

Abdomen: Small and large bowel, blood supply of intestine and the portal system

## SMALL INTESTINE

- Average length 6 metres (20 feet)
- Range 3-10 metres (10-33 feet)
- Patients can survive with 2/3 removed. Little if any effect by removing 1/3

### ORIGIN OF SMALL BOWEL MESENTERY





15cm (6") long.

Starts at the duodenojejunal junction, just to left of L2 vertebra and extends down and to the right to right sacro-iliac joint at S2 sacral level.

Contains superior mesenteric vessels, lymphatics and autonomic nerves.

**BLOOD:** Ileal & jejunal brs of superior mesenteric artery.

**NERVES:** General visceral afferents in lesser splanchnics (sympathetic) referred to T10 (para-umbilical)

	JEJUNUM	ILEUM
<b>General</b>	2/5, red, wide bore, thick wall	3/5, pink, narrow bore, thin wall
<b>Macroscopic</b>	Valvulae conniventes, plicae circulares ++, sparse arcades	Smooth wall, Peyer's patches, multiple arcades
		
<b>Mesentery</b>	Lies superiorly, attached to left of aorta, less fat	Lies inferiorly, attached to right of aorta, fatty mesentery
<b>Histology</b>	Tall villi Long crypts	Short villi Short crypts
		

Note: At base of crypts are Paneth cells that produce lysozyme. Also terminal ileum is site for absorption of vitamin B12 and bile salts

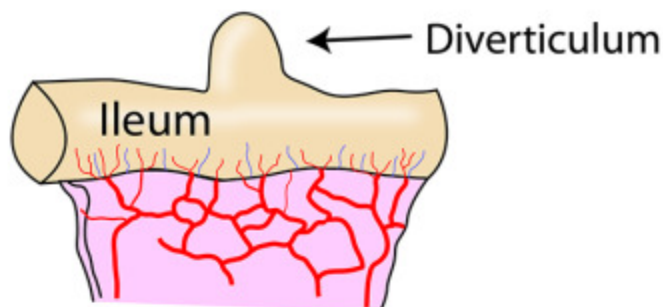
# MECKEL'S DIVERTICULUM

## SMALL BOWEL MESENTERY

## SMALL BOWEL SECRETIONS

### MECKEL'S DIVERTICULUM

- Said to be present in 2-3% of people, 2-3 inches" long and 2-3 feet from the ileocaecal valve but these statements are probably only 2/3 true!
- May contain gastric, pancreatic, liver, carcinoid or lymph tissue
- May attach to umbilicus via a vitello-intestinal tract which may or may not leak but may cause intestinal obstruction as a volvulus can wrap around it
- Symptoms very similar to appendicitis
- Lies on antemesenteric border of ileum



### ORIGIN OF SMALL BOWEL MESENTERY

- 6 inches (15cm) long
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- Contains superior mesenteric vessels, lymphatics and autonomic nerves

