



# Small & Large Intestine

Gastrointestinal block-Anatomy-Lecture 6,7

Editing file



# Objectives

 **At the end of the lecture, students should be able to:**

- 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.
- List the different parts of large intestine.
- List the characteristic features of colon.
- Describe the anatomy of different parts of large intestine regarding:

(the surface anatomy, peritoneal covering, relations, arterial & nerve supply)

**Color guide :**

Only in boys slides in **Green**

Only in girls slides in **Purple**  
important in **Red**

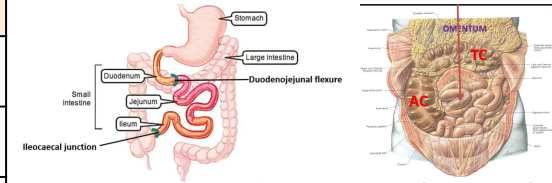
Notes in **Grey**



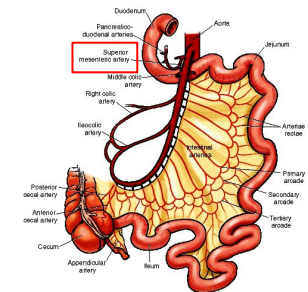
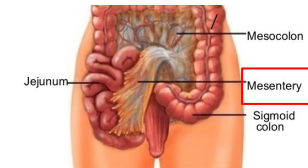
# Small intestine

The small intestine divided into :

Parts	Fixed Part (No Mesentery): Duodenum*	Free (Movable) Part (With Mesentery): Jejunum & Ileum
Shape	C-shaped loop	coiled tube
Length	10 inches	6 meters (20 feet)
Beginning	At pyloro-duodenal junction	at duodeno-jejunal flexure
Termination	At duodeno-jejunal flexure	at ileo-cecal flexure
Peritoneal Covering	Retroperitoneal	mesentery of small intestine
Divisions	4 parts	-----
Embryological origin	Foregut (above bile duct opening in 2nd part )& Midgut (below bile duct opening in 2nd part) So 2nd part <b>has double origin and double supply</b>	Midgut
Arterial Supply	Coeliac (artery of foregut) Superior Mesenteric (artery of midgut)	Superior mesenteric
Lymphatic Drainage	Coeliac & Superior Mesenteric	Superior mesenteric



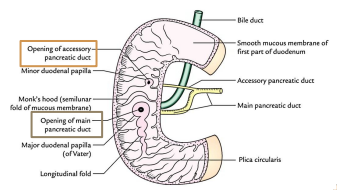
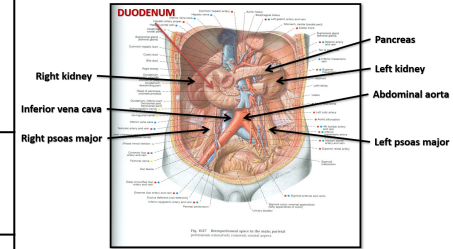
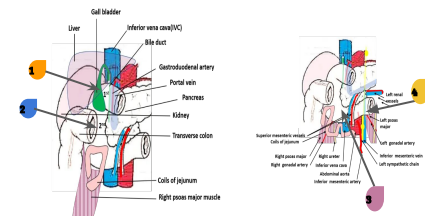
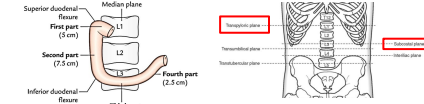
Transverse Colon separates the stomach/liver from the jejunum/ileum



\* 1st inch of 1st part has an omentum with the stomach

# Duodenum parts

Part	1st Part (Superior)	2nd Part (Descending)	3rd Part (Horizontal)	4th Part (Ascending)
Length	2 inches	3 inches	4 inches	1 inch
Level	L1 (Transpyloric Plane)	Descends from L1 to L3	L3 (Subcostal Plane)	Ascends from L3 to L2
Anterior Relations	Liver	1) Liver 2) Transverse Colon 3) Small Intestine	1) Small intestine 2) Superior mesenteric vessels	Small intestine
Posterior Relations	1) Bile duct 2) Gastroduodenal artery* 3) Portal Vein 4) Neck of pancreas	Right Kidney	1) Right psoas major 2) Inferior vena cava 3) Abdominal aorta 4) Inferior mesenteric vessels	Left psoas major
Medial Relations	-	head of Pancreas	-	-
Lateral Relations	-	Right Colic Flexure	-	-



