

Biology 323

Human Anatomy for Biology Majors

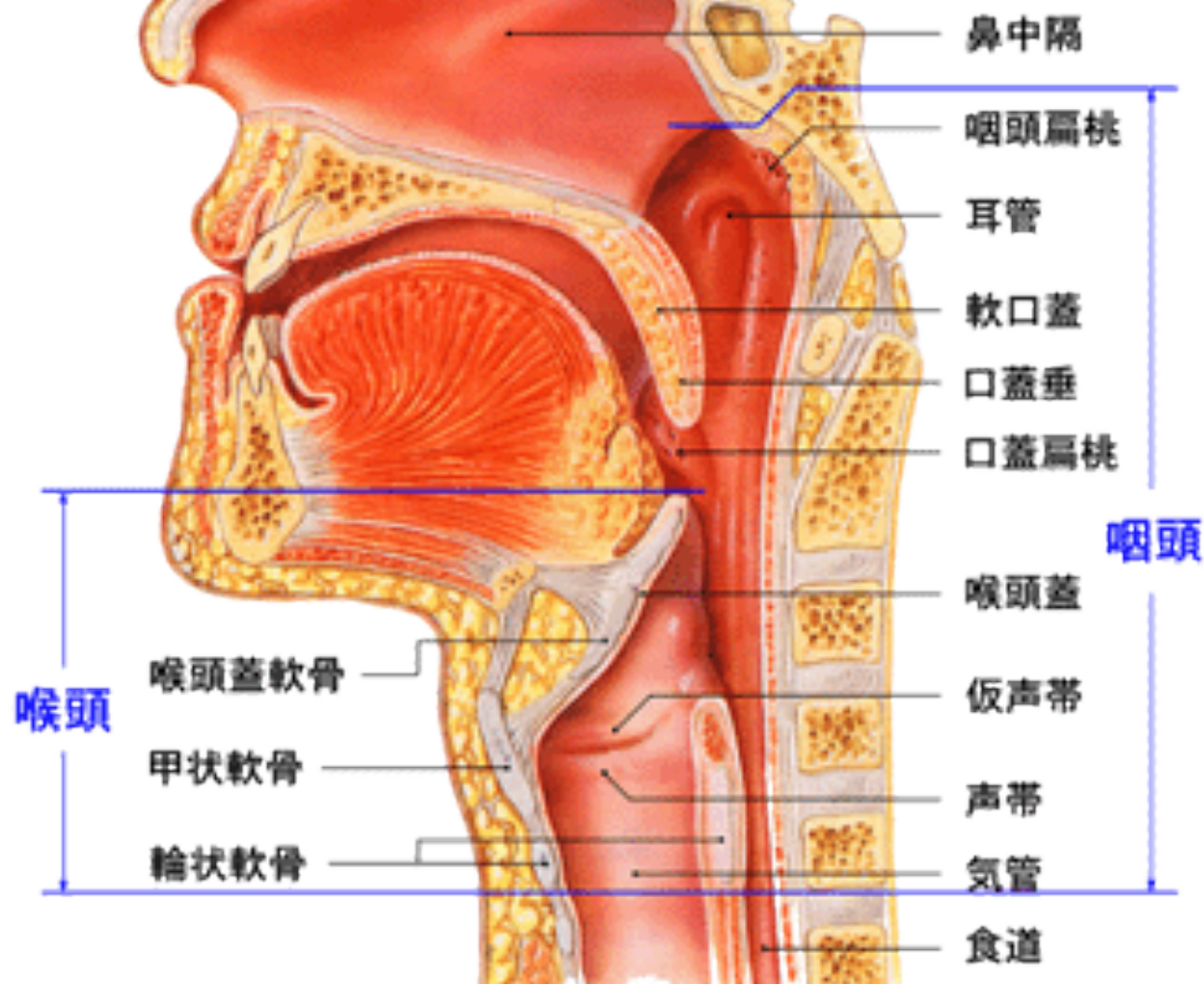