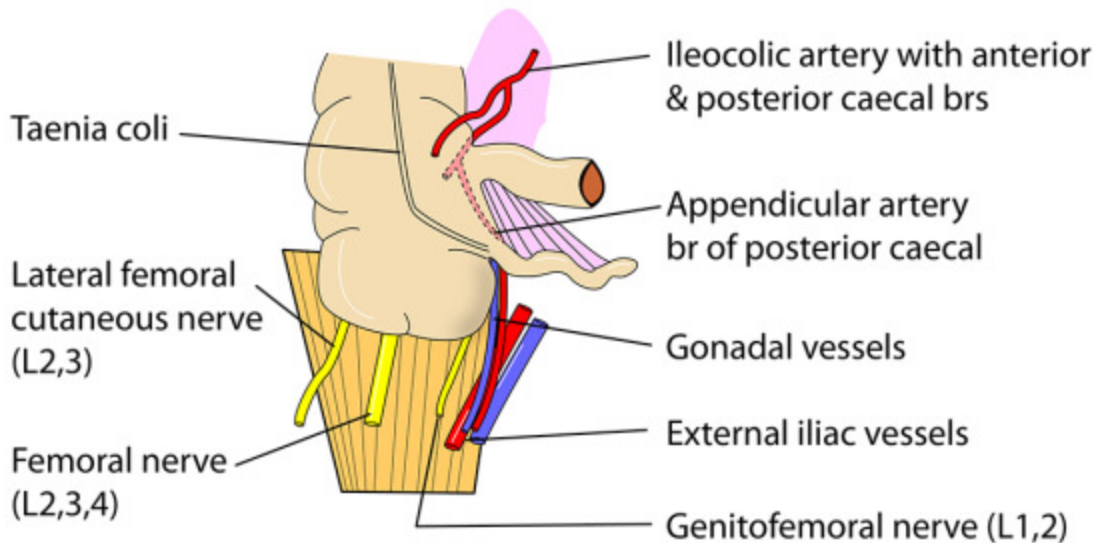
### SECRETIONS FROM SMALL BOWEL

- Mucus, lysozyme, secretin, somatostatin, cholecystokinin, serotonin and endomorphin, VIP, GIP, etc

# CAECUM AND APPENDIX

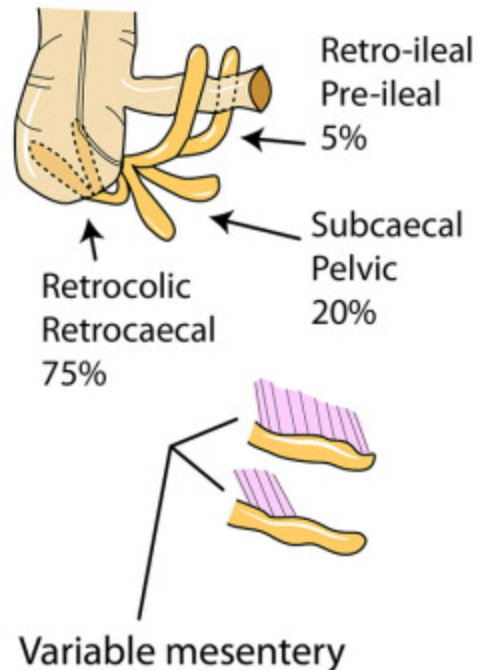
## CAECUM

- On mesentery
- Below ileocaecal valve
- Retrocaecal fossa behind it
- 3 taenia meet at base of appendix
- Ileocaecal valve is a double fold of mucosa & circular muscle of ileum which acts as an anti-reflux mechanism



## APPENDIX

- At McBurney's point
- 1/2"-9" (2-25cm) average 7-8cm
- Fully coated diverticulum
- Variable mesentery
- Appendicular artery usually from posterior caecal artery. It is an end artery hence appendix can easily become gangrenous
- Appendix moves posterior and medial with caecal expansion