Openings of the 2nd part

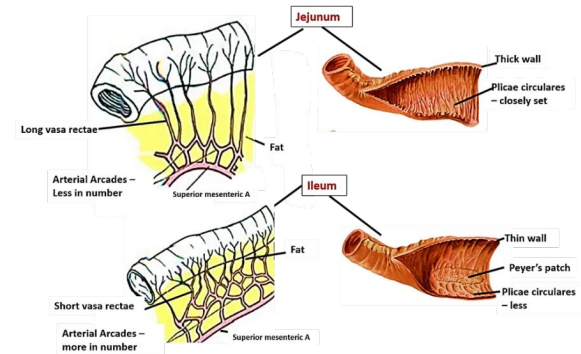
- **Opening of accessory pancreatic duct** One inch higher), on summit of minor duodenal papilla
- **Common opening of bile duct & main pancreatic duct** On summit of major duodenal papilla (vater) **the bile duct** could be obstructed in case of head of pancreas carcinoma

\*if there is an ulcer in the duodenum, Gastroduodenal artery will be the source of bleeding



# Comparison Between Jejunum & Ileum

	Jejunum	Ileum
<b>Length</b>	Shorter (Proximal 2/5)	Longer (Distal 3/5)
<b>Diameter</b>	Wider	Narrower
<b>Wall</b>	Thicker (More Plicae Circulares)	Thinner (Less Plica Circulares)
<b>Appearance</b>	Dark Red (More Vascular)	Light Red (Less Vascular)
<b>Vessels</b>	Less Arcades (Long Terminal Branches)	More Arcades (Short Terminal Branches)
<b>Mesenteric Fat</b>	Small Amount away from Intestinal Border	Large Amount Near Intestinal Border
<b>Lymphoid Tissue</b>	Few Aggregations	Numerous Aggregations (Peyer's Patches)



The absorption happens in Jejunum more, so it needs to be **wider** and **thicker** to increase the surface area of absorption, also it needs to be **more vascular** to facilitate moving of substance to the circulation

While Ileum is **longer** and **thinner**, so it needs **more fat** around to support it and this fat needs supply, so it will be hard for the blood to reach the ileum so the vessels need to be **More Arcades** to penetrate the fat and supply it. As a result of that the blood that reaches the ileum will be less so its **less vascular**

# Large Intestine

## Parts of Large Intestine

### In Abdomen

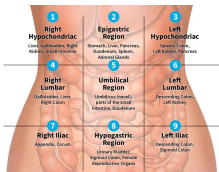
- cecum (in right iliac region)
- appendix (in right iliac region)
- Ascending Colon (in right lumbar region)
- Transverse Colon (in 4,5,6 regions)
- descending Colon (in left lumbar, iliac regions)

### In pelvis

- sigmoid Colon (in left iliac, hypogastric regions)
- rectum (in right iliac region)

### In peritoneum

- anal Canal



## Characteristics of COLON

### Taeniae coli

3 longitudinal muscle bands

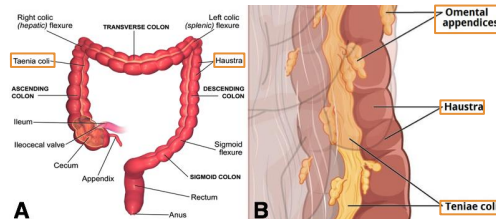
### Sacculations (Haustra)