Lecture 13

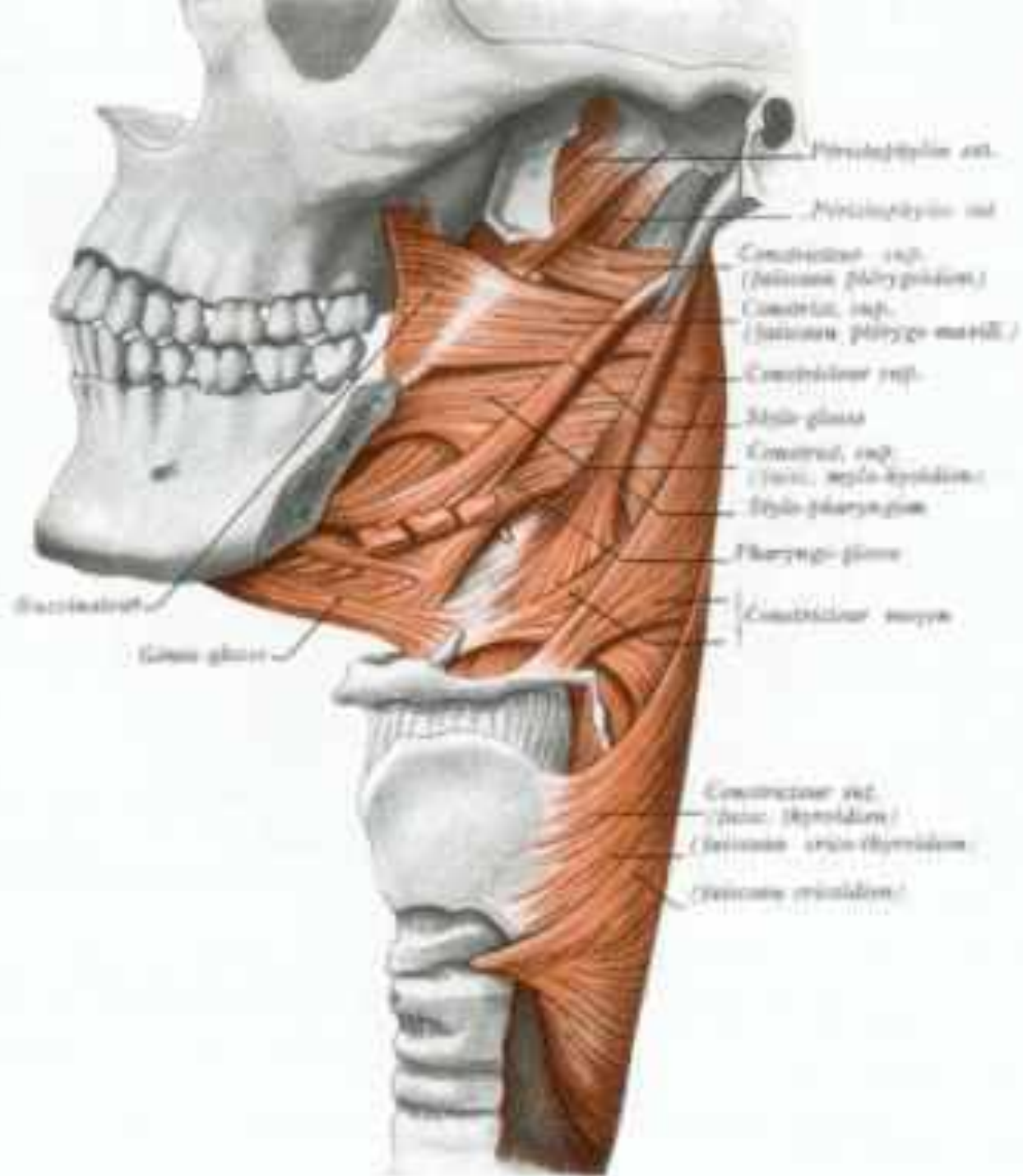
Dr. Stuart S. Sumida