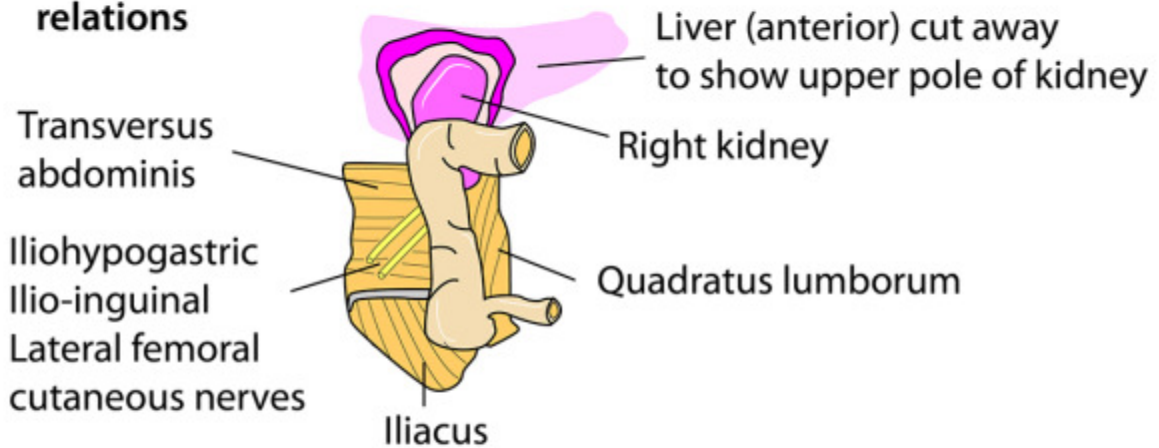


# ASCENDING AND TRANSVERSE COLON

## ASCENDING COLON

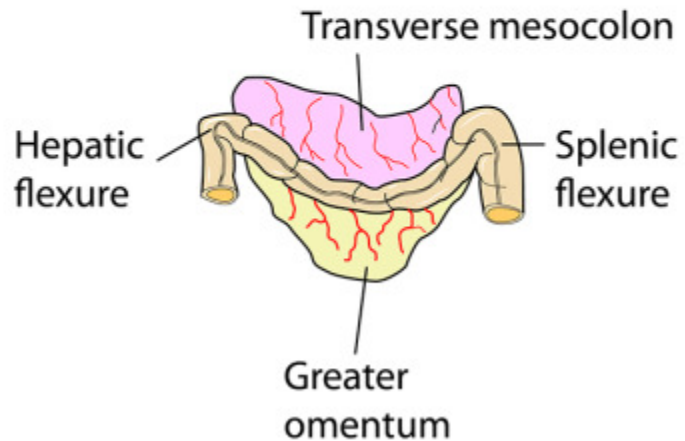
- 15cm (6")
- From ileocaecal valve to hepatic flexure
- Retroperitoneal
- Anterior: Coils of small bowel & omentum

### Posterior relations



## TRANSVERSE COLON

- 45cm (18")
- Between hepatic and splenic flexures
- Fixed at both ends
- Hangs on transverse mesocolon





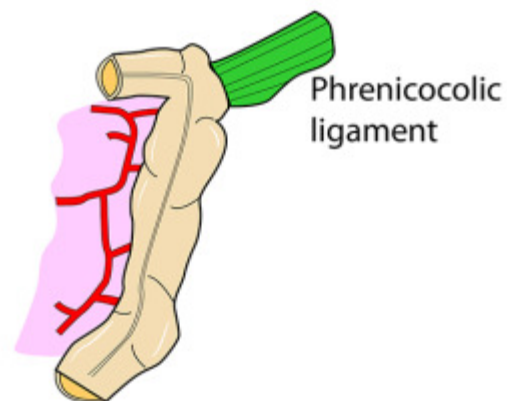
## DESCENDING AND SIGMOID COLON

### DESCENDING COLON

- 30cm (9-12")
- From splenic flexure to brim of pelvis
- Retroperitoneal
- Appendices epiploicae ++
- Lies on psoas, iliacus, transversus abdominis, quadratus lumborum

### Posterior relations

- Left subcostal artery/vein/nerve
- Iliohypogastric nerve
- Ilio-inguinal nerve
- Lateral femoral cutaneous nerve
- Genitofemoral nerve
- Gonadal artery/vein
- External iliac artery/vein



