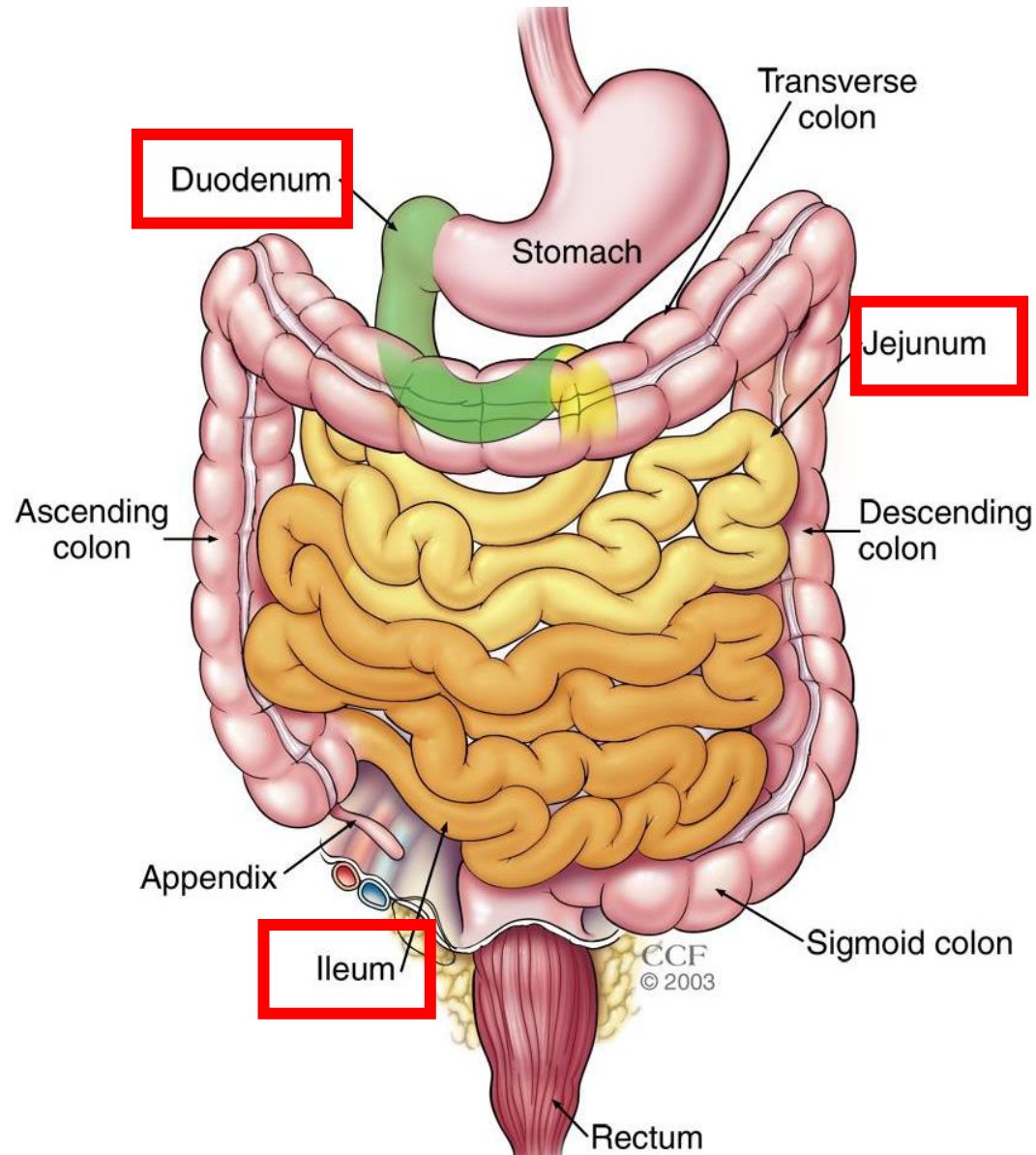


# Small Intestine

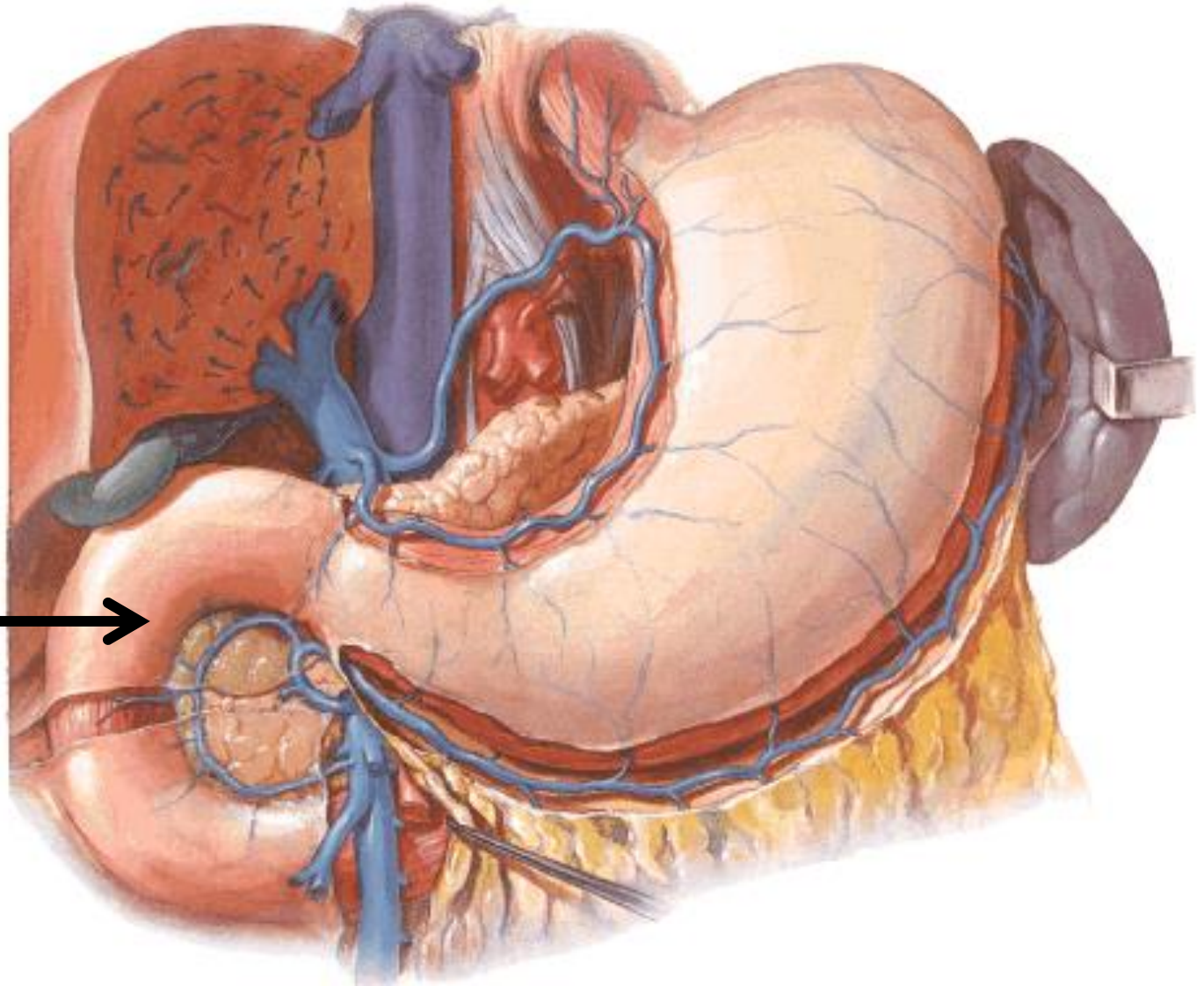
# Small Intestine



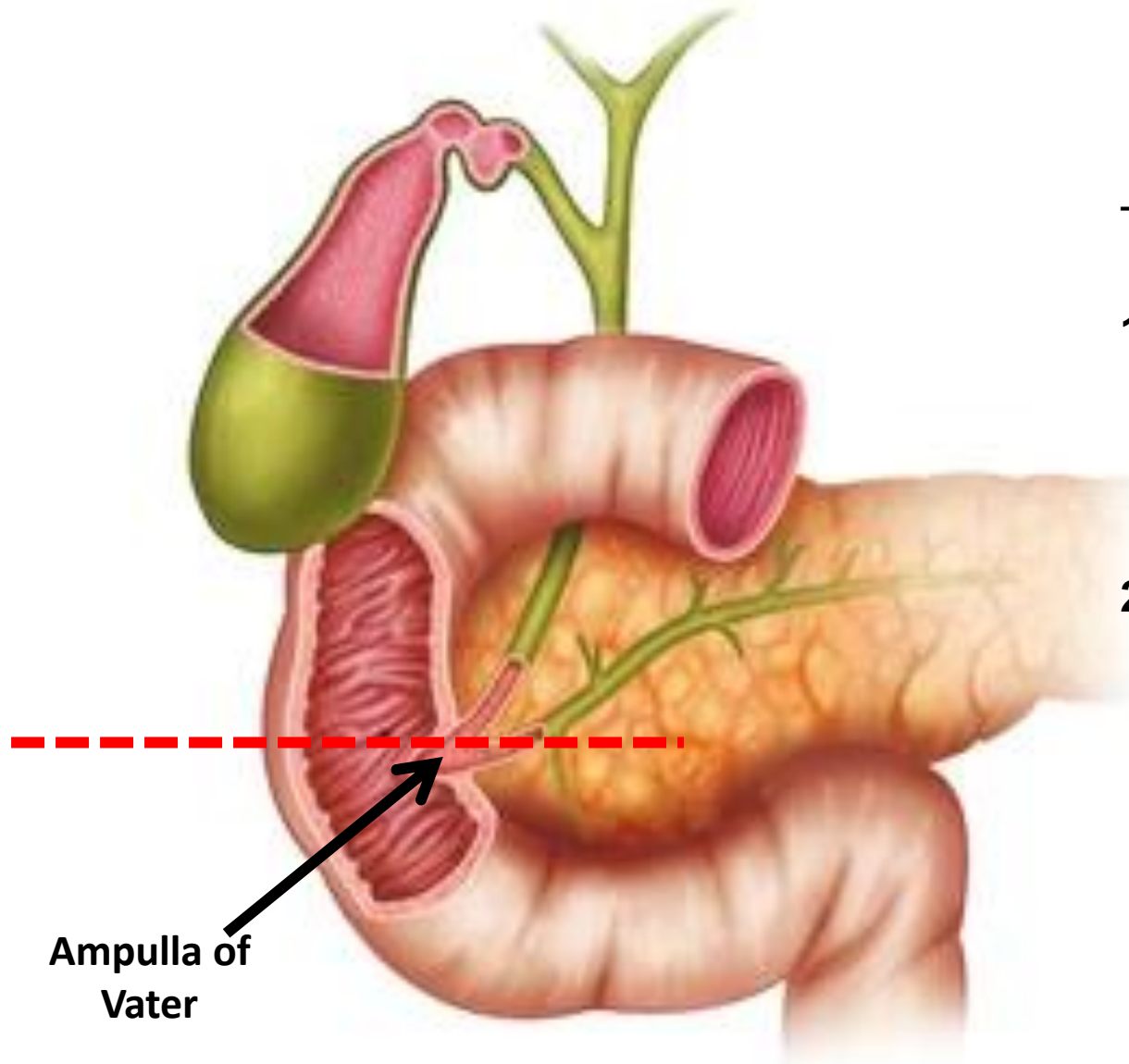
**The small intestines consists of:**  
**[1] Duodenum**  
**[2] Jejunum**  
**[3] Ileum**

# Duodenum

The duodenum is  
the first part of the small intestine.



# Duodenum



The duodenum is divisible into

## 1. supra-ampullary part

- lies above the opening of the common bile duct (ampulla of Vater)
- develops from **the foregut**

## 2. infra-ampullary part

- lies below the opening of the common bile duct (ampulla of Vater)
- develops from **the midgut**

Ampulla of  
Vater

# Duodenum

- Duodenum is the widest, shortest, & most fixed part of the small intestine. Therefore, the duodenum is tightly attached to posterior abdominal wall
- It forms like the letter “C” with the concavity fitted around the head of the pancreas & faces to the left.