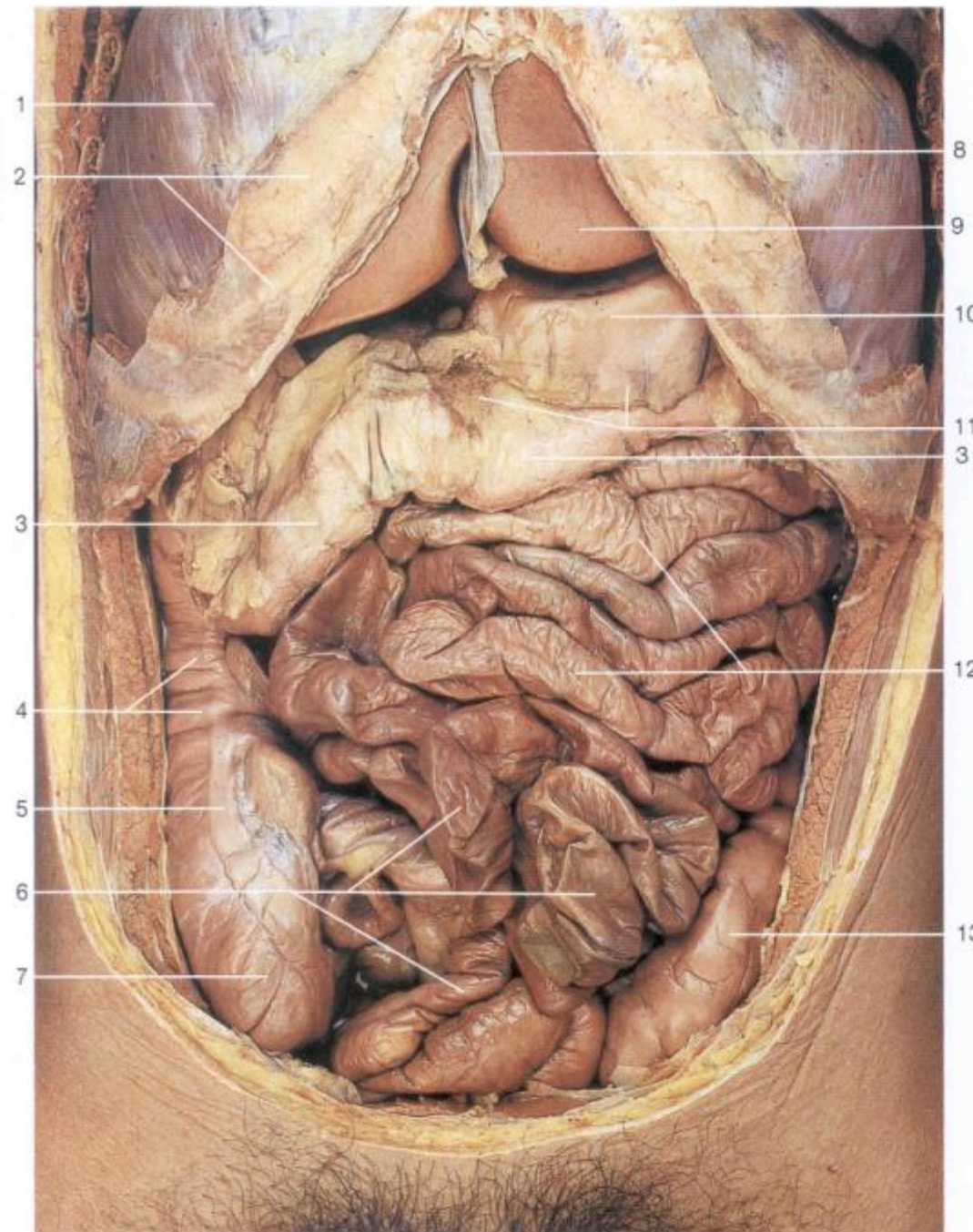
Gut Tube: Development, Structure, Function