Because the Taeniae coli are shorter than large intestine

### Epiploic Appendices

Short peritoneal folds filled with fat

**NOTE: THESE CHARACTERISTICS ARE NOT FOUND IN RECTUM & ANAL CANAL**



## Peritoneal covering

### Parts With Mesentery

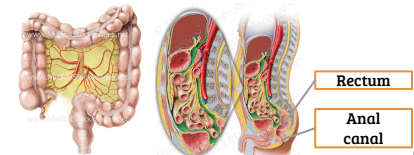
1. Transverse colon (transverse mesocolon)
2. Sigmoid colon (sigmoid mesocolon)
3. Appendix (mesoappendix)
4. Cecum (could be without) (see slide 8)

### Retroperitoneal Parts

1. Ascending colon
2. Descending colon
3. **Upper 2/3 of rectum**

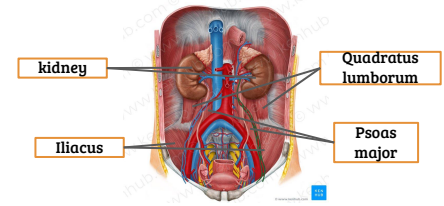
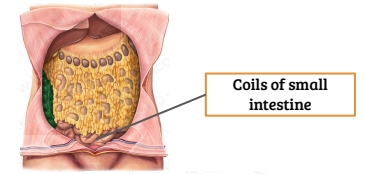
### Parts Devoid Of Peritoneal Covering

1. **Lower 1/3 of rectum**
2. Anal canal



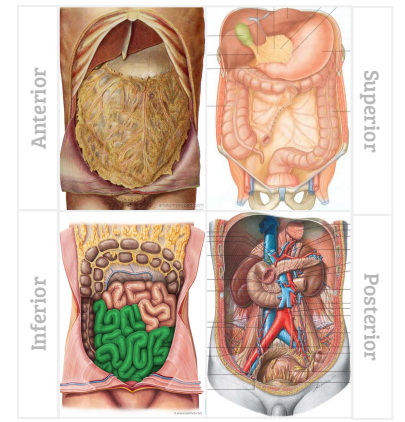
# 1 Cecum—ascending & Descending Colons

Parts	Cecum	Ascending colon	Descending colon
Anterior Relations	1-Greater omentum 2-Coils of small intestine 3-Anterior abdominal wall		
Posterior Relations	1. Right <b>Psoas major</b> 2. Right Iliacus Nerves: (all right)* Iliohypogastric Ilioinguinal	1. Right Iliacus 2. Right <b>Quadratus lumborum</b> 3. <b>Right kidney</b> . Nerves: (all right)* lateral cutaneous of thigh ,Femoral,Genitofemoral	1. Left Iliacus 2. Left <b>Quadratus lumborum</b> 3. <b>Left kidney</b> . 4. <b>Left Psoas major</b> Nerves: (all left)* Iliohypogastric ,Ilioinguinal, lateral cutaneous of thigh Femoral, Genitofemoral;



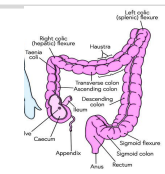
# 2 Transverse Colon

Anterior Relations	Posterior Relations	Superior Relation	Inferior Relation
1-greater omentum 2-anterior abdominal wall	1-2nd part of duodenum 2-pancreas 3-superior mesenteric vessels	1-liver 2-gallbladder 3-stomach	1-coils of small intestine



# 3 Colic Flexures

- ❖ **Hepatic flexure** (right colic flexure): position: lower(liver push it down) + angle: wider
- ❖ **Splenic flexure** (left colic flexure): Position: higher + Angle: more acute



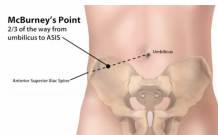
\*from the picture in the lecture

4

# Appendix

## Surface anatomy

- the base of appendix is marked by **McBurney's point**:
- A point at the junction of lateral  $\frac{1}{3}$  & medial  $\frac{2}{3}$  of a line
- traced from right anterior superior iliac spine to umbilicus



