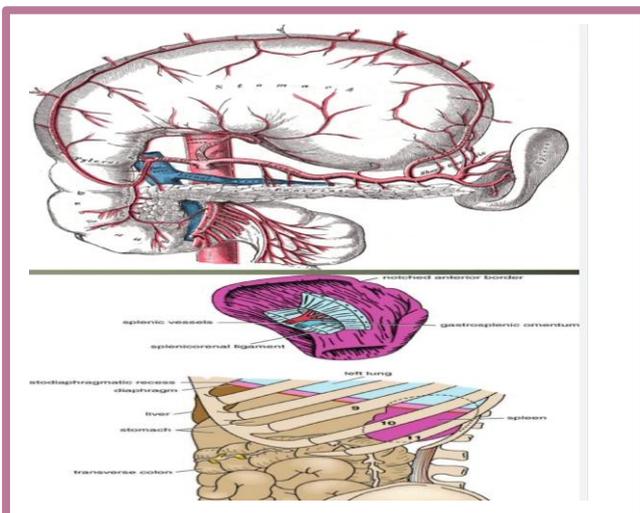
### **Regarding the visceral surface, lecture**

we noticed that hilum exists in it and

- impression between upper border and hilum called "*gastric impression* " so the stomach causes impression on the spleen between anterior \ superior border and the hilum
- also below hilum, kidney does impression ( renal impression ), for sure, left kidney  
→Either we call borders anterior and posterior OR lower and upper

And also we have

- colic impression or splenic for left colic flexure
- And below the hilum, we have the tail of pancreas does another impression  
We should pay attention to the visceral surface and impressions

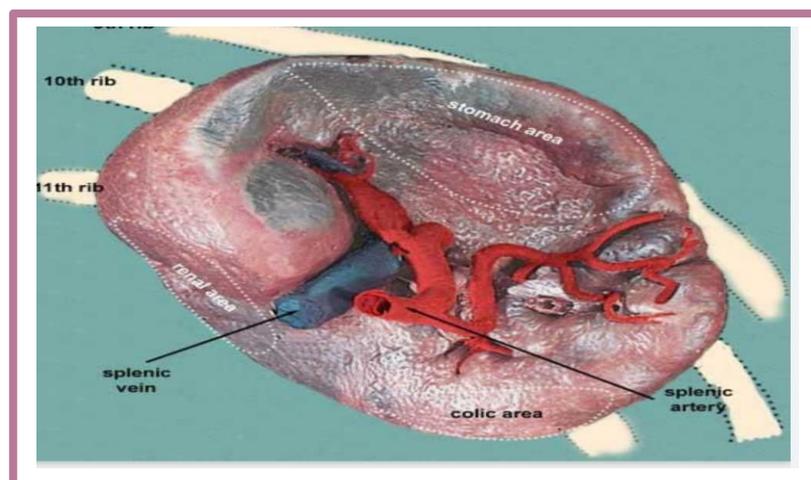


## **Surfaces of spleen** slides

- ✿ Lower extremity has
  - Colic surface
  - Pancreatic surface
- ✿ Gastric surface –
  - Extends forward, upward, and medialward
  - Broad and concave
  - Related to stomach Renal surface
- ✿ Renal surface
  - Directed medialward and downward.
  - It is somewhat flattened
  - Related to Lt.kidney
- ✿ The lower extremity or Colic surface same as splenic
  - flat and triangular in shape
  - Rests upon the left flexure of the colon and phrenicocolic ligament *we talked about it that spleen ( sleep on it Zzz .. ) and especially colic flexure* and is generally in contact with the tail of the pancreas(pancreatic surface)

## **Hilum of spleen** slides

- Splenic . A ant
- Splenic . v post
- Tail of pancreas ( *under splenic artery and splenic vein* ) and does impression also it exists inside *lienorenal ligament*
- ✿ if we ask you about spleen whether it is *intraperitoneal or Intrapertoneal*  
The answer is *intraperitoneal* which means completely covered by peritoneum except for the hilum and the hilum was found that it is very small and surrounded by 2 layers of peritoneum that form ligament-like *gastrosplenic* and *lienorenal ligament* so it considered as **intraperitoneal**
- ✿ Regarding interperitonuim like liver there is *a bare area clearly* appears and not covered. so we consider spleen as intraperitoneal because hilum small and blood vessels enter between 2 layers ( ligament )