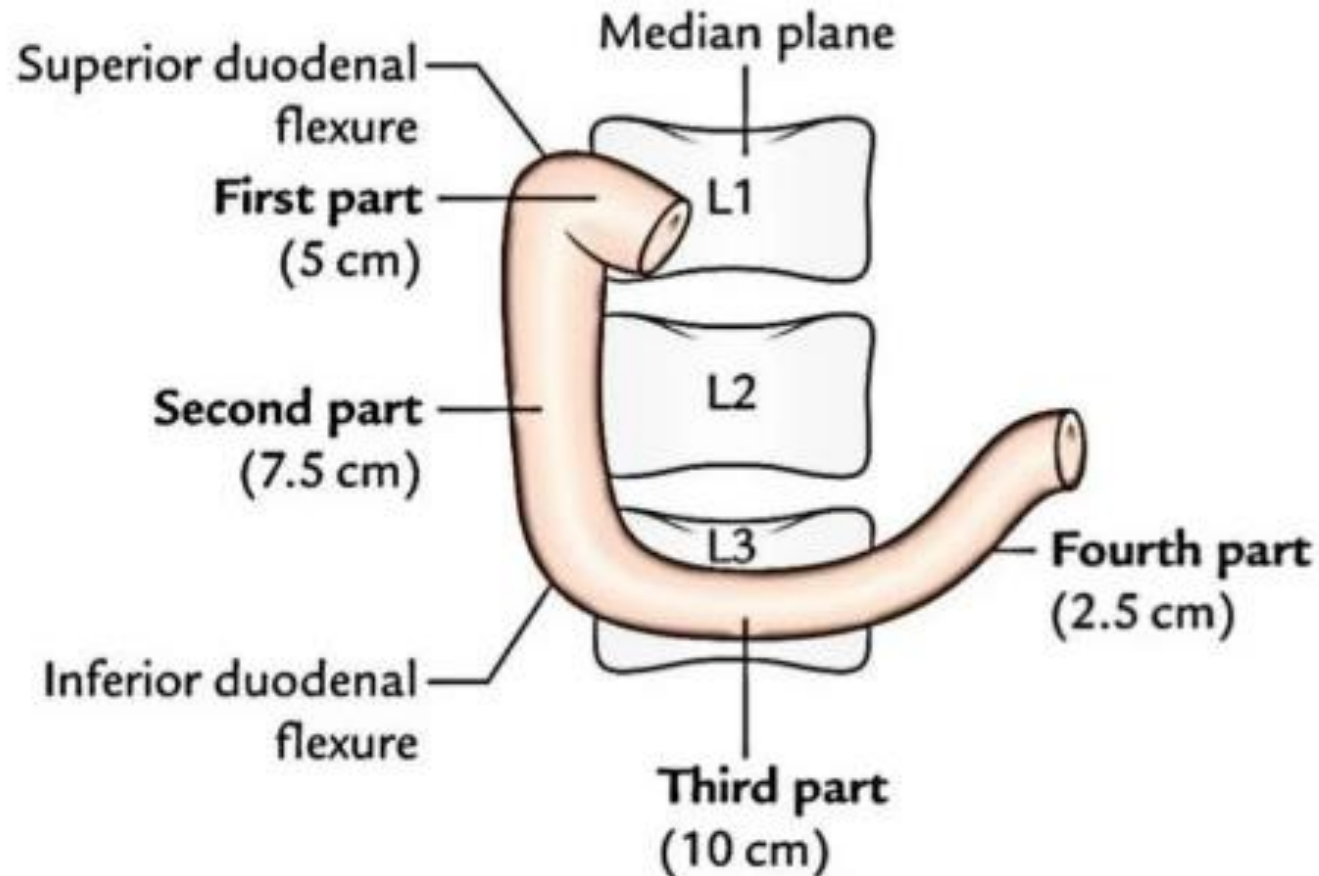


# Duodenum

It is divided into **four parts**

- |   |                 |                     |
|---|-----------------|---------------------|
| • The 1 <sup>st</sup> part or upper part      | - at LV 1 level | - two inches long   |
| • The 2 <sup>nd</sup> part or descending part | - at LV 1-3     | - three inches long |
| • The 3 <sup>rd</sup> part or horizontal part | - at LV 3`      | - four inches long  |
| • The 4 <sup>th</sup> part or ascending part  | - at LV 1 or 2  | - one inch long     |

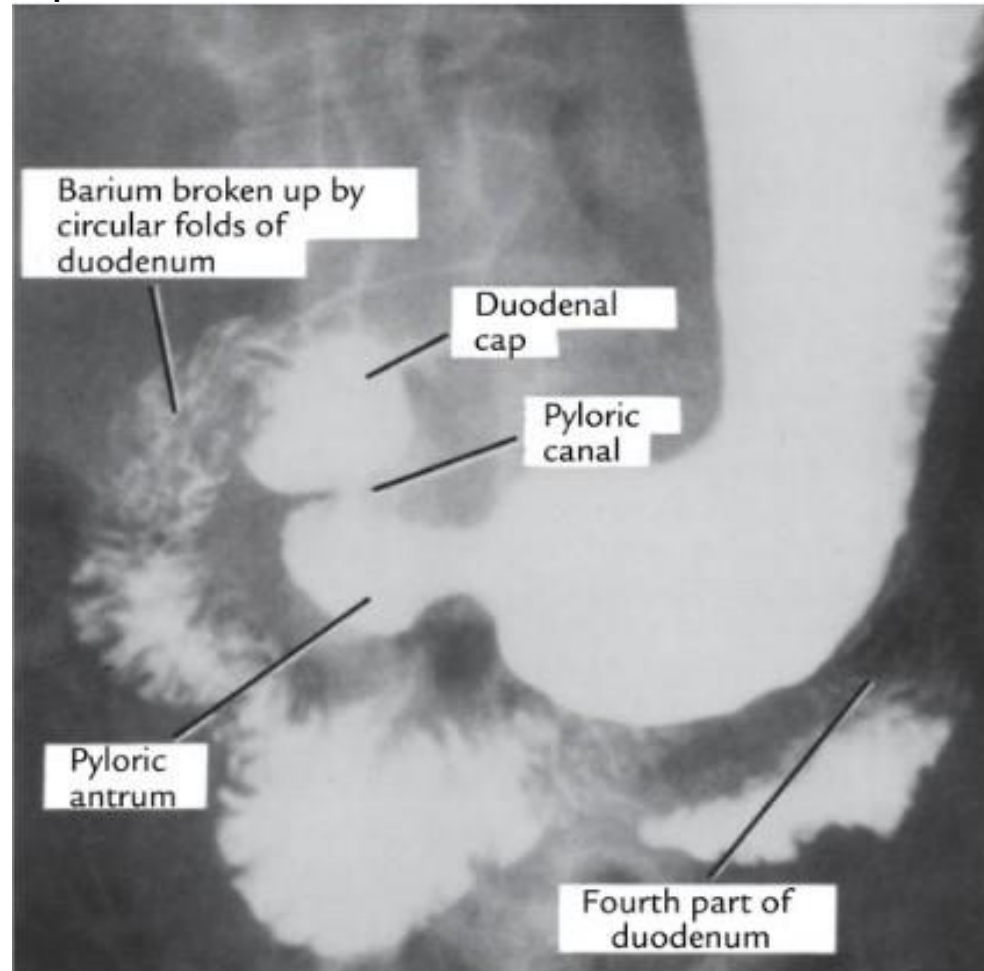
} 10 inches or 25cm long



# Duodenum

## The 1<sup>st</sup> part of the duodenum

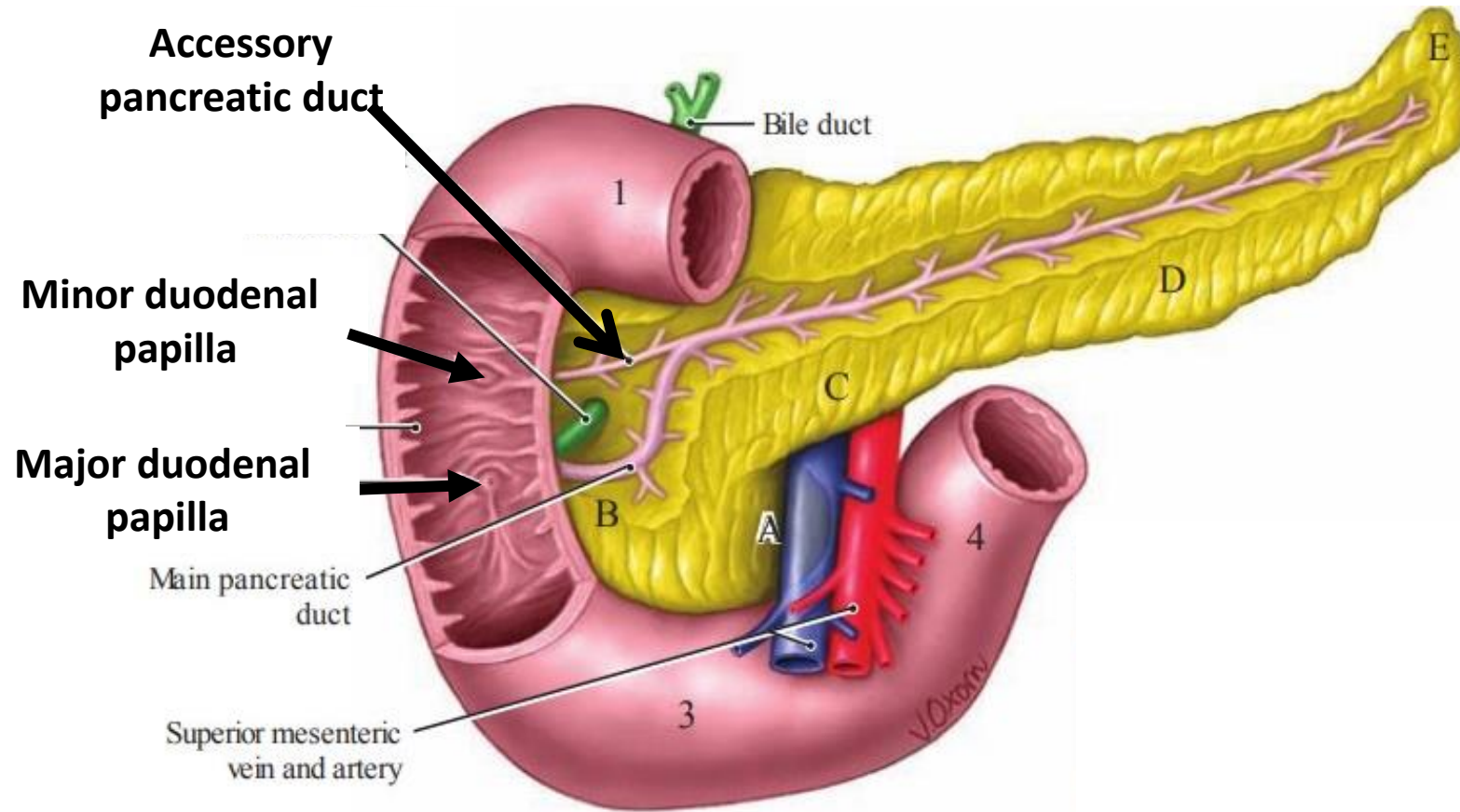
- The proximal half of the 1<sup>st</sup> part is intraperitoneum.
- The 1<sup>st</sup> inch of the 1<sup>st</sup> part of the duodenum is known as the duodenal cap radiologically
- The distal half is retroperitoneum