咽頭と喉頭

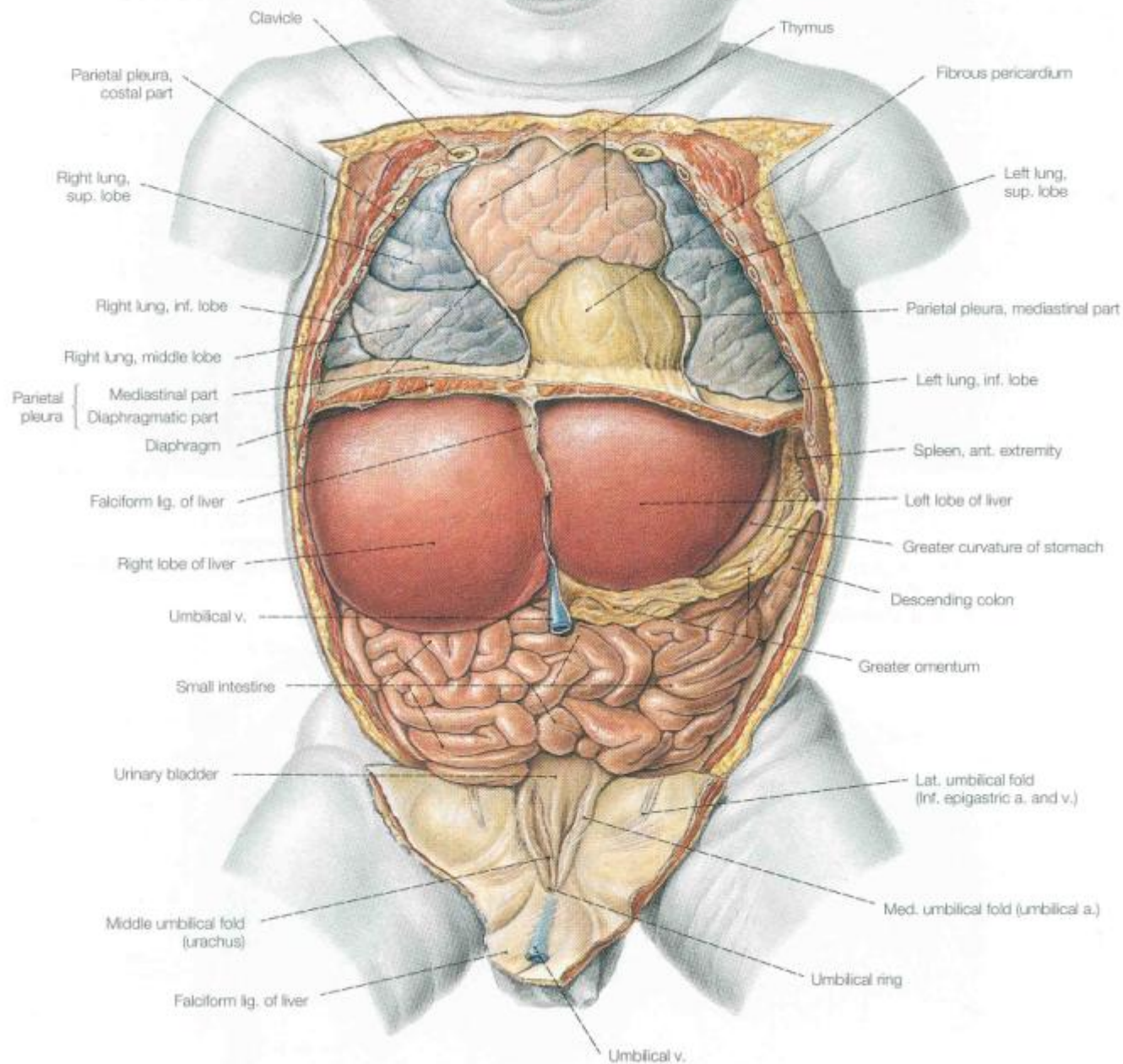
(講談社 からだの地図帳より)







- 1 Diaphragm
- 2 Costal margin
- 3 Transverse colon
- 4 Ascending colon with haustra
- 5 Free taenia of cecum
- 6 **Ileum**
- 7 **Cecum**
- 8 **Falciform ligament of liver**
- 9 Liver
- 10 Stomach
- 11 Gastrocolic ligament
- 12 Jejunum
- 13 Sigmoid colon
- 14 **Vermiform appendix**
- 15 Terminal ileum
- 16 **Mesoappendix**
- 17 Mesentery



