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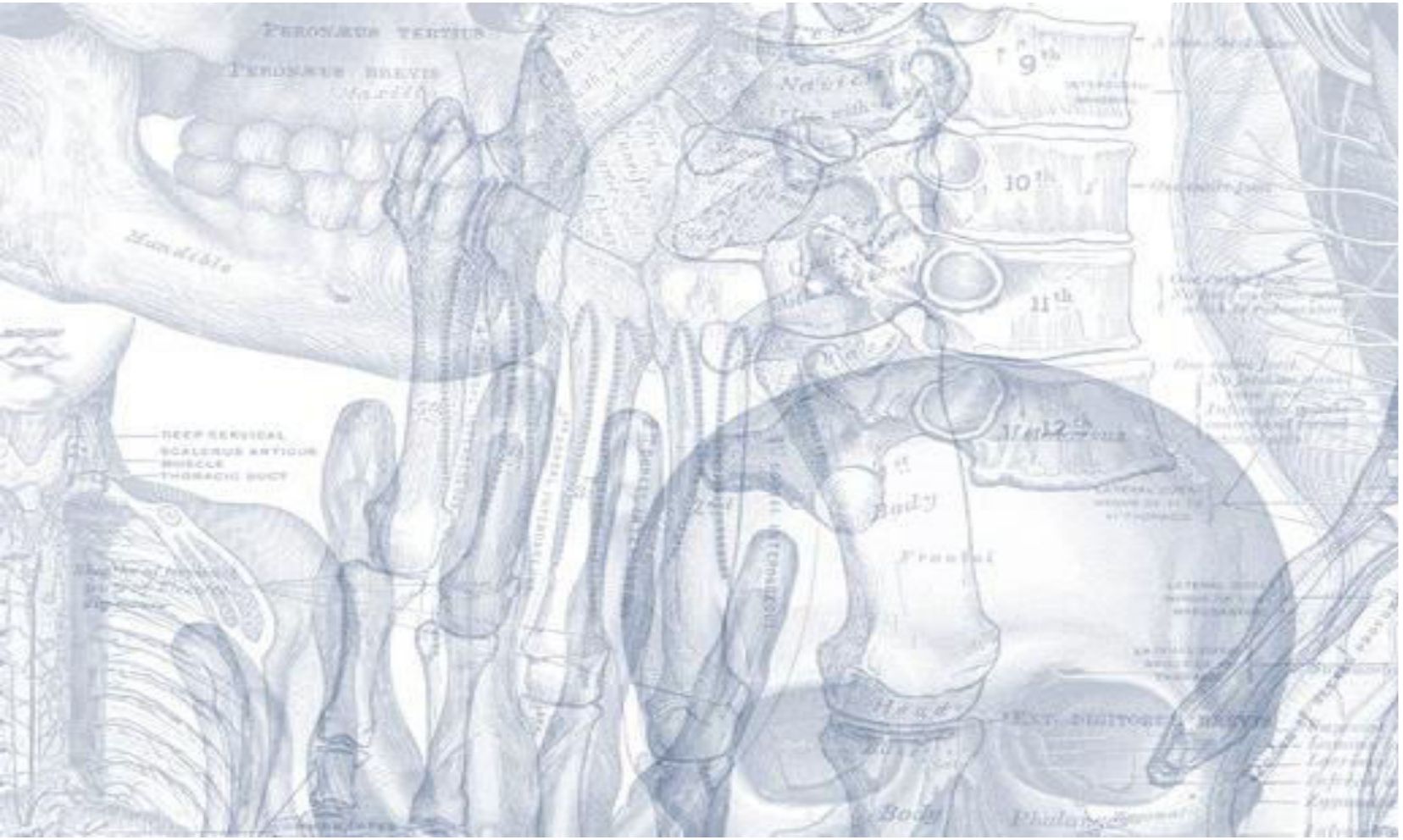


ANATOMY
TEAM 436

436
MEDICINE
KING SAUD UNIVERSITY

تمت المراجعة
شوق الأحمري & عبدالعزيز العنقري

Anatomy of Small Intestine

Please view our Editing File before studying this lecture to check for any changes.

Color Code

- Important
- Doctors Notes
- Notes/Extra explanation

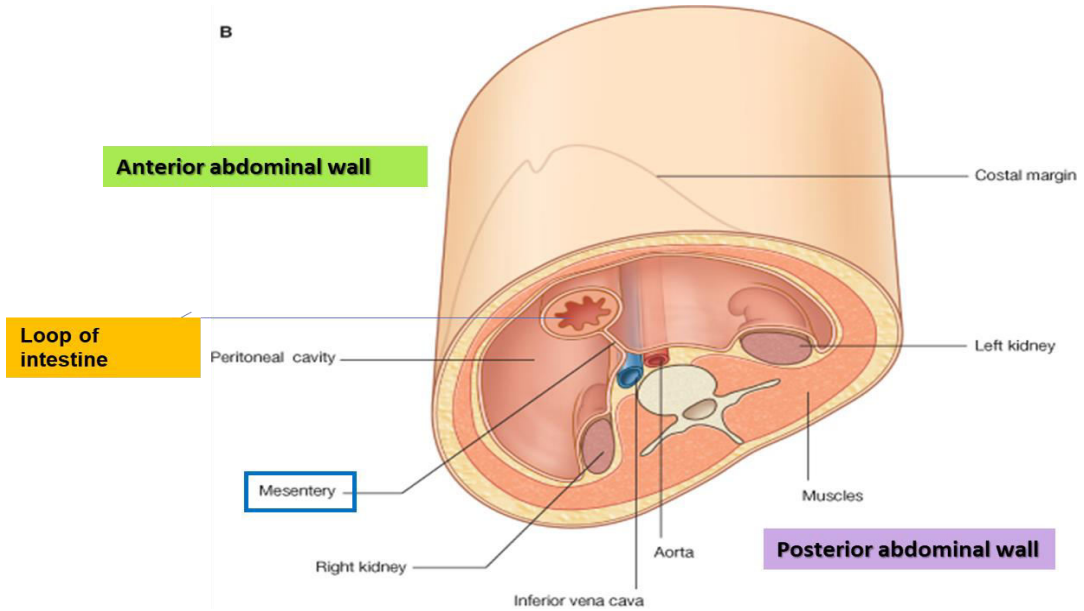
Objectives:

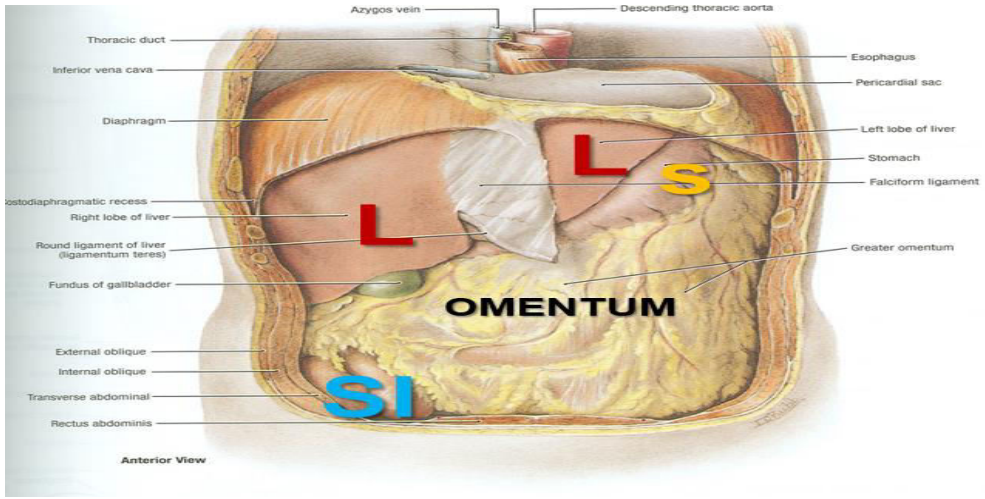
At the end of the lecture, students should:

- ✓ List the different parts of small intestine.
- ✓ Describe the anatomy of duodenum, jejunum & ileum regarding: *the shape, length, site of beginning & termination, peritoneal covering, arterial supply & lymphatic drainage.*
- ✓ Differentiate between each part of duodenum regarding *the length, level & relations.*
- ✓ Differentiate between the jejunum & ileum regarding *the characteristic anatomical features of each of them.*

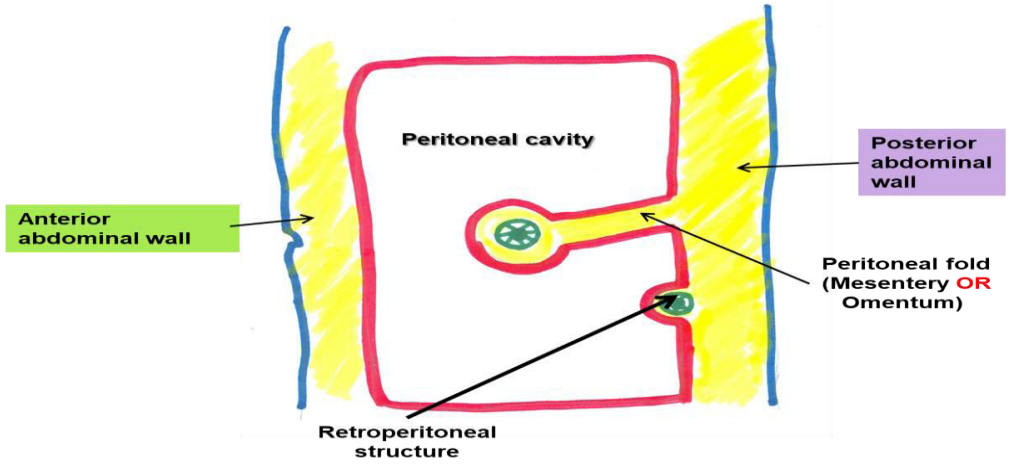
Abdomen

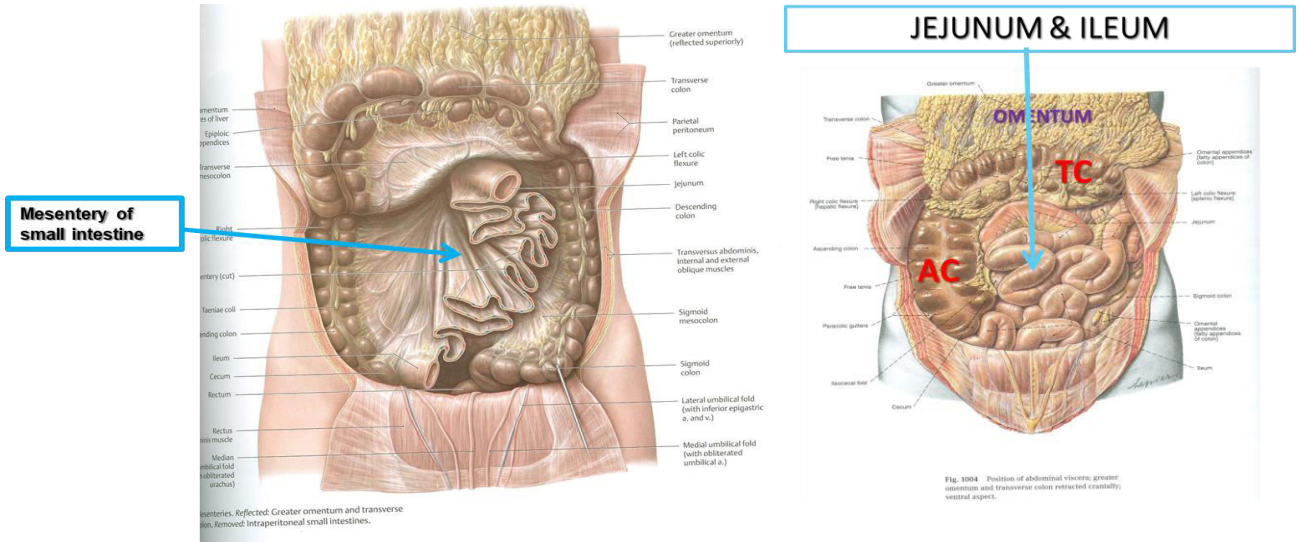
What is Mesentery? It is a double layer attach the intestine to abdominal wall. If it has mesentery it is freely moveable.