### SIGMOID COLON

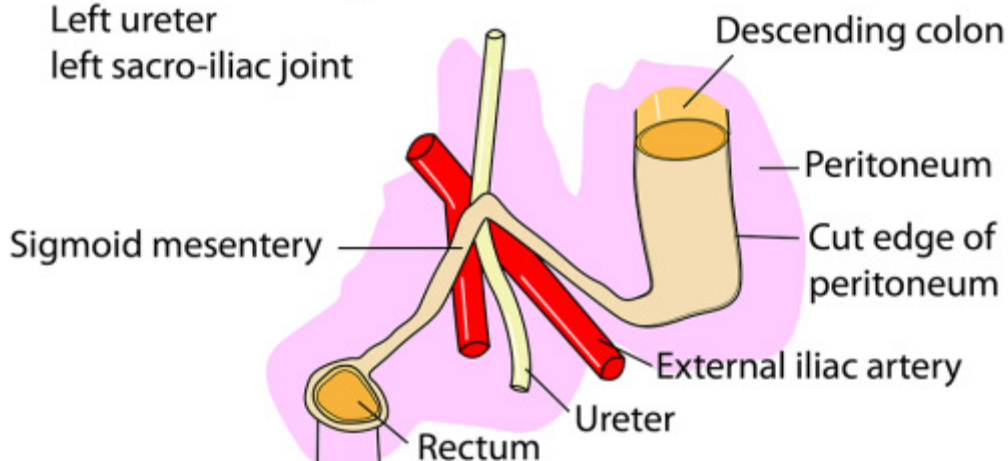
- 15-45cm (5-30")
- From pelvic brim to S3 midline
- On mesentery
- Appendices epiploicae +++
- Taenia become progressively more as a longitudinal coat

Sigmoid colon is excised to expose the base of its mesentery which crosses:

Common iliac artery bifurcation

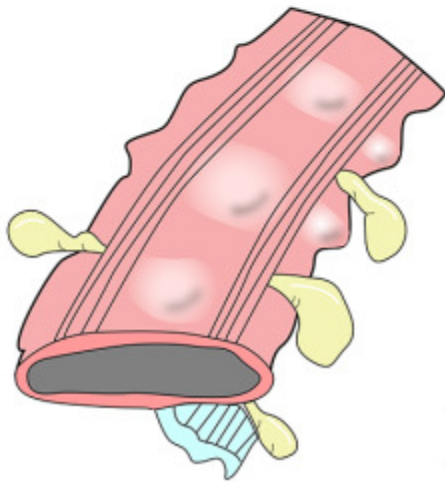
Left ureter

left sacro-iliac joint



## LARGE BOWEL - GENERAL

- Approximately 5 foot (1.4m)
- Partially retroperitoneal (see individual segments of bowel)
- Outer longitudinal muscle in three flat bands - Taenia Coli
- Taenia only in colon and caecum - not in rectum or appendix
- As taenia are shorter than the bowel they cause inner haustrations called Valvulae Conniventes
- Inner circular muscle
- Appendices epiploicae are little tags of fat at the mesentery border of the bowel - not in appendix, caecum or rectum
- Crypts with goblet cells but no villi
- Lymphatics: Alongside superior/inferior mesenteric vessels to para-aortics to coeliac and on upwards
- Nerves: Parasympathetic - vagus to 2/3 along transverse colon then S2,3,4 to rest of bowel. With sympathetics T10-L2 for vasoconstriction and pain. Note some pelvic organ pain is with parasympathetics