# Duodenum

## The 2<sup>nd</sup> part of the duodenum

- The common bile duct & the main pancreatic duct unite to form the ampulla of Vater
- The ampulla opens on the major duodenal papilla, in the postero-medial wall of the 2<sup>nd</sup> part
- The opening of the papilla is guarded by the sphincter of Oddi

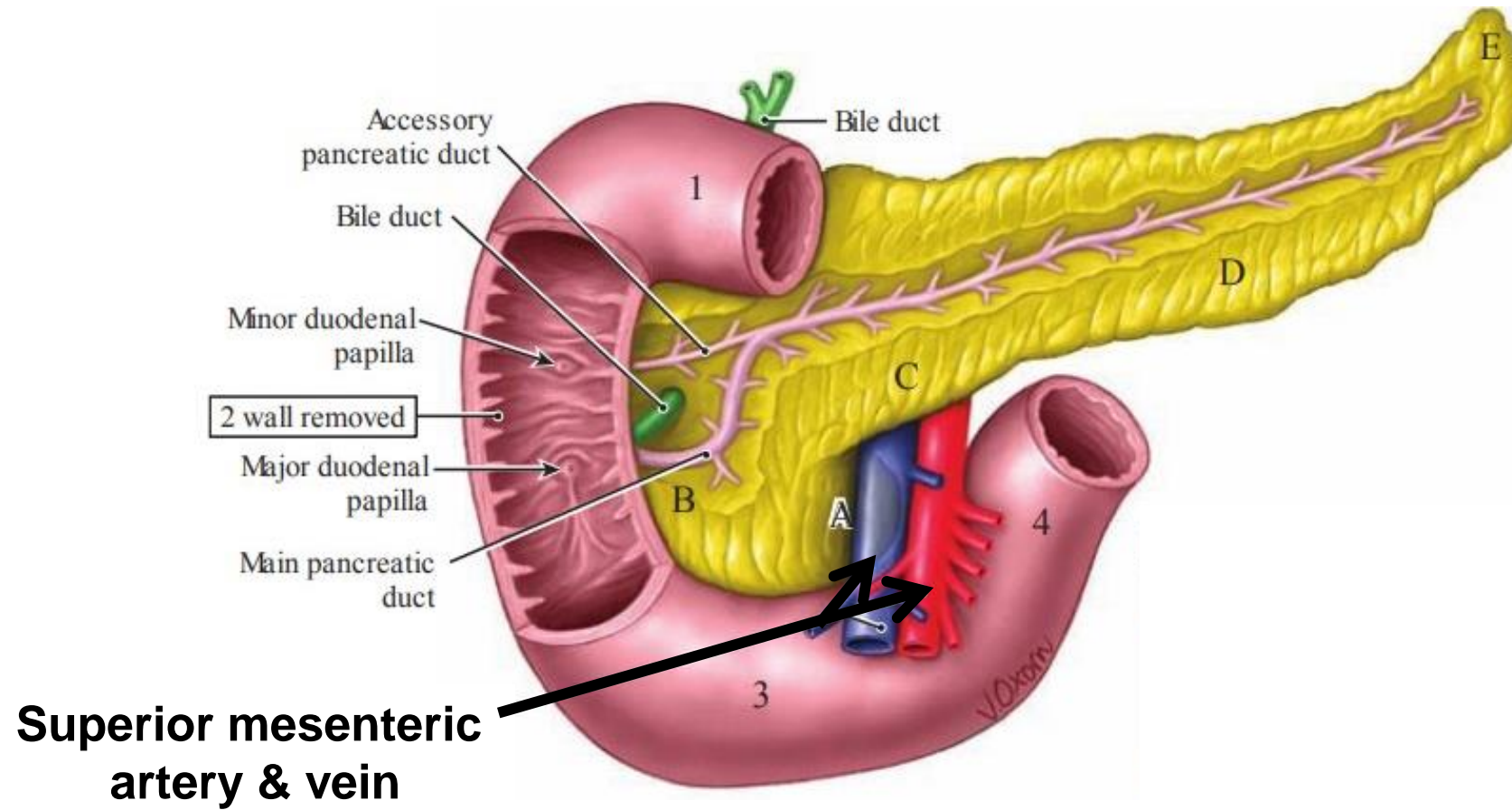




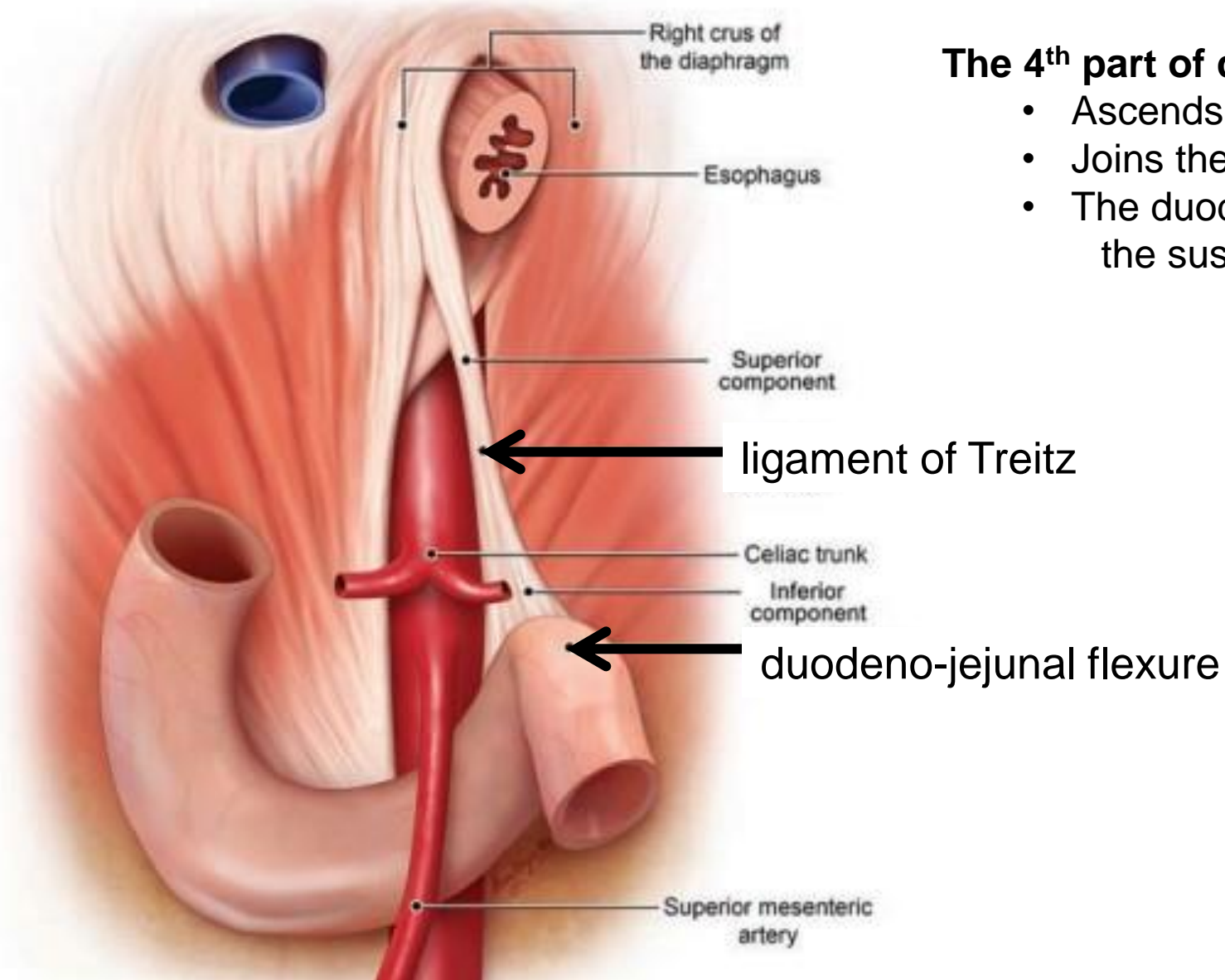