L= liver, S=Spleen, SI=Small Intestine, AC=Ascending Colon, TC=Transverse Colon



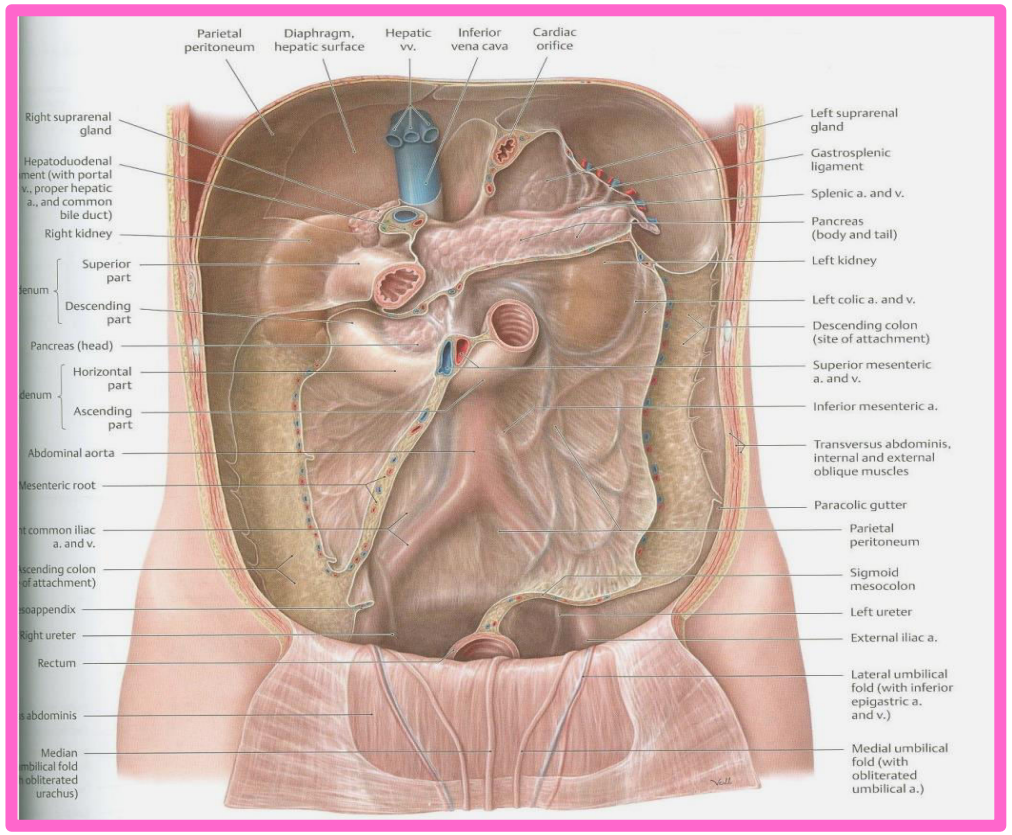


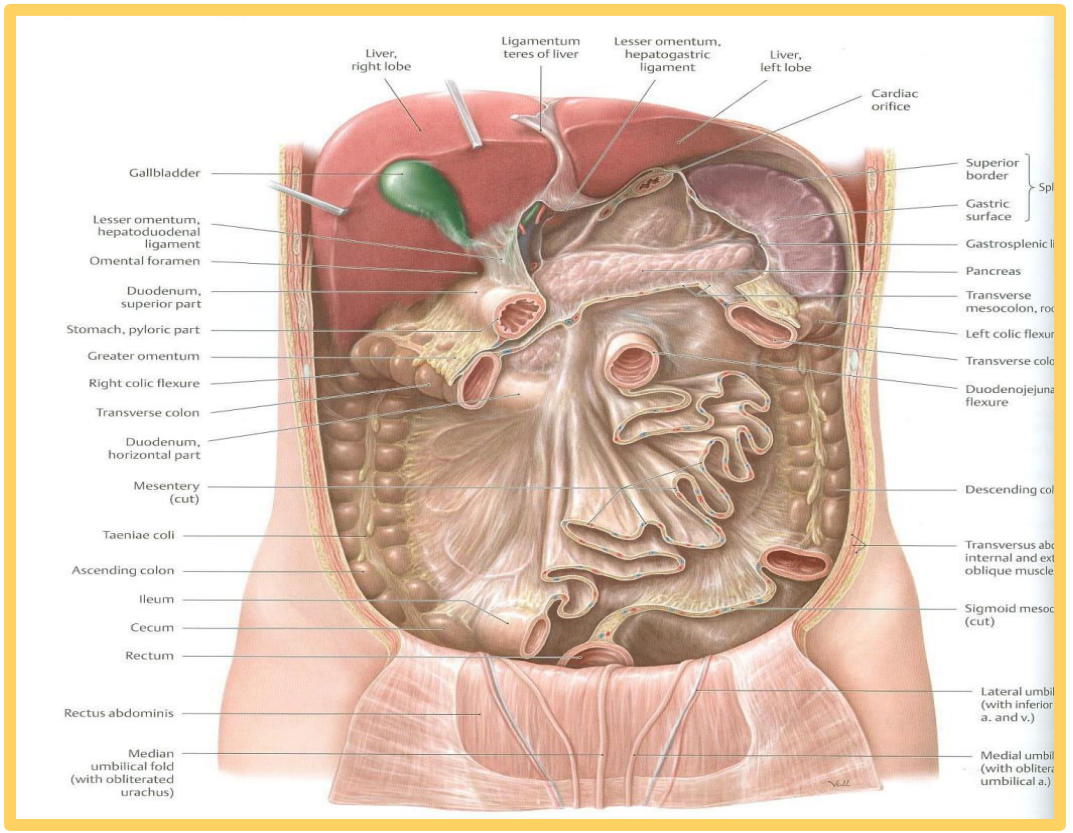
Abdomen

The small intestines consist of two parts:

1- fixed part (no mesentery) (retroperitoneal) : **duodenum**

2- free (movable) part (with mesentery) :**jejunum & ileum**

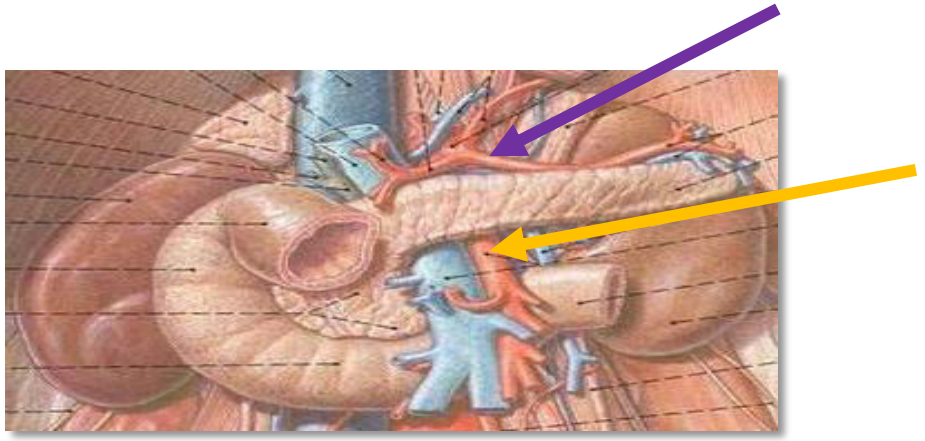




Only on the boys' slides

RELATION BETWEEN **EMBRYOLOGICAL** ORIGIN & **ARTERIAL** SUPPLY

Extra: مهم
Arterial supply depends on the embryological origin :
Foregut → Coeliac trunk
Midgut → superior mesenteric
Hindgut → Inferior mesenteric



Duodenum:

- Origin: *foregut & midgut*
- Arterial supply:

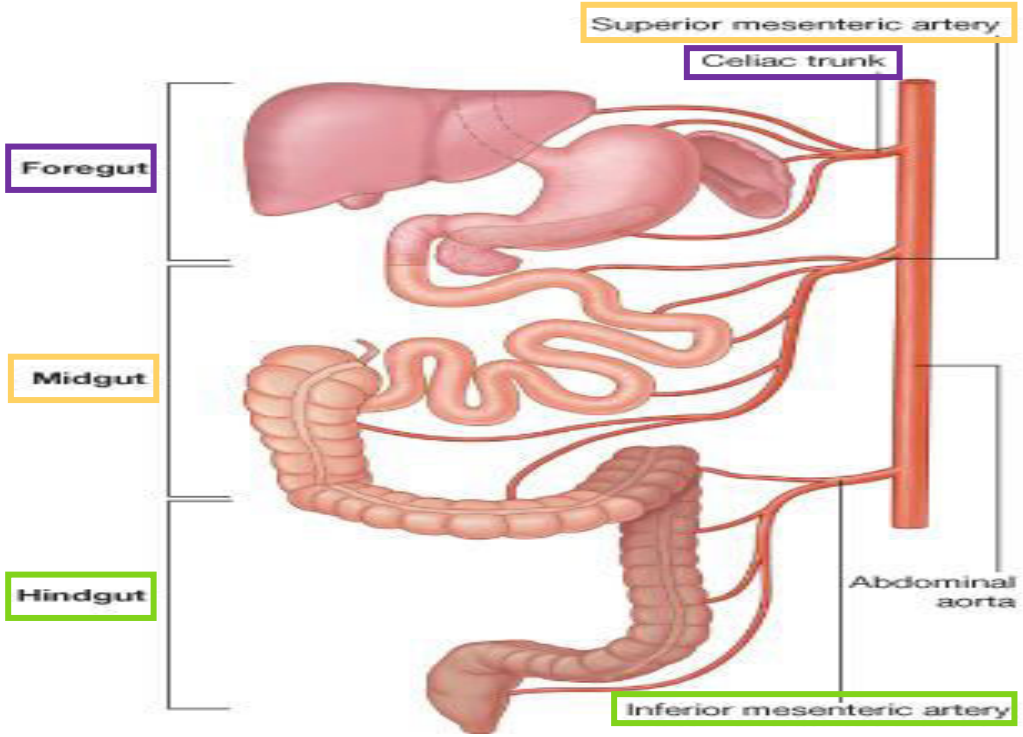
1. **Coeliac** trunk (artery of *foregut*)
2. **Superior mesenteric**: (artery of *midgut*)