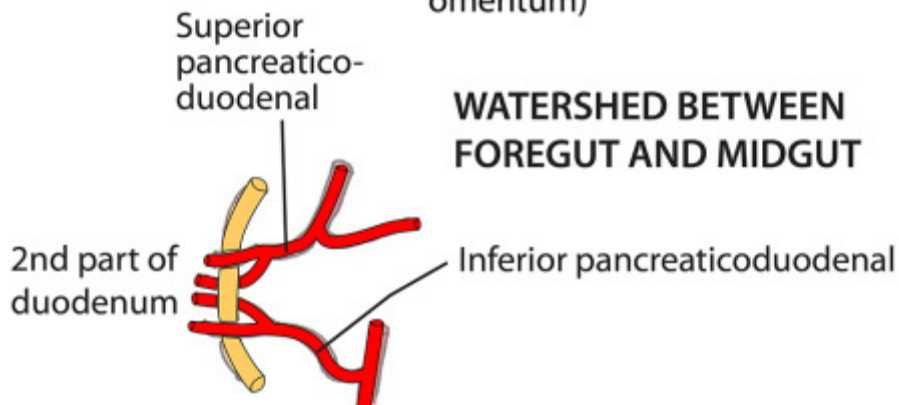
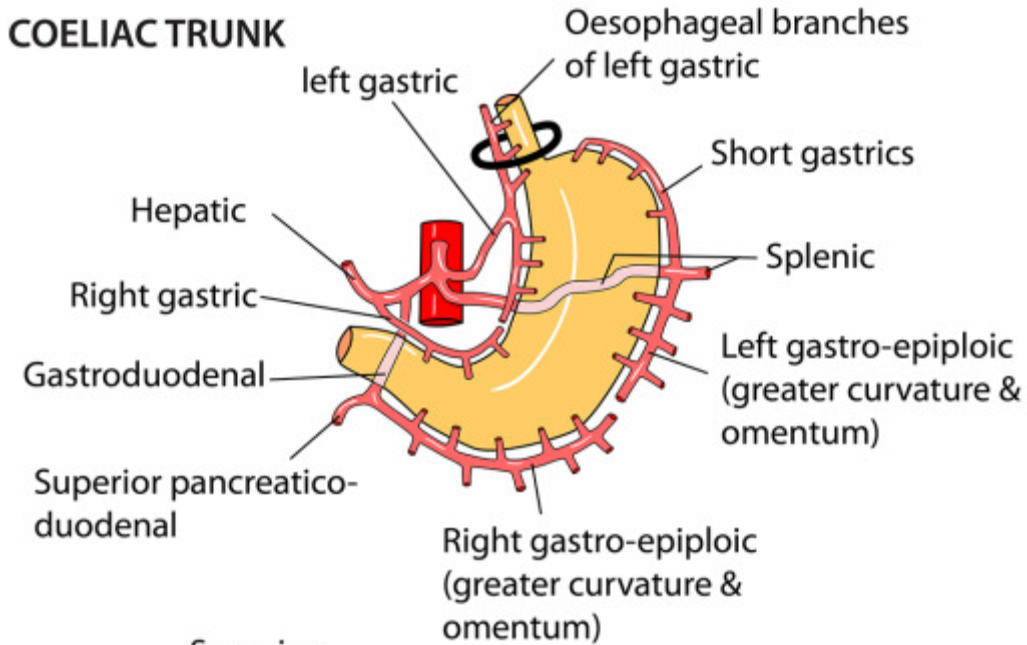
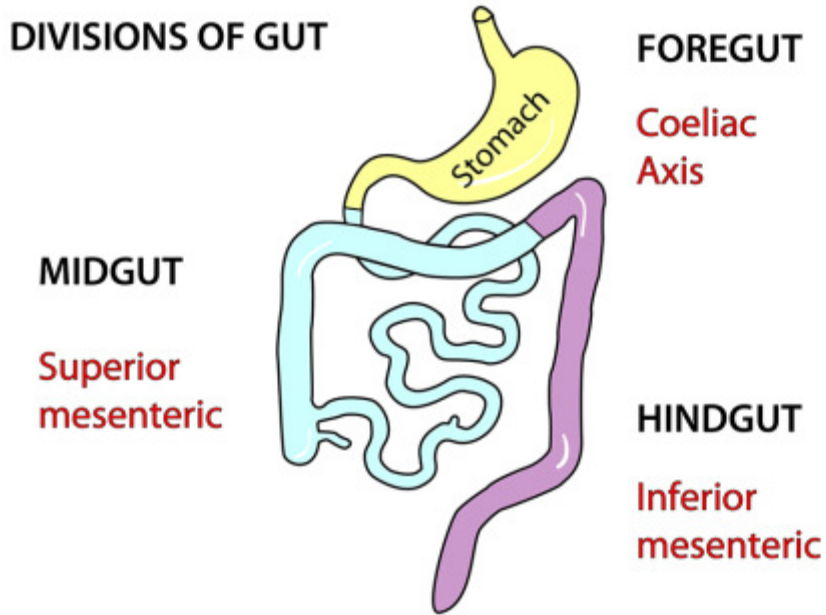