## **Borders of spleen**

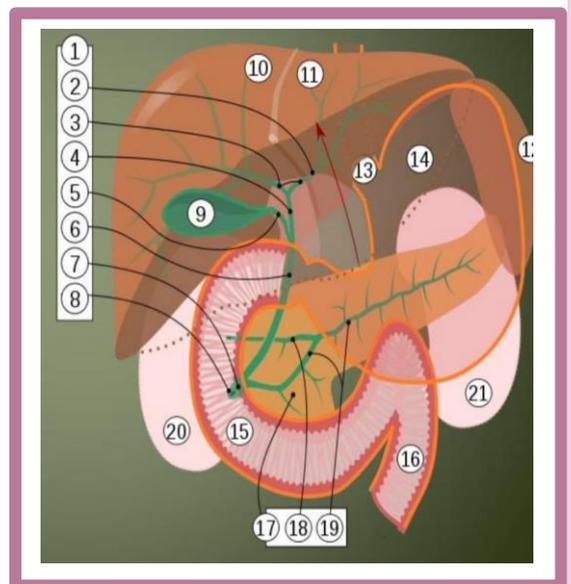
- ❁ sup. Border/ upper
  - It is free
  - Sharp
  - Thin
  - Often notched (sup. Notch very clear) what makes it different !! , especially below
  - It separates the diaphragmatic surface from the gastric surface
- ❁ inferior border/Lower border below renal area ( rounded )
  - More rounded and blunter
  - Separates the renal from the diaphragmatic surface
  - It corresponds to the lower border of the eleventh rib
  - lies between the diaphragm and left kidney.

*Doctor said that the information below is not very important*

- ❁ Intermediate margin is the ridge which separates the renal and gastric surfaces.
- ❁ Internal border separates the diaphragmatic from the colic surface

- ❁ We are very interested in the 2 ends
- ❁ Med.end (upper end )
  - up & back
  - 4cm away from midline post ( we have an anterior mid-sagittal line and posterior mid-sagittal) near the dorsal spine of vertebra
- ❁ Lat.end (lower end )

in left mid-axillary line ( from the apex of axilla downward in the middle)



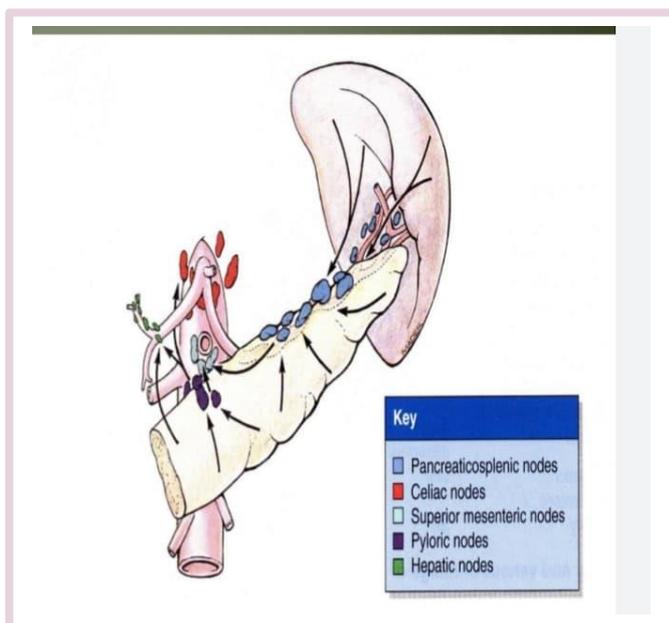
## **Blood supply slides**

- ❁ The large splenic artery is the largest branch of the celiac artery.
- ❁ It has a tortuous course
- ❁ It runs along the upper border of the pancreas
- ❁ The splenic artery then divides into about six branches in the hilum, which enter the spleen at the hilum

- ⊗ Veins ( opposite to the arteries veins form in the hilum instead of giving branch as artery )
- ⊗ The splenic vein leaves the hilum and runs behind the tail and the body of the pancreas.
- ⊗ Behind the neck of the pancreas, the splenic vein joins the superior mesenteric vein to form the portal vein