The duodenum has 2 arterial supply because of the double origin
The junction of foregut and midgut is at the second part of the duodenum

Jejunum & ileum:

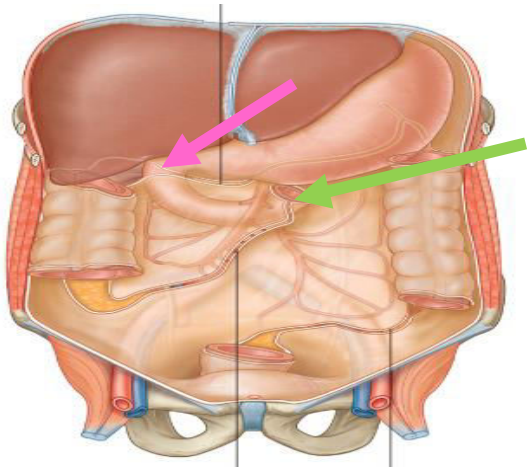
- Origin: *midgut*
- Arterial supply:

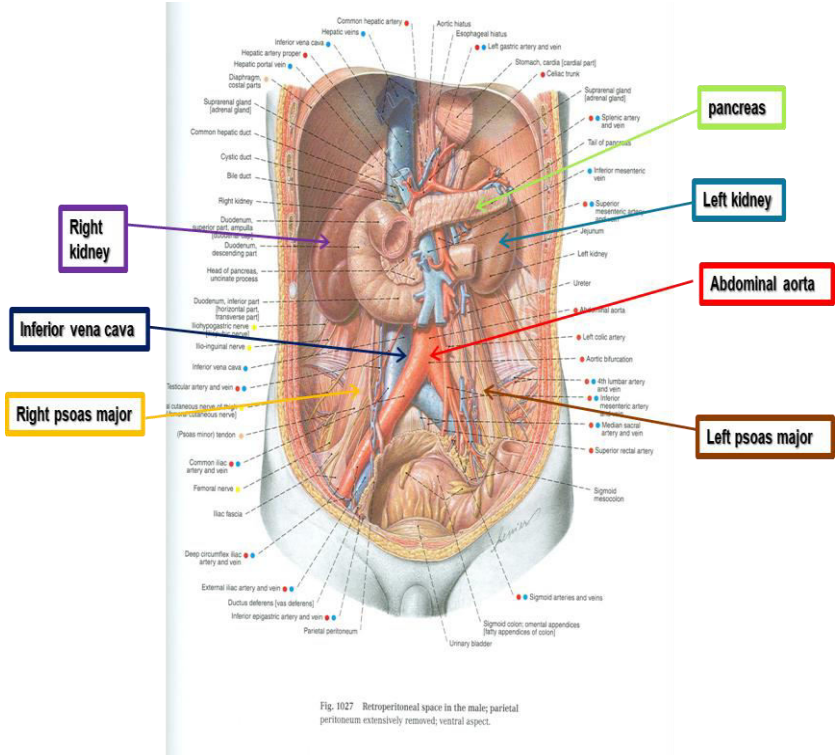
Superior mesenteric: (artery of *midgut*)



Duodenum

Duodenum	
Shape	C-shaped loop
Length	10 inches
Beginning	At pyloro-duodenal junction
Termination	At duodeno-jejunal flexure
Peritoneal covering	Retroperitoneal {fixed movement}
Divisions	4 parts {superior-descending-horizontal-ascending} *next slide*
Embryological origin	Foregut & midgut
Arterial supply	Coeliac & superior mesenteric
Venous drainage	Superior mesenteric & portal veins
Lymphatic drainage	Coeliac & superior mesenteric lymph nodes



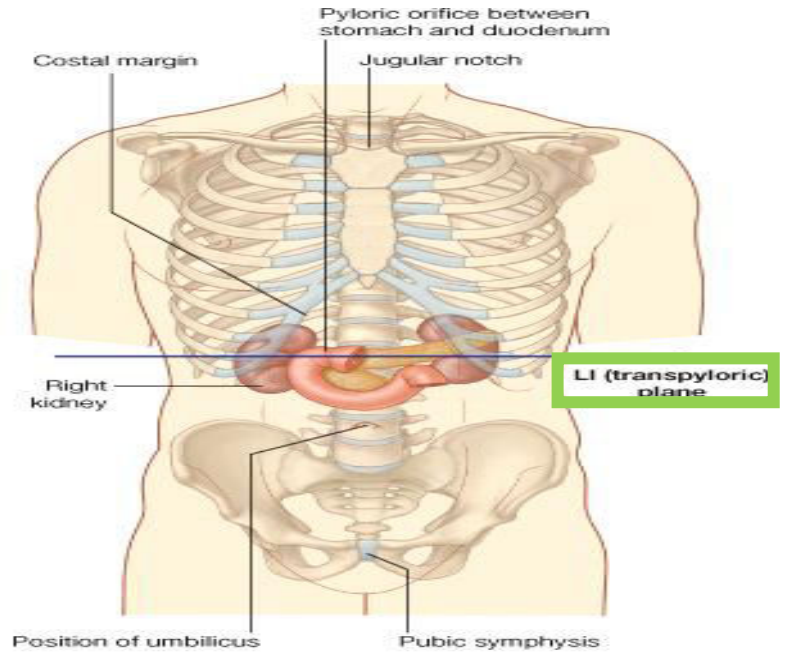


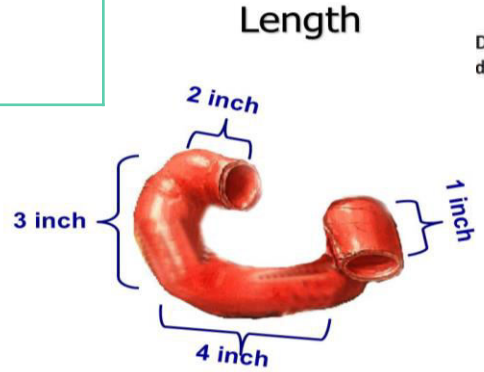
Duodenum

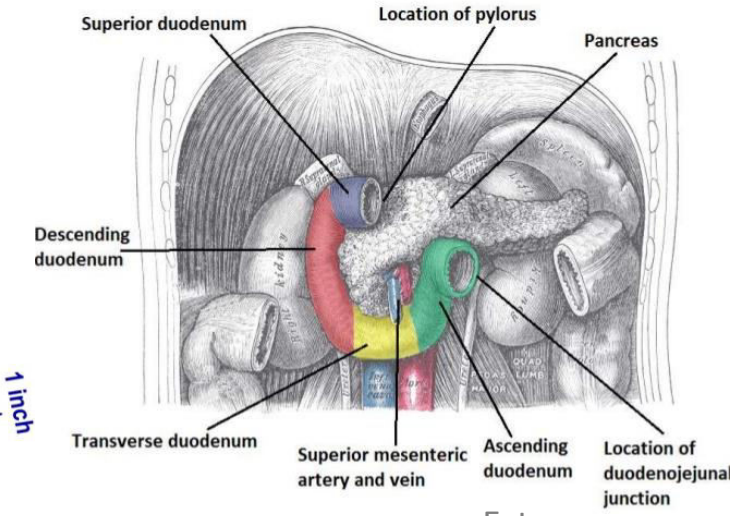
Parts Important

Part	Length	Level (surface anatomy)
FIRST PART (Superior)	2 INCHES	**L1** (Transpyloric Plane)
SECOND PART (Descending)	3 INCHES	Descends From **L1** TO **L3**
THIRD PART (Horizontal)	**4 INCHES**	**L3** (Subcotal Plane)
FOURTH PART (Ascending)	**1 INCHES**	Ascends From **L3** TO **L2**