- **Appendices epiploicae**
- **Taenia coli**
- **Sacculations**
- **Haustrations**
- **Mesentery**

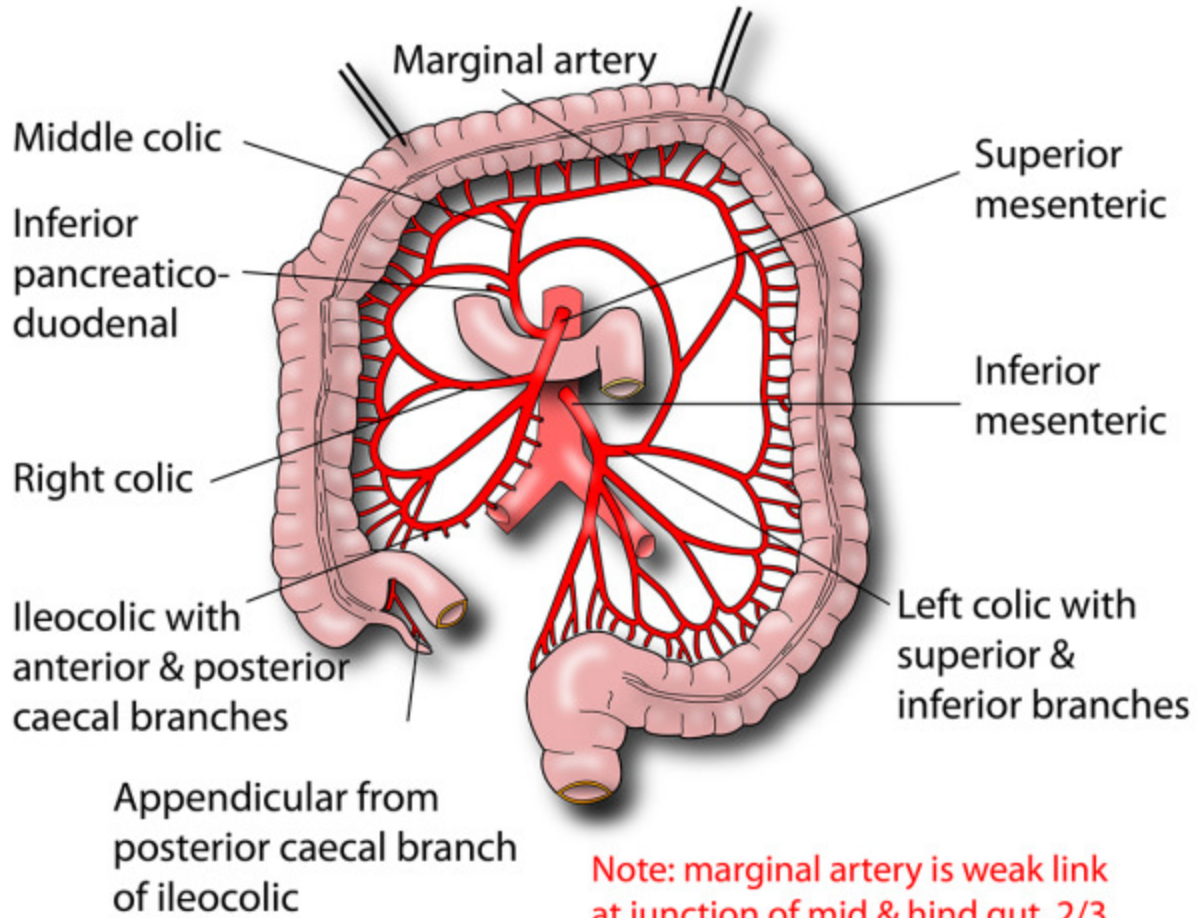
**THEY ALL STOP BEFORE  
THE RECTUM BEGINS**