# Duodenum

## The 3<sup>rd</sup> part of the duodenum

- It runs horizontally from right to left.
- The superior mesenteric artery and vein cross anteriorly to it.



# Duodenum



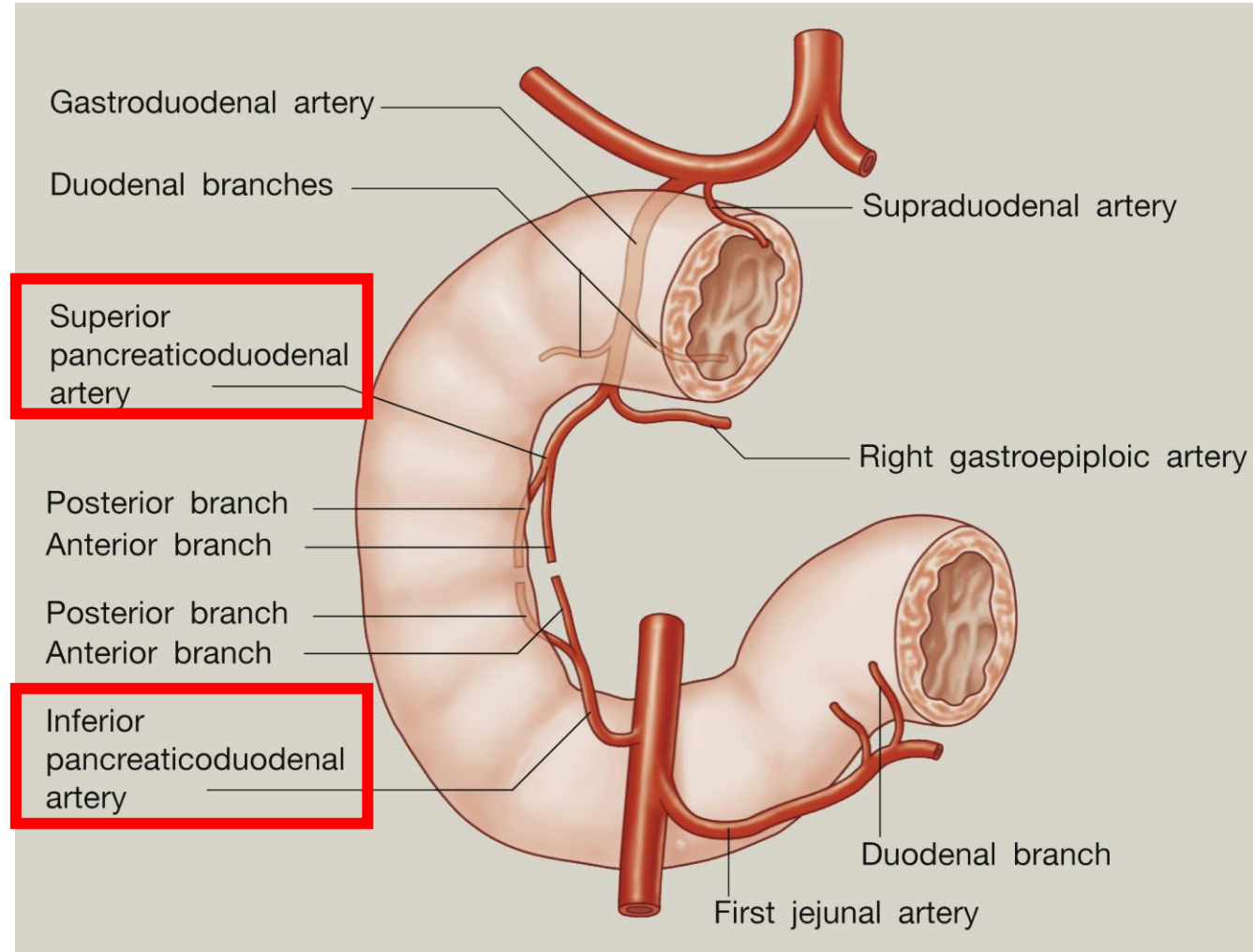
## The 4<sup>th</sup> part of duodenum

- Ascends on the left side of aorta
- Joins the jejunum at duodeno-jejunal junction
- The duodeno-jejunal flexure is marked by the suspensory ligament of Treitz