Total = 10 inches







Extra

Duodenum
First Part

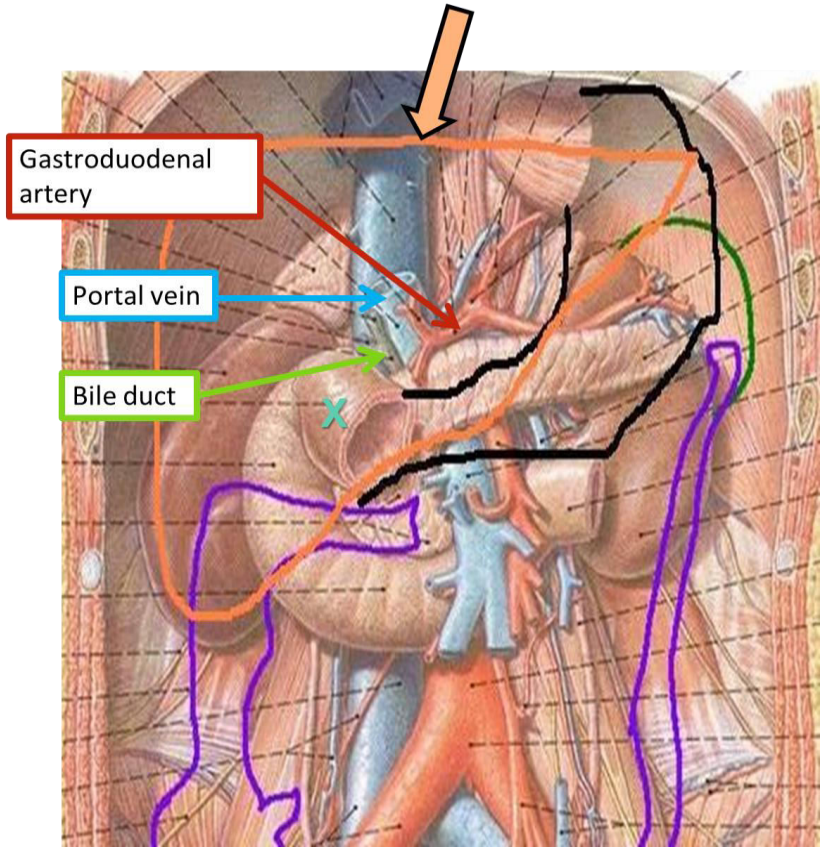
Relations of the first part:

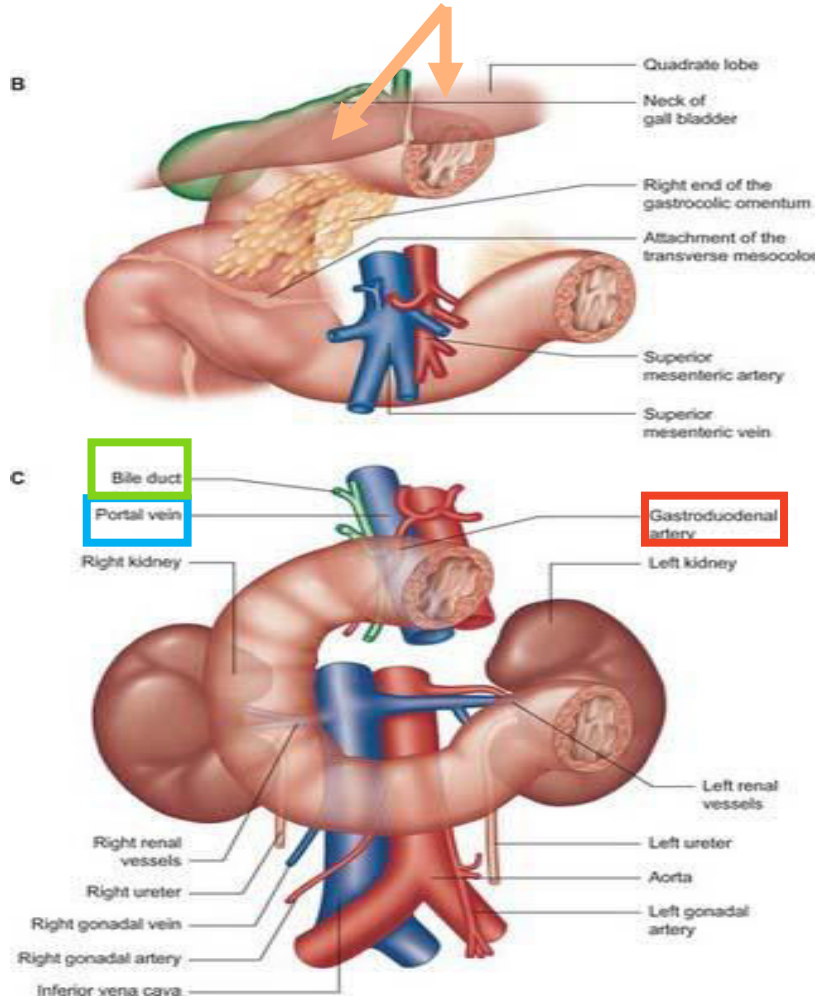
Anterior:

1. Liver

Posterior:

1. Gastroduodenal artery
2. Portal vein
3. Bile duct

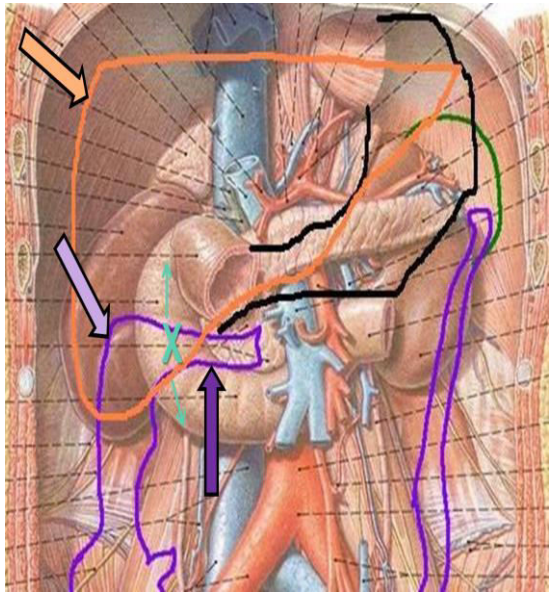


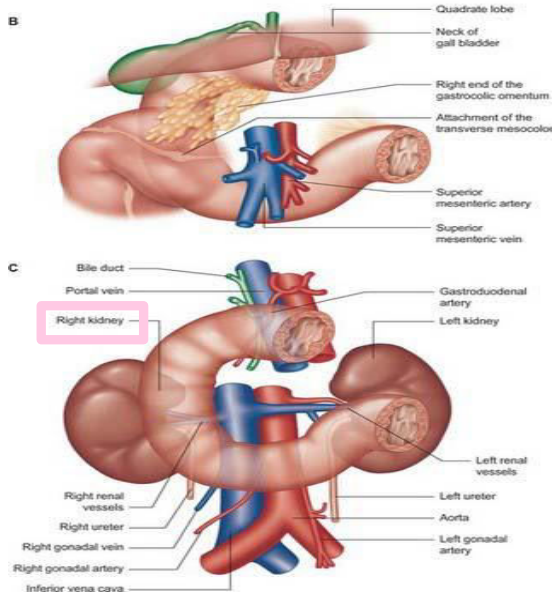


Duodenum
Second Part

Anterior	*Posterior*	*Medial*	*Lateral*
1. Liver 2. Transverse colon 3. Small intestine*	Right kidney	Pancreas	Right colic flexure

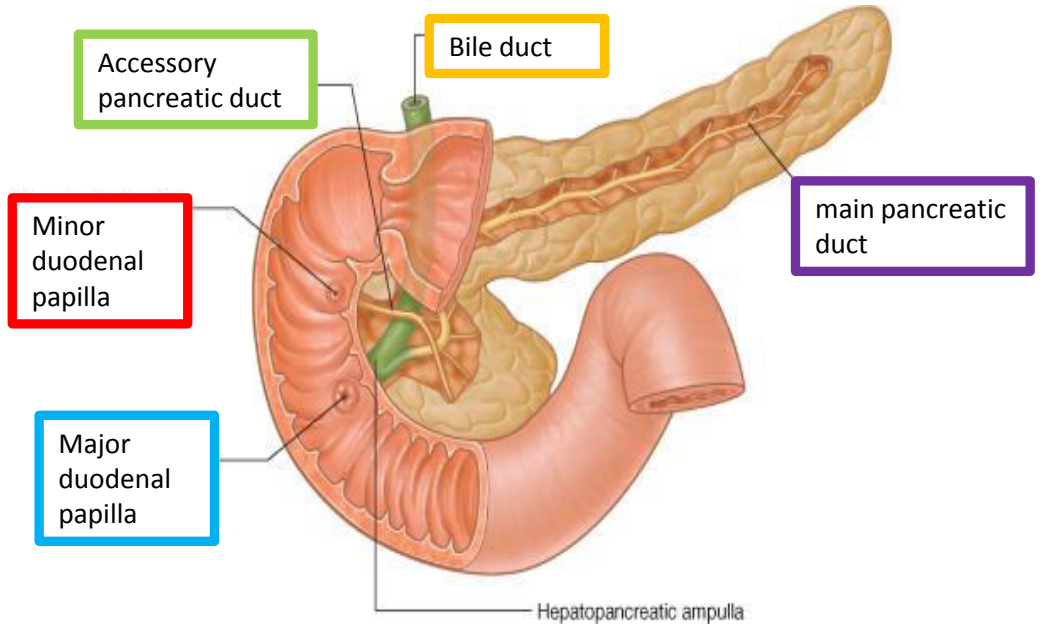
*we mean jejunum and ileum





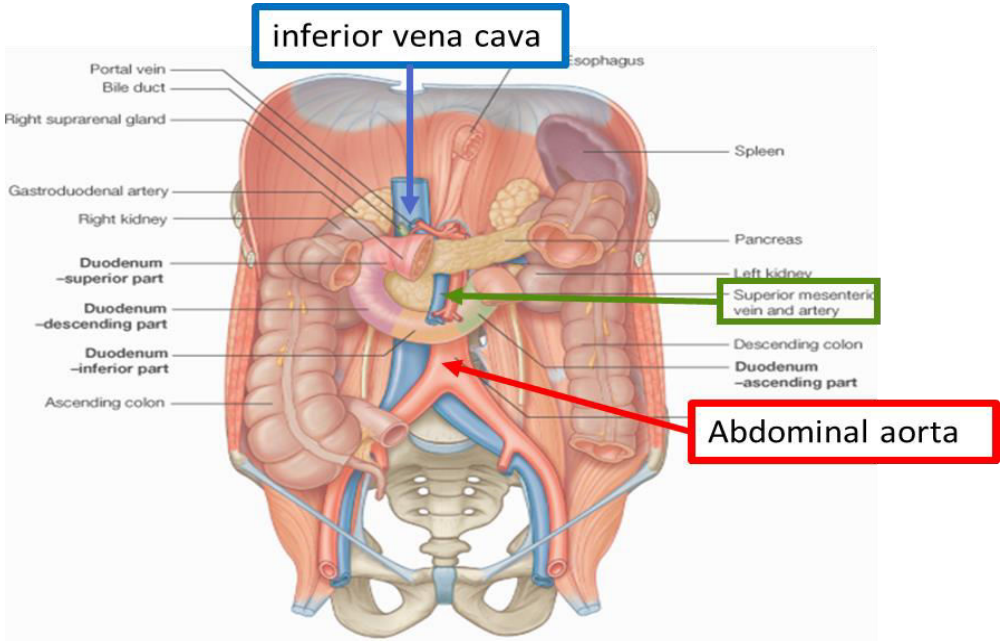
Openings of second part:

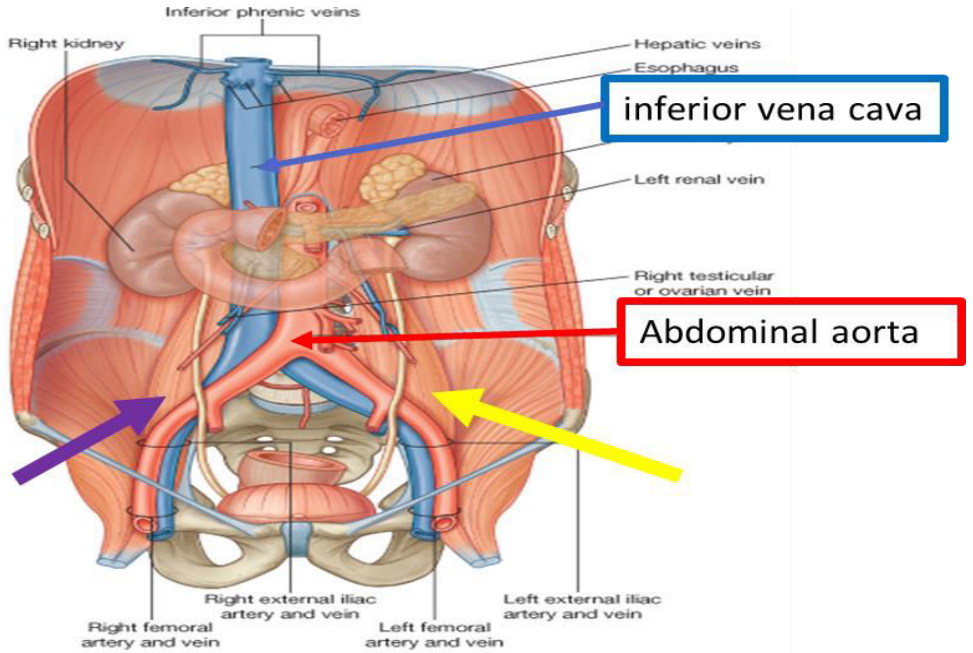
1. Common opening of bile duct & main pancreatic duct: on summit of **major duodenal papilla**.
2. Opening of accessory pancreatic duct (one inch higher): on summit of **minor duodenal papilla.**