# PRINCIPLES OF BOWEL ARTERIAL SUPPLY

## COELIAC TRUNK



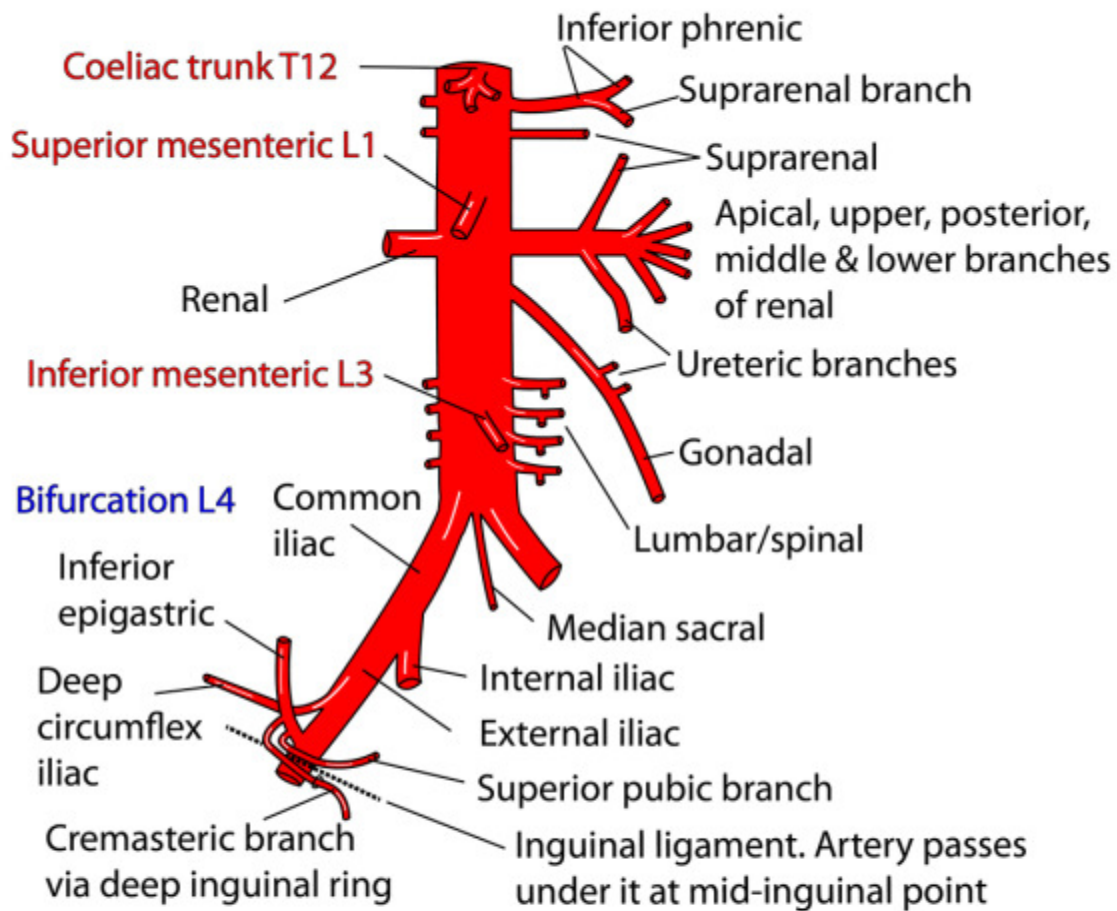
## SUPERIOR & INFERIOR MESENTERIC ARTERIES



Note: marginal artery is weak link at junction of mid & hind gut, 2/3 along transverse colon