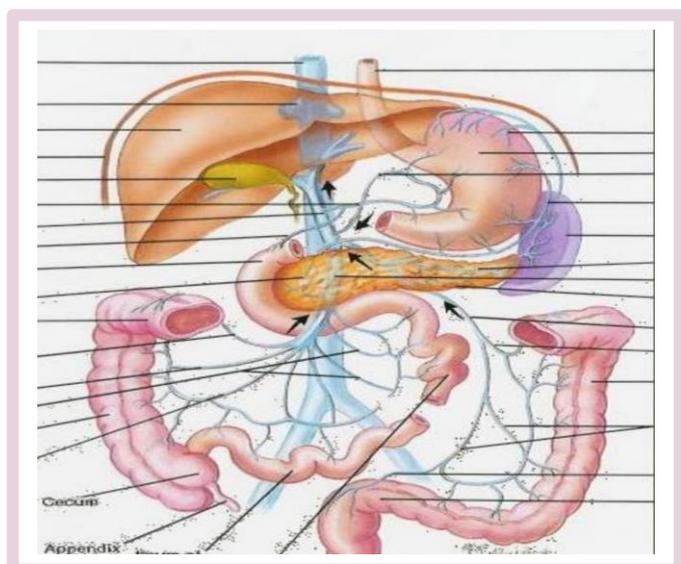
### **Lymphatic Drainage of spleen** *mixed*

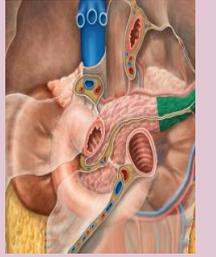
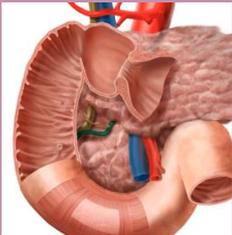
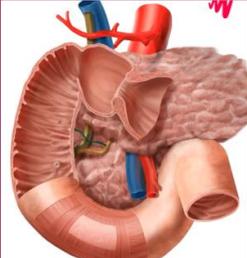
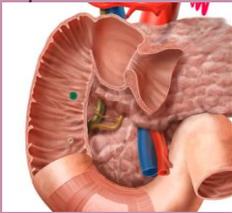
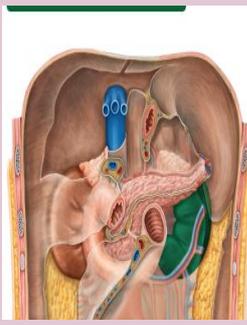
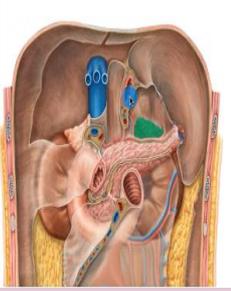
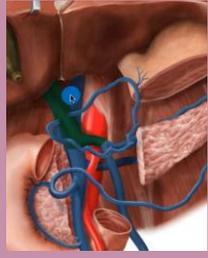
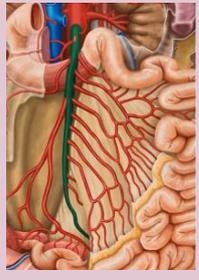
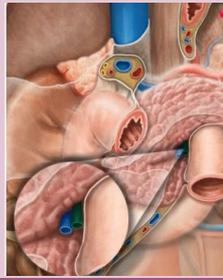
- ⊗ The lymph vessels emerge from the hilum and pass through a few lymph nodes along the course of the splenic artery and then drain into the celiac nodes.
- ⊗ Splenic lymph node → pancreatic lymph node → pancreaticosplenic lymph node → superior mesenteric lymph node → then celiac lymph nodes



### **Nerve Supply of spleen**

- ⊗ The nerves accompany the splenic artery and are derived from the celiac plexus.
- ⊗ Sympathetic and parasympathetic through celiac plexus of nerves which contains sympathetic and parasympathetic which finally go with blood vessels to the target organs .



<b>pancreas</b>	<b>retroperitoneal</b>	<b>Head of pancreas</b>	<b>body of pancreas</b>	<b>tail of pancreas</b>
				
<b>uncinate process</b>	<b>Pancreatic duct</b>	<b>Accessory duct</b>	<b>Ampulla of Vater</b>	<b>minor duodenal papilla</b>
				
<b>root of transverse mesocolon</b>	<b>Root of mesentery</b>	<b>left kidney</b>	<b>Left suprarenal gland</b>	<b>Left gastric artery</b>
				
<b>celiac trunk</b>	<b>Splenic artery</b>	<b>Splenic artery</b>	<b>hepatic artery</b>	<b>portal vein</b>
				