Duodenum
Third & Fourth Part

Relations	*Anteriorly*	*Posteriorly*
3rd	1- **S**mall Intestine 2- **Superior** Mesenteric vessels	1- Right psoas major 2- Inferior vena cava 3- Abdominal aorta 4- **Inferior** mesenteric vessels (originate at L3)
4th	Small Intestines	Left Psoas major





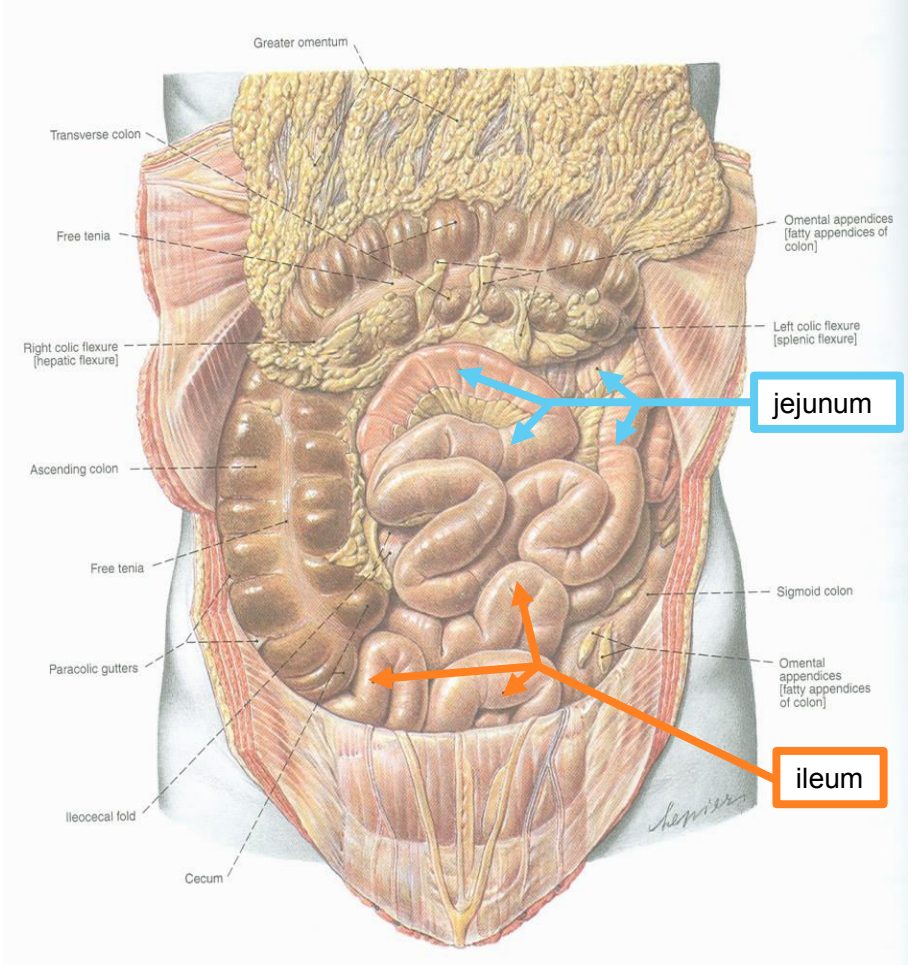
Duodenum Summary

This slide is extra and summarizes the slides before

Duodenum					
Part		**Superior (1st)**	**Descending (2nd)**	**Inferior (3rd)**	**Ascending (4th)**
Length		2 in.	3 in.	4 in.	1 in.
Level		L1 – transpyloric plane	L1 → L3	L3 – subcotal plane	L3 → L2
Relations	Anterior	1. Liver	1. Liver **2. Transverse** colon 3. Small intestine (J & L)	1. Small intestine **2. Superior** mesenteric vessels	1. Small intestine
	Posterior	1. Bile duct 2. Gastroduodenal artery 3. Portal vein	**1. Right** kidney	**1. Right** psoas major 2. Inferior vena cava 3. Abdominal aorta **4. Inferior** mesenteric vessels	1. **Left** psoas major
	Medial		1. Pancreas		
	Lateral		1. Right colic flexure		

Jejunum & Ileum

Shape	• Coiled tube
Length	• 6 meters (20 feet)
Beginning	• At duodeno-jejunal flexure
Termination	• At ileocecal junction Or valve/orifice
Peritoneal fold	• Mesentery of small intestine
Embyological origin	• midgut
Blood supply	• **Superior mesenteric** Artery & Vein
Lypmphatic drainage	• **Superior mesenteric** lymph nodes

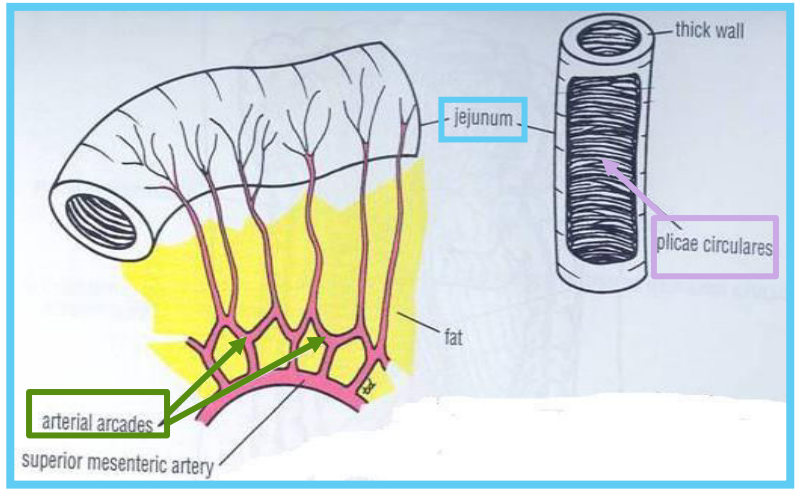


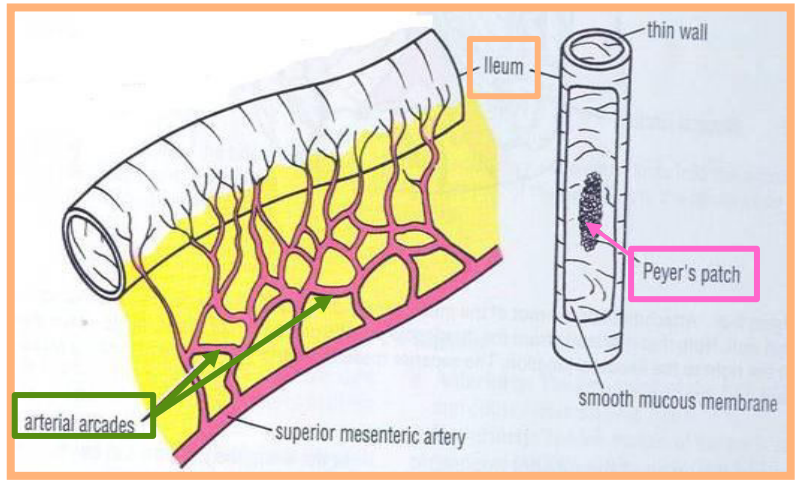
Jejunum & Ileum

Comparison (Jejunum absorbs more than the ileum and needs more blood)