## ABDOMINAL AORTA AND RIGHT EXTERNAL ILIAC ARTERY



### Relations of aorta

**Left lateral:** Sympathetic chain

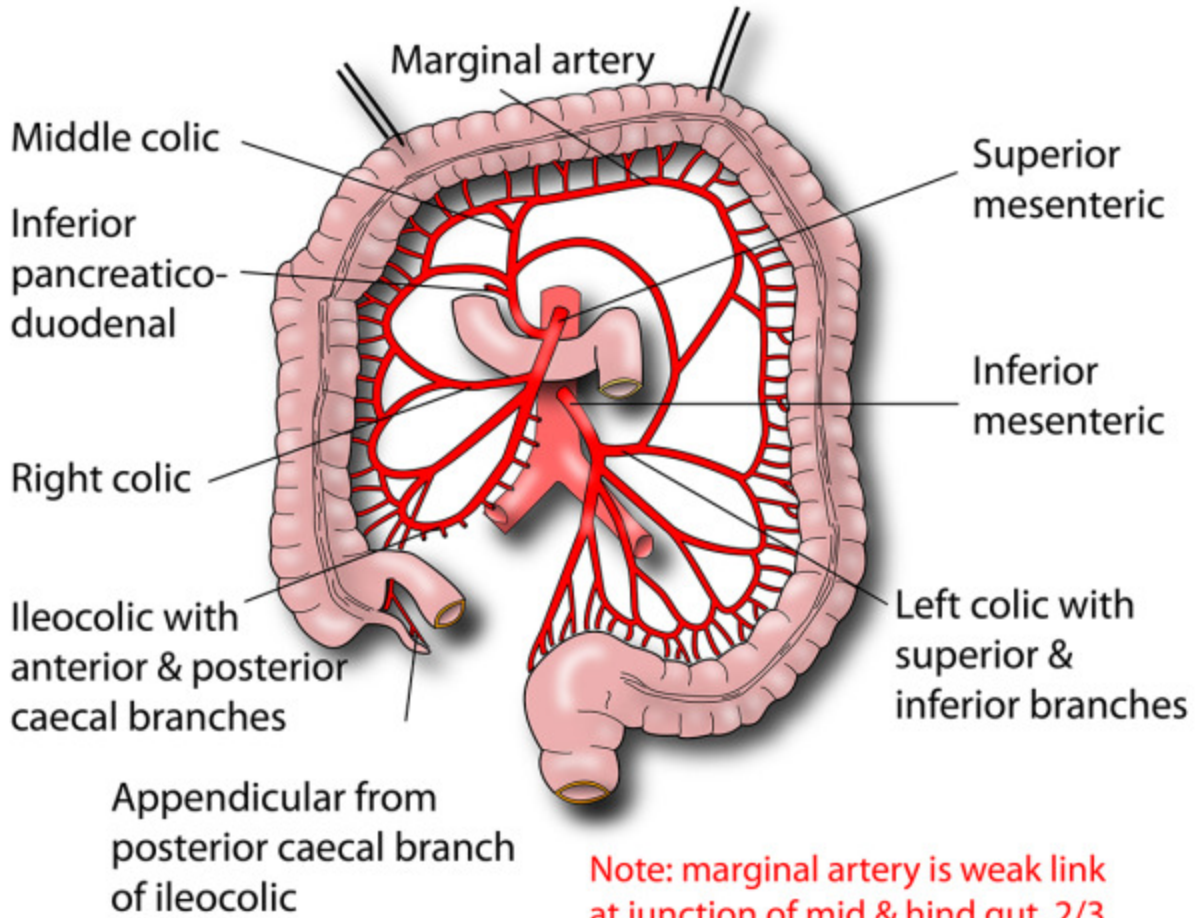
**Right lateral:** IVC, Cisterna chyli

**Both lateral:** Azygos veins, para-aortic nodes, coeliac ganglia

**Anterior:** Pancreas, splenic vein, left renal vein, 3rd part duodenum, mesentery, nodes, autonomic plexus, lesser sac, stomach, omentum, small bowel

**Posterior:** T12-L4 vertebrae, left lumbar veins

## SUPERIOR & INFERIOR MESENTERIC ARTERIES



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# HEPATIC PORTAL SYSTEM

**Drains venous blood from:**

Whole bowel from lower 1/3 oesophagus to upper anal canal  
Spleen, pancreas, gall bladder

**To:** Liver sinusoids

**Formed by:** Superior mesenteric & splenic behind neck of pancreas.  
Inferior mesenteric joins splenic at variable distances along it