1. Implications of Gut Development

Foregut Development

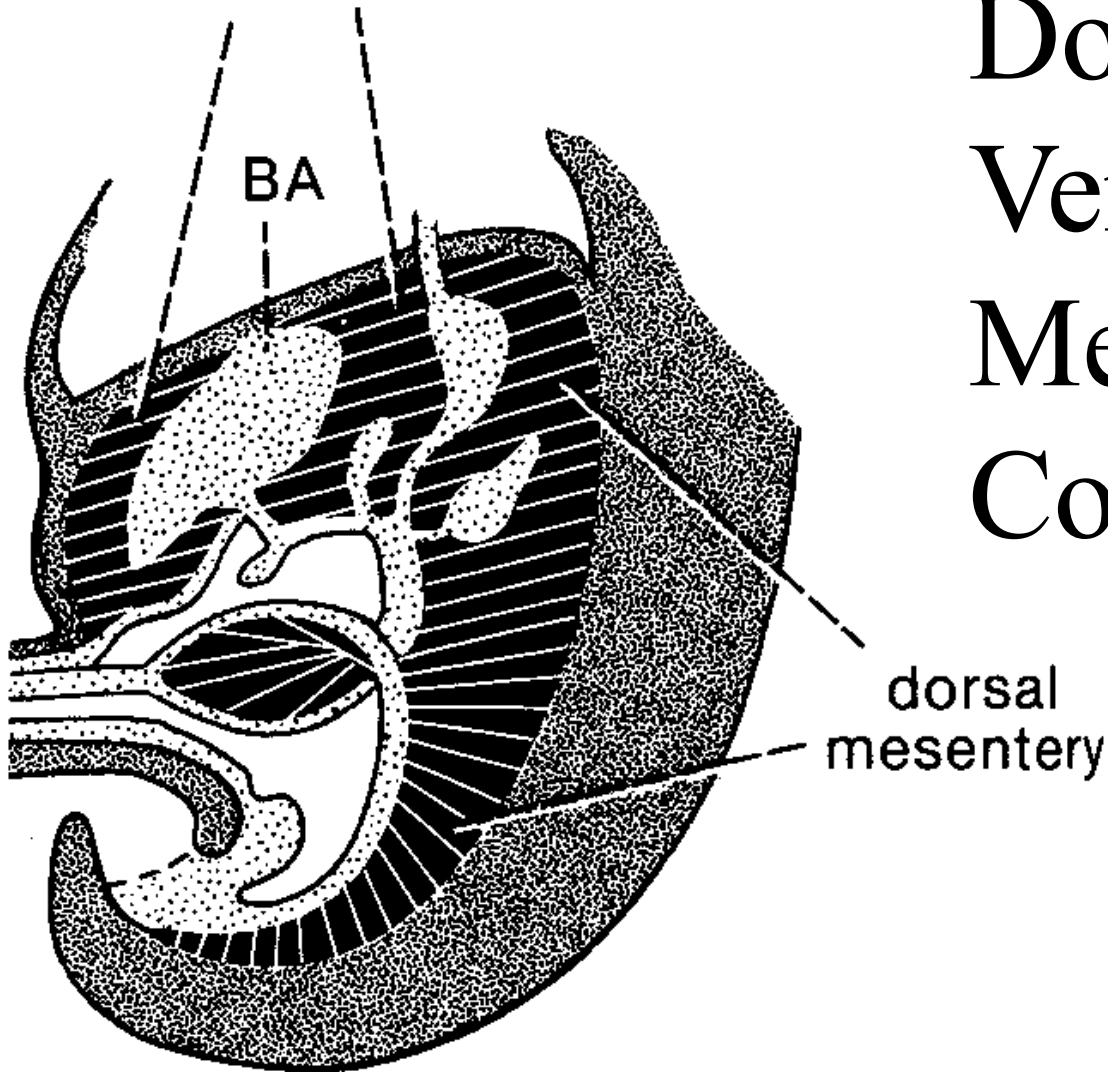