- Plicae circulares: they are mucosal folds.
- Arcades: Anastomosing arterial arches.
- High: farther from the intestinal wall
- Low: nearer intestinal wall

	Jejunum	Ileum
Length*	Shorter (proximal 2/5) of SI	Longer (distal 3/5) of SI
Diameter	Wider	Narrower
Wall	Thicker (more plicae circulares)	Thinner (less plicae circulares)
Appearance	Dark red (more vascular)	Light red (less vascular)
Vessels?	• High & less arcades • Long terminal branches	• Low & more arcades • Short terminal branches
Mesenteric fat**	Small amount & Away from intestinal border	Large amount & Close to intestinal border
Lymphoid tissue	Few aggregations	Numerous aggregations (peyer's patches)





*in regards to the total length of jejunum and ileum. (SI = Small Intestine)

**In general, the mesentery of the jejunum has less fat than the ileum. Also, the fat in the jejunum is not near the intestinal wall (the gap in the picture).

Summary

	Duodenum	Ileum	Jejunum
Shape	C-shaped	Coiled tube	
Peritoneal covering	Retroperitoneal	With mesentery	
Length	10 inch	2/5 of SI	3/5 of SI
Beginning	Pyloro-duodenal junction	Duodeno-jejunal flexure	
End	Duodeno-jejunal flexure	Ilieo-caecal junction	
Embryological origin	Foregut & midgut	Midgut	
Arterial Supply	Celiac & superior mesenteric arteries	Superior mesenteric artery	
Venous Drainage	Superior mesenteric → portal vein	Superior mesenteric vein	
Lymphatic Drainage	Celiac & superior mesenteric lymph nodes	Superior mesenteric lymph node	

MCQ

1-The origin of the duodenum is :
A- Foregut
B- Midgut
C- Hindgut
D- A and B

2-The lymphatic drainage of the duodenum is :
A- coeliac
B- superior mesenteric
C- A and B
D- Inferior mesenteric

3-Which level lies the third part of duodenum?
A-Transpyloric plane.
B-Subcotal plane
C-L1 to L3
D-L3 to L2

4-Which of the following lies anterior to the first part of duodenum?
A-liver.
B-Bile duct.
C-Portal vein.
D-Aorta.

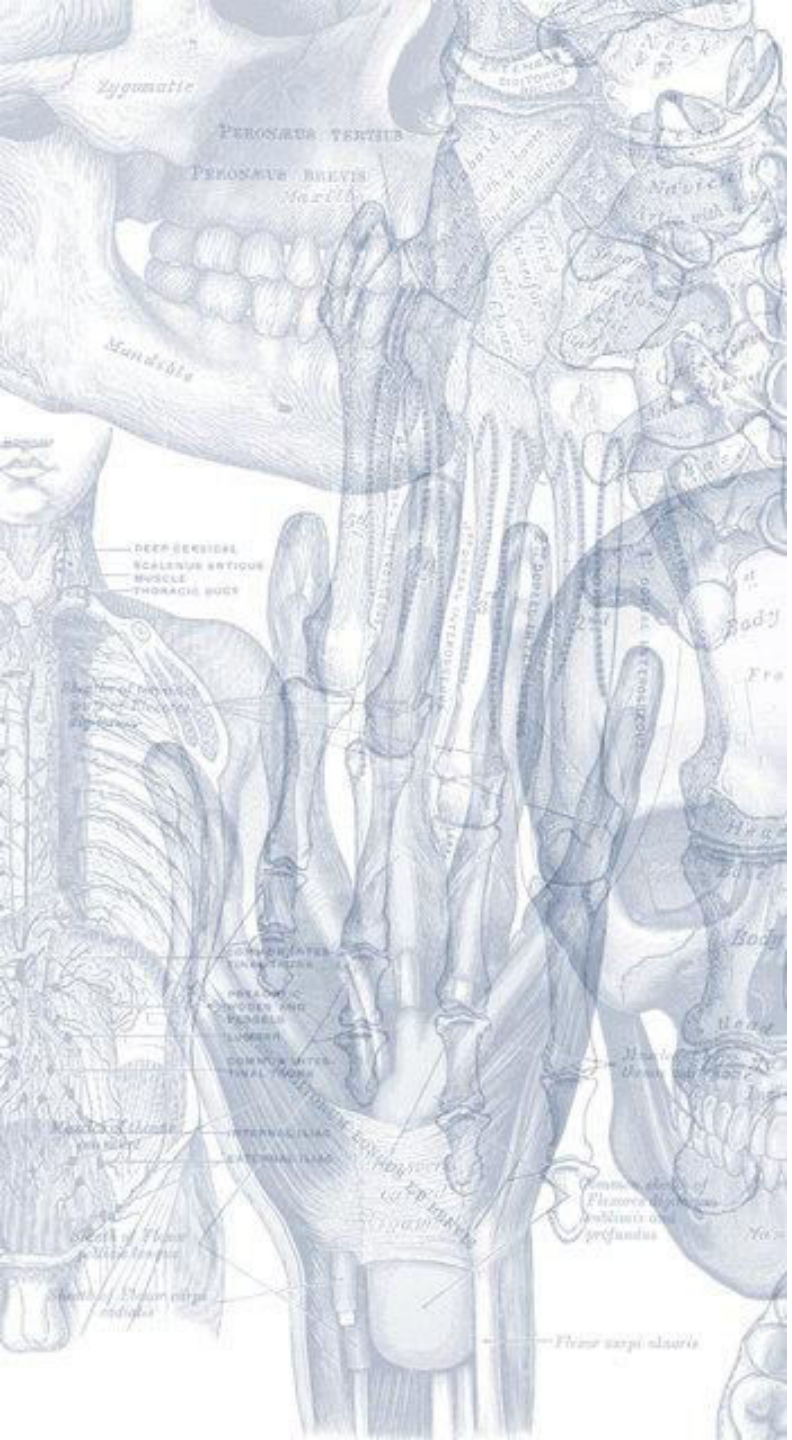
5-the blood supply for the jejunum and ileum is from the:
A-Celiac trunk
B-Superior mesenteric artery
C-Inferior mesenteric artery

6-which of the following has a major contribution to the thickness of the jejunum?
A-Plicae circulares
B-Lymphoid tissue
C-Mesenteric fat

7- Which of the following lies anterior to the third part of duodenum?
A- Liver
B- Superior mesenteric vessels
C- Inferior mesenteric vessels
D- Abdominal aorta

8- Which one of the following structures can be injured in case of perforated duodenal ulcer?
A- Right kidney
B- Right colic flexure
C- Gastroduodenal artery
D- Inferior mesenteric vessels

1-D, 2-C, 3-B, 4-A, 5-B, 6-A, 7-B, 8-B



Leaders:

Nawaf AlKhudairy

Jawaher Abanumy

Members:

Abdulmalki alhadlaq

Abdullah jammah

Abdulmohsen alkhalaf

Abdulmohsen alghannam

Abdulrahman almalki

Abdulrahman alrajhi

Abdullah alhashem

Feedback

anatomyteam436@gmail.com

@anatomy436

References:

1- Girls' & Boys' Slides

2- Greys Anatomy for Students

3- TeachMeAnatomy.com