# Duodenum

## Arterial supply of duodenum

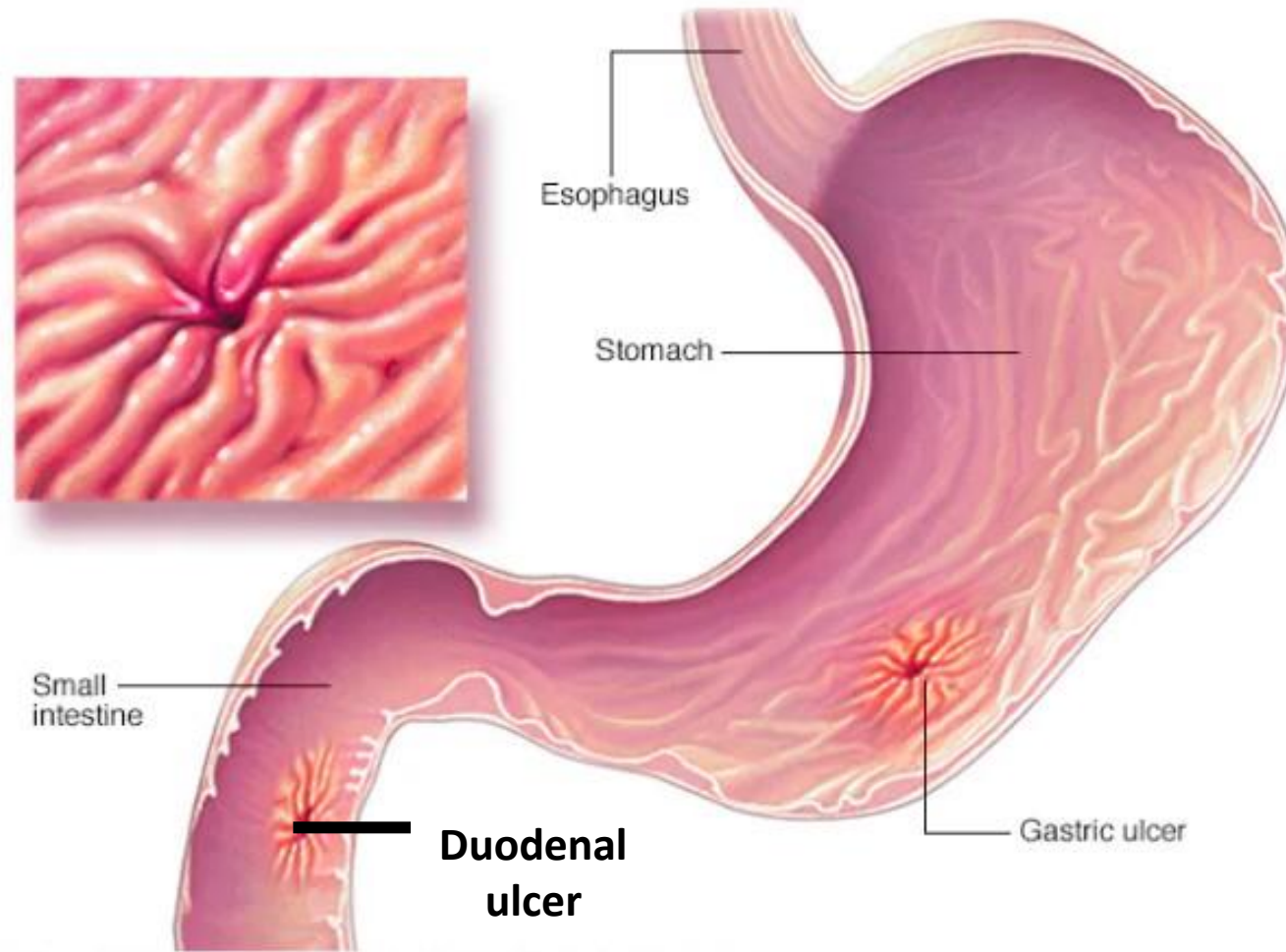
- The supra-ampullary part is supplied by **superior pancreatico-duodenal artery**
- The infra-ampullary part is supplied by **inferior pancreatico-duodenal artery**



# Duodenum

## Applied anatomy

- **Duodenal ulcer** are commonly located in the duodenal cap (1<sup>st</sup> inch of 1<sup>st</sup> part of duodenum)
- **Erosion of the duodenal ulcer** may involve the **gastro-duodenal artery** & cause severe bleeding