<b>IVC</b>	<b>abdominal aorta</b>	<b>SMA</b>	<b>SMA &amp; SMV</b>	<b>SMV</b>
				

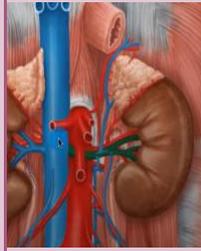
renal artery



abdominal aorta



Left renal vein



diaphragmatic surface of spleen



visceral surface of spleen

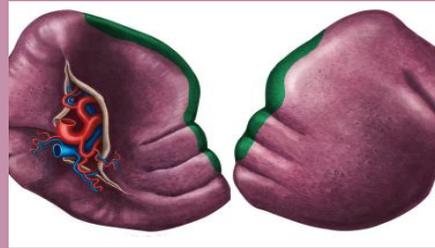


regarding spleen

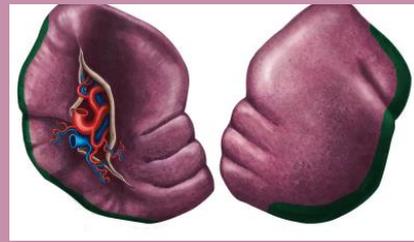
Helpful hints:

- 2 borders
- 2 extremities
- 2 surfaces

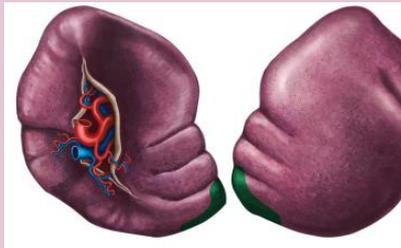
superior border of spleen



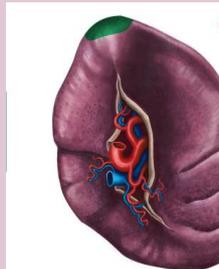
Inferior border of spleen



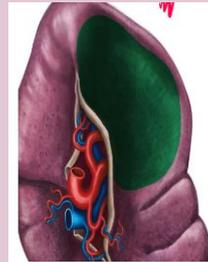
anterior extremity



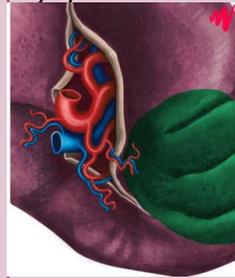
posterior extremity



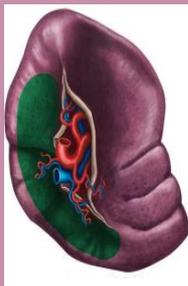
gastric impression of spleen



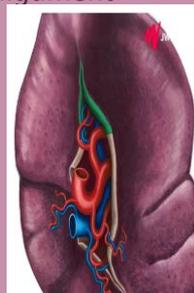
Colic impression of spleen



renal impression



gastrosplenic ligament



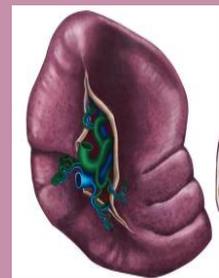
Splenorenal ligament -lienorenal ligament



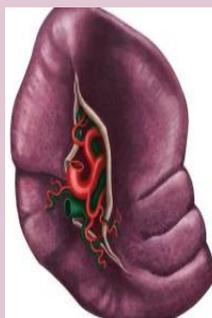
hilum of spleen



splenic artery



splenic vein



**SYMPTOMS**

\* MOSTLY ASYMPTOMATIC

\* SOME CASES

- PURPURA
- RED/PURPLE SPOTS
- 0.3 - 1 cm DIAMETER

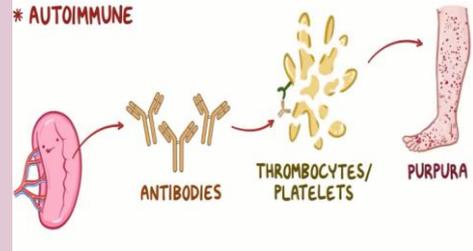


\* SEVERE

- PLATELET LEVELS VERY LOW
- FREQUENT MUCOSAL BLEEDING
- COMMONLY PRESENTS as EP

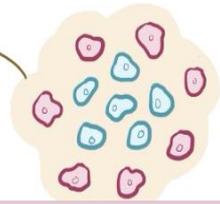
**IMMUNE THROMBOCYTOPENIC PURPURA (ITP)**

\* AUTOIMMUNE

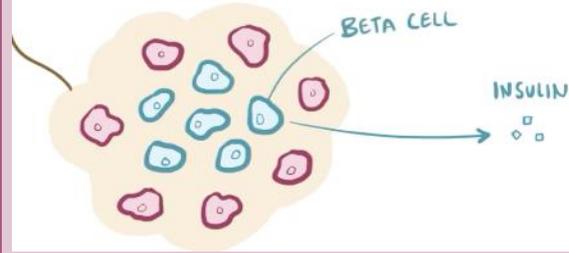


DIABETES MELLITUS

ISLET OF LANGERHANS



ISLET OF LANGERHANS



no food or drink  
for 8 hours

FASTING  
GLUCOSE

ISLET OF LANGERHANS