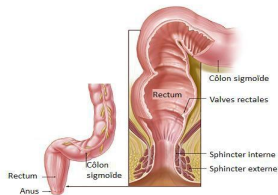
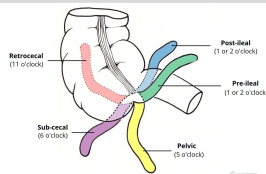
## Opening

At posteromedial aspect of cecum, 1 inch below ileo-cecal junction

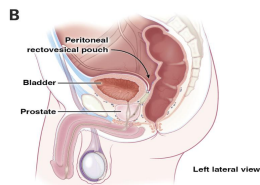
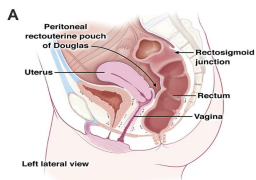
## Positions

1. Retrocecal: (most common)
2. Pelvic
3. Subcecal
4. Preileal
5. Postileal: (least common)

if the appendix in any position rather than (1) the **cecum** will be without mesentery



Rectum



Relations of Rectum in Pelvis

5

# Rectum



## Beginning

as a continuation of sigmoid colon **at level of S3**



## Termination

continues as anal canal, **one inch below & in front of tip of coccyx**. Its end is dilated to form the rectal ampulla.

## Length

13 cm (5 inches)

## Relations of Rectum in Pelvis

Vs.

### Males

Anterior :  
 1. Posterior surfaces of urinary bladder  
 2. Seminal vesicles  
 3. Prostate gland

### Females

Anterior :  
 1. posterior wall of vagina

Posterior: 1. Sacral plexus 2. Sacrum 3. Coccyx



# Relation between embryological origin of GIT & Supply

## Arterial Supply

### 1-Foregut: celiac trunk

Includes Stomach ,liver, gallbladder, pancreas, spleen, upper part of duodenum until major duodenal ampulla

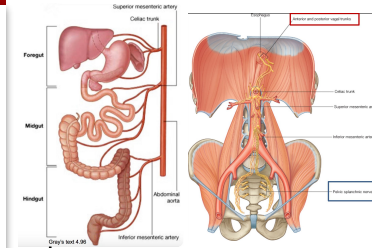
### 2-Midgut (endoderm) : Superior mesenteric artery

Includes the Rest of duodenum ,jejunum, ileum, **cecum,appendix, ascending colon, right 2/3 of transverse colon**

### 3-Hindgut (endoderm): Inferior mesenteric artery

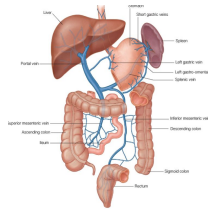
**Left 1/3 of transverse colon, descending colon, sigmoid colon, rectum, upper part of anal canal**

**4-Ectoderm:**  
inferior rectal artery  
Lower part of anal canal



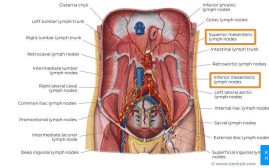
## Venous Drainage

- Veins draining gut form the portal circulation
- All veins finally end into portal vein which enters the liver



## Lymph drainage of GIT

- The lymph vessels follow the arteries.
- Ultimately, all the lymph is collected at the Preaortic lymph nodes (Superior & Inferior mesenteric).



## Nerve Supply

- **Midgut (endoderm) :** Autonomic nerve supply :Sympathetic + **Vagus nerve**
- **Hindgut (endoderm)** Autonomic nerve supply :Sympathetic + **pelvic splanchnic nerves (S2,S3,S4)**
- **ectoderm(lower 1/3 of anal canal)**  
Somatic nerve supply :inferior rectal (branch of pudendal nerve)

# QUIZ 1



Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
D	C	C	B	A	B	D	B

**Q1:** The duodenum originates from the .....

- A. Foregut
- B. Midgut
- C. Hindgut
- D. A&B

**Q2:** Which of the following could be injured in case of perforated duodenal ulcer?

- A. Right kidney
- B. Right colic flexure
- C. Gastroduodenal artery
- D. Inferior mesenteric vessels

**Q3:** if there is a stone in gallbladder ,Which part of intestine initially receives the stone?

- A. cecum
- B. ascending colon
- C. 2nd part of duodenum
- D. 3rd part of duodenum