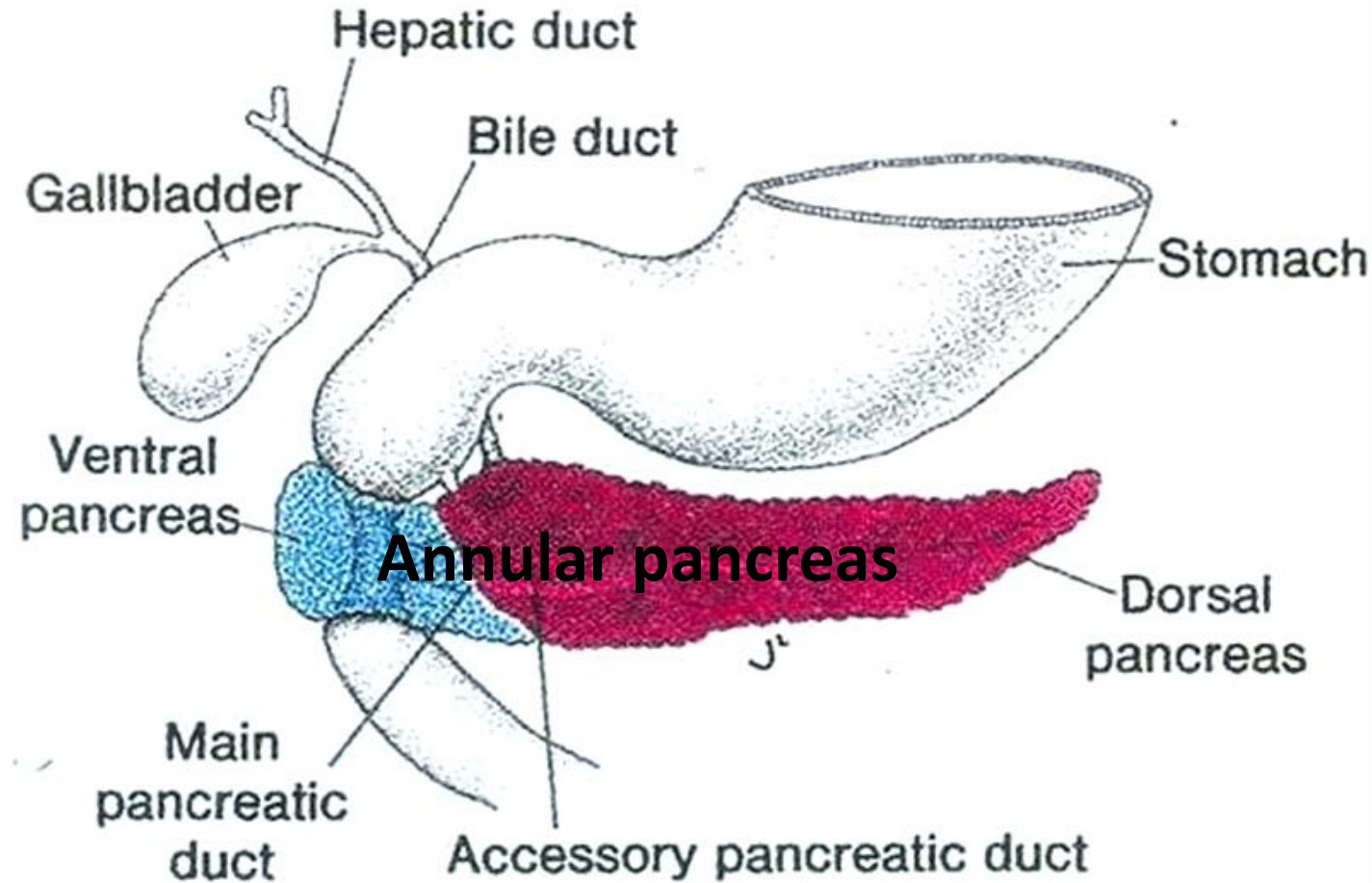




# Duodenum

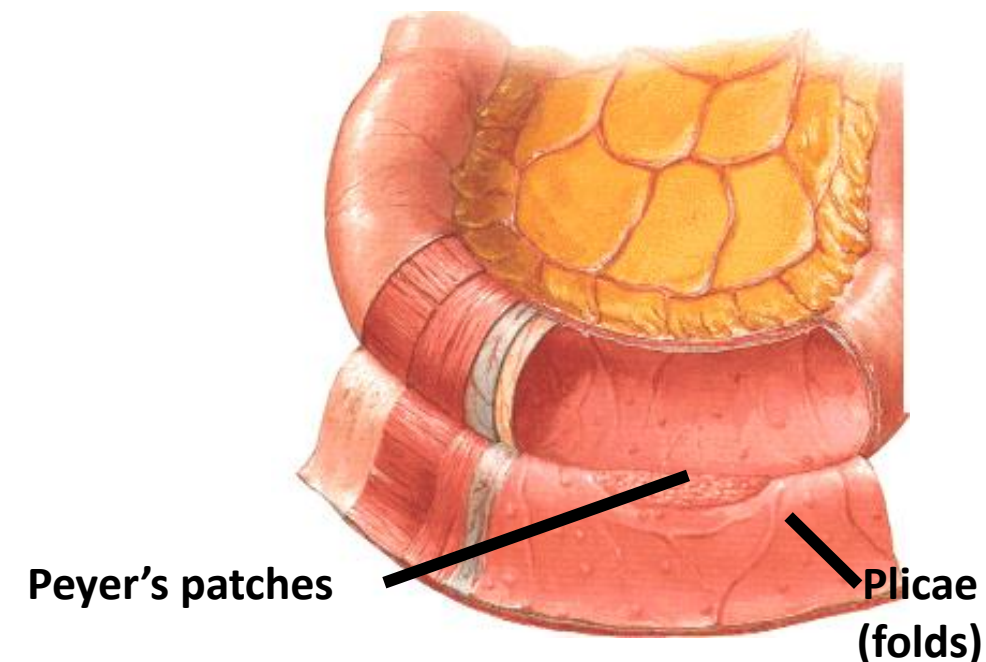
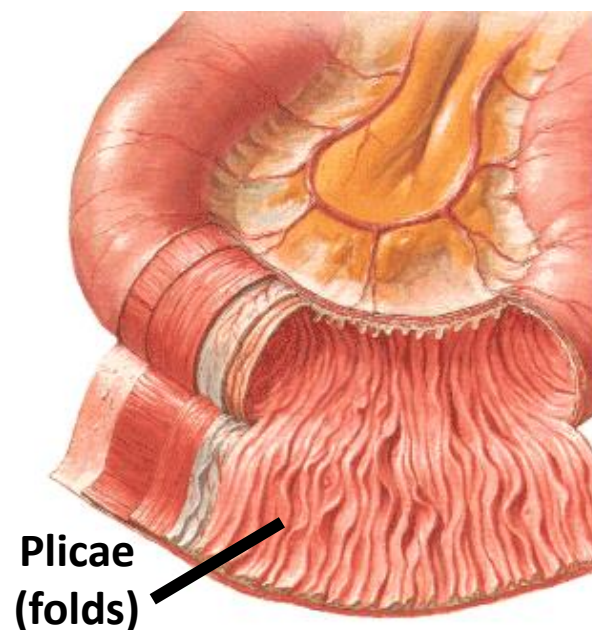
## Applied anatomy

- **Duodenal stenosis** may be associated with **annular pancreas**

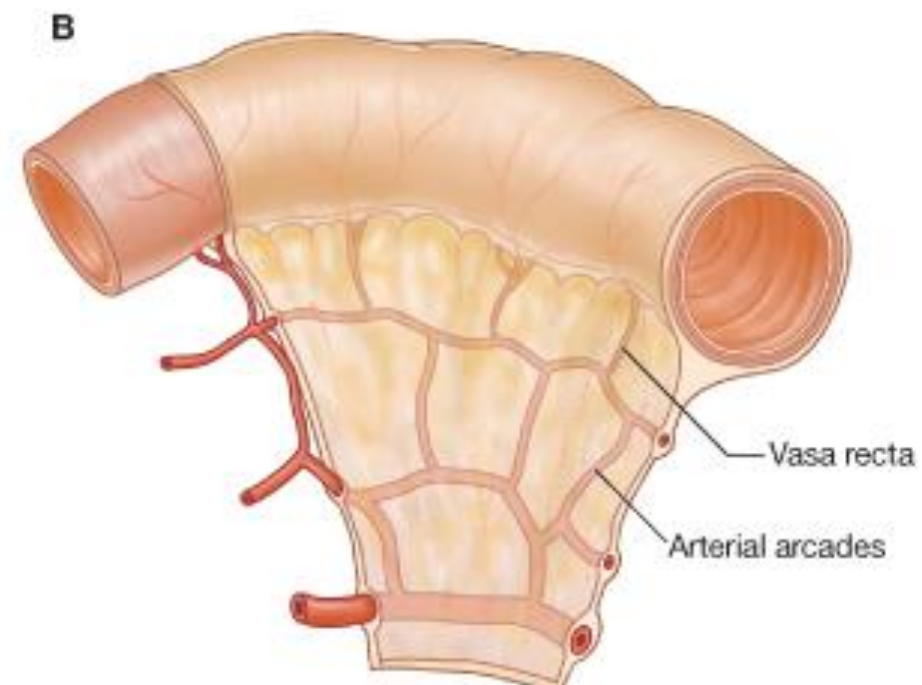
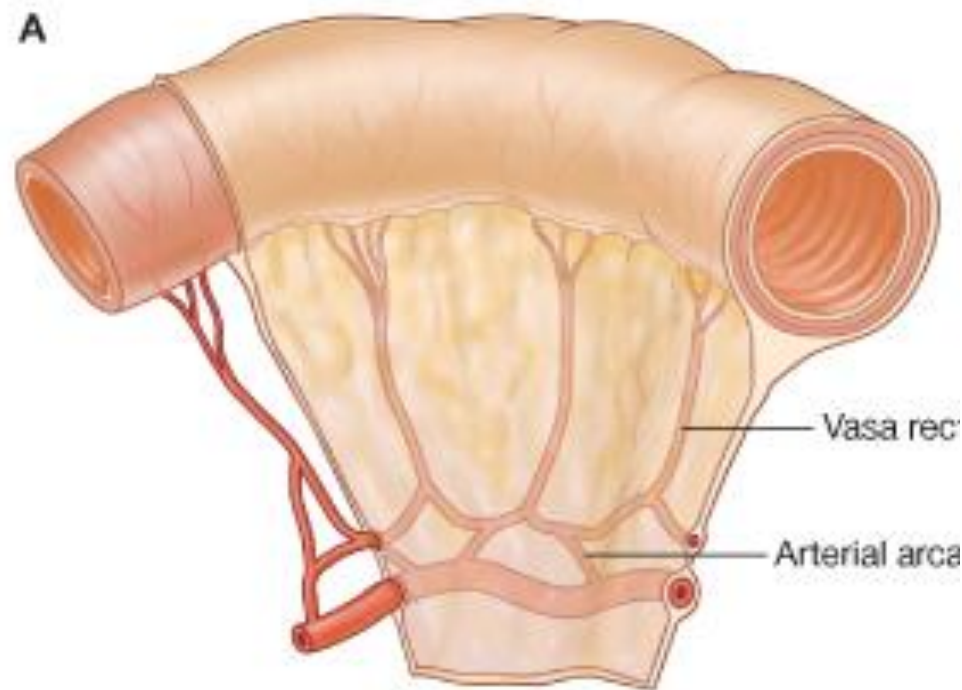