Midgut Development

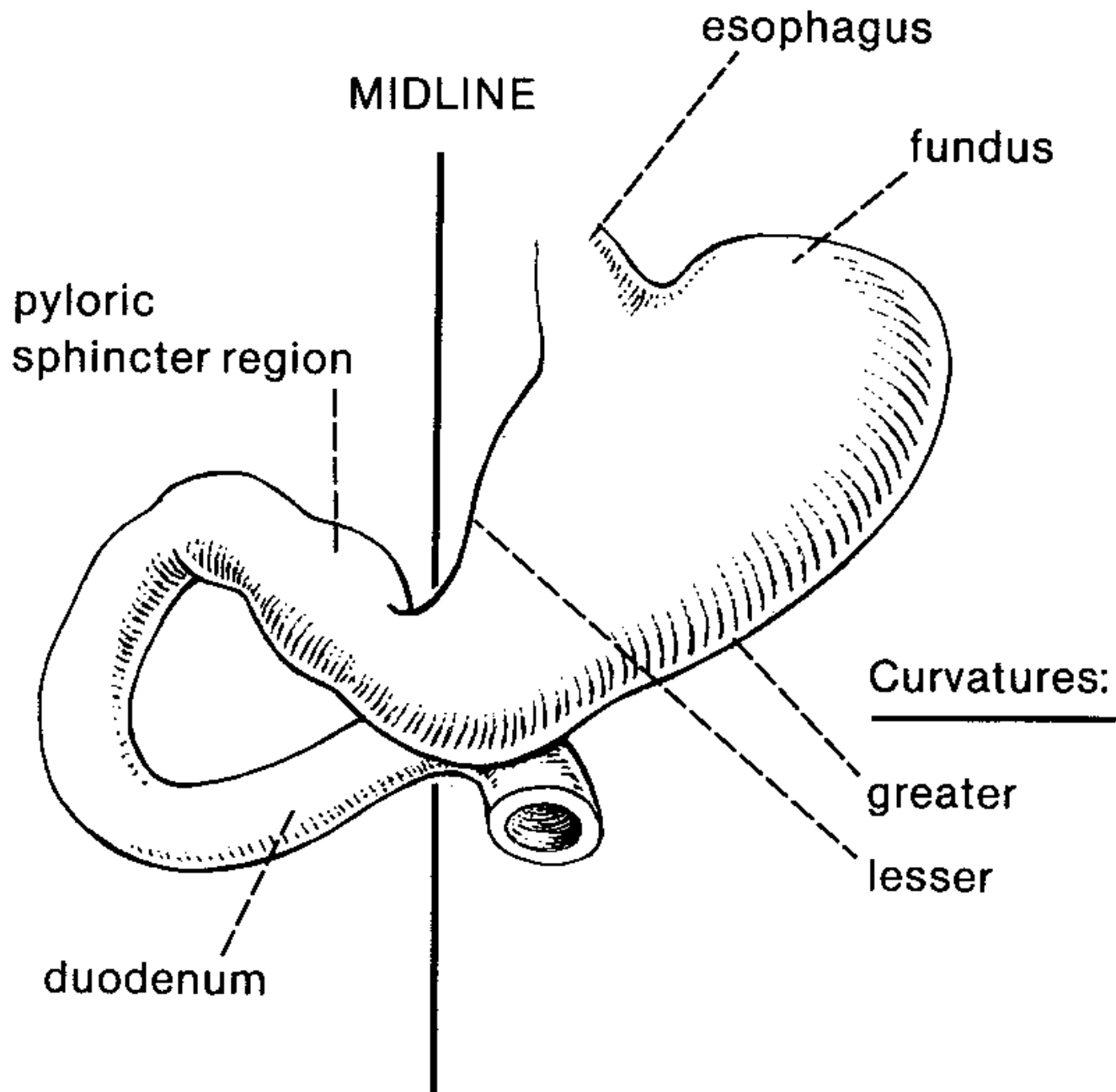
Hindgut Development