**Q4:** Which of the following lies anterior to the third part of duodenum?

- A. Right psoas major
- B. Small Intestine
- C. Ureter
- D. Bile duct

**Q5:** What part of the duodenum lies in the transpyloric plane?

- A. 1st
- B. 2nd
- C. 3rd
- D. 4th

**Q6:** the length of the Jejunum & Ileum is

- A. 6 inches
- B. 6 meter
- C. 10 meter
- D. 10 inches

**Q7:** Which one of these contains numerous aggregation of Lymphoid Tissue ?

- A. Jejunum
- B. Stomach
- C. duodenum
- D. ileum

**Q8:** Which ONE of the following lies behind the 3rd part of the duodenum?

- A. inferior mesenteric vein
- B. inferior mesenteric artery
- C. superior mesenteric artery
- D. Gastroduodenal artery

# QUIZ 2



Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
B	C	A	C	C	B	A	D

**Q1:** where does the rectum begin?

- A. At s3 as continuation of cecum
- B. At s3 as continuation of sigmoid colon
- C. At L3 as continuation of cecum
- D. At L3 as continuation of sigmoid colon

**Q2:** which one of the following structures found in pelvis?

- A. Anal canal
- B. Descending colon
- C. sigmoid colon
- D. appendix

**Q3:** which one of the following structures marked by McBurney's point?

- A. Base of appendix
- B. Apex of appendix
- C. Beginning of cecum
- D. Termination of cecum

**Q4:** the innervation of inferior part of anal canal is :

- A. Autonomic, by vagus nerve
- B. Somatic, by pudendal nerve
- C. Somatic, by inferior rectal nerve
- D. Autonomic, by pelvic splanchnic nerve

**Q5:** One of the superior relations to transverse colon is

- A. Coils of small intestine
- B. Anterior abdominal wall
- C. Gallbladder
- D. Right kidney

**Q6:** if superior mesenteric artery and vagus nerve injured. Which part of colon will be affected?

- A. Ascending and descending
- B. Ascending and transverse
- C. Descending and sigmoid
- D. Descending and transverse

**Q7:** Appendix opens at posteromedial aspect of cecum, .....below ileocecal junction

- A. 1 inch
- B. 5 inches
- C. 3 inches
- D. 2 inches

**Q8:** One of anterior relations of rectum in males is

- A. Vagina
- B. Sacral plexus
- C. Sacrum
- D. Posterior surfaces of urinary bladder



# Members board

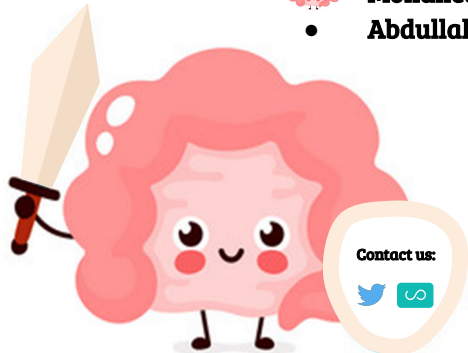


## Team leaders

### ● Abdulrahman Shadid

#### Boys team:

- Mohammed Al-huqbani
-  Salman Alagla
- Ziyad Al-jofan
- Ali Aldawood
- Khalid Nagshabandi
- Sameh nuser
- Abdullah Basamh
-  Alwaleed Alsaleh
-  Mohaned Makkawi
- Abdullah Alghamdi



### ● Ateen Almutairi

#### Girls team :

- Ajeed Al Rashoud
- Taif Alotaibi
- Noura Al Turki
- Amirah Al-Zahrani
- Alhanouf Al-haluli
- Sara Al-Abdulkarem
- Renad Al Haqbani
- Nouf Al Humaidhi
- Jude Al Khalifah
- Nouf Al Hussaini
- Danah Al Halees
-  Rema Al Mutawa
- Maha Al Nahdi
-  Razan Al zohaifi
- Ghalia Alnufaei