	Jejunum	Ileum
<b>1. Site</b>	umbilical region	hypogastric & inguinal region
<b>2. Diameter</b>	greater (4cm)	smaller (3.5cm)
<b>3. Lumen</b>	often empty	usually not empty
<b>4. Wall</b>	thick, more vascular & redder	thin, less vascular
<b>5. Plicae (folds)</b>	thicker, larger & closely packed	thin, wide apart
<b>6. Peyer's patches</b>	absent	present in the lower part in the anti-mesenteric border



	Jejunum	Ileum
7. mesentery	fat-free, thinner	More fat, thicker
8. Windows	present due to absence of fat in the mesentery	window is absent
9. Vasa recta	long parallel vessels	short parallel
10. Arterial arcades	1 or 2 arcades only	3-4 arcades



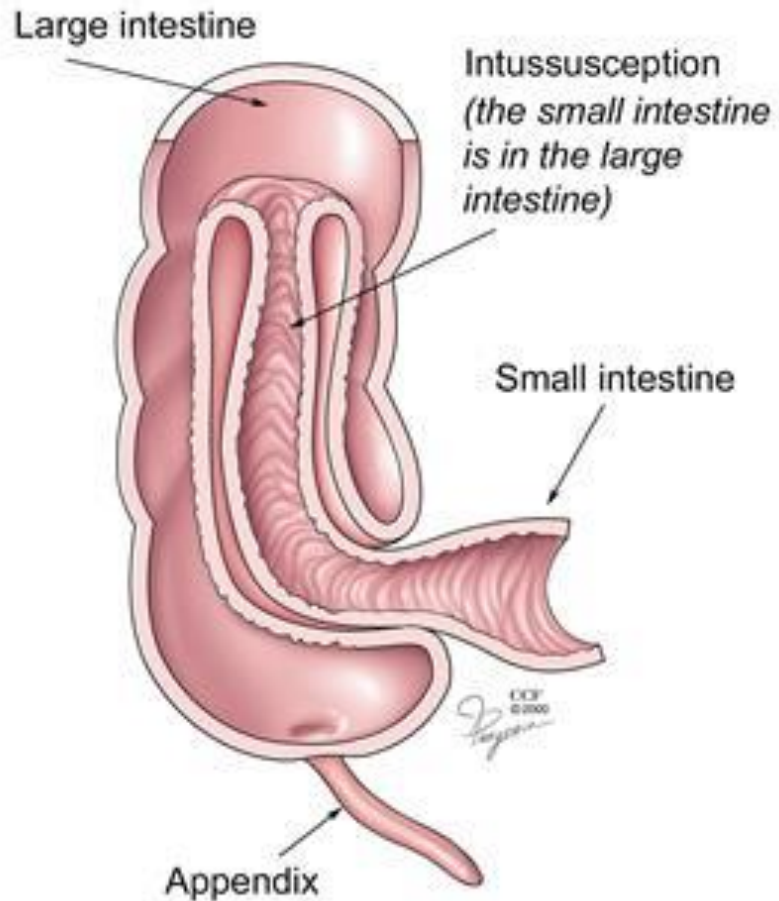
# Applied Anatomy of Small Intestine

1. The small intestine can be excised to 1/3 of its length.
2. It is the commonest site for worm infestation
3. In typhoid, the Peyer's patches become swollen & ulcerated.
4. Congenital anomalies: Meckel's diverticulum, omphalocele, congenital umbilical hernia, left sided colon, reverse rotation of midgut & malrotation of midgut can lead to many surgical conditions

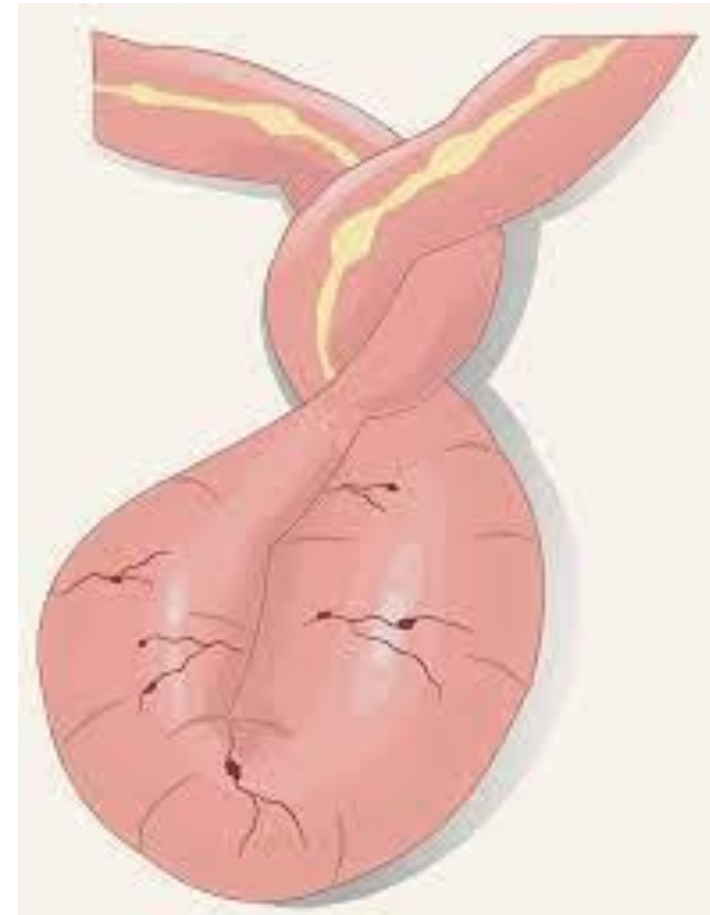


# Applied Anatomy of Small Intestine

## 5. Intestinal obstruction → intussusception, volvulus



**Intussusception**



**Volvulus**

# Figure-references

## Netter Atlas of Anatomy

Netter FH. (2011) *Atlas of human anatomy*. 5<sup>th</sup> Ed. Philadelphia, Pennsylvanian, USA.

## Grant's Atlas of Anatomy

Agur, A. M. R., & Dalley, A. F., II. (2017). *Grant's atlas of anatomy* (Edition 14.). Philadelphia: Wolters Kluwer.

## Websites

<https://www.shutterstock.com/search/ampulla+of+vater>

<https://www.ajronline.org/doi/pdf/10.2214/AJR.20.23273>

<https://www.surgeryjournal.co.uk/article/S0263-9319%2820%2930068-5/fulltext>

<https://www.slideshare.net/Drsanayaseen/anatomy-of-duodenum-248329253>

<https://www.earthslab.com/anatomy/duodenum-and-parts/>





# Text-references and More Readings

## Handout for 2<sup>nd</sup> year B.Med.Tech, Anatomy

### Gray's Anatomy for Students

Gray (2009) *Gray's anatomy for students*. 2<sup>nd</sup> Ed. Churchill Livingstone Elsevier Netter's Atlas

### Moore Clinical Anatomy

Moore KL and Dalley AR. (1999) *Clinically Oriented Anatomy*. 4th Ed. Lippincott Williams & Wilkins, Toronto.

### Netter Atlas of Anatomy

Netter FH. (2011) *Atlas of human anatomy*. 5<sup>th</sup> Ed. Philadelphia, Pennsylvanian, USA.

### Clinical Anatomy

Ellis H. (2006) *Clinical Anatomy*. 11<sup>th</sup> Ed. Massachusetts: Blackware Publishing



# Thank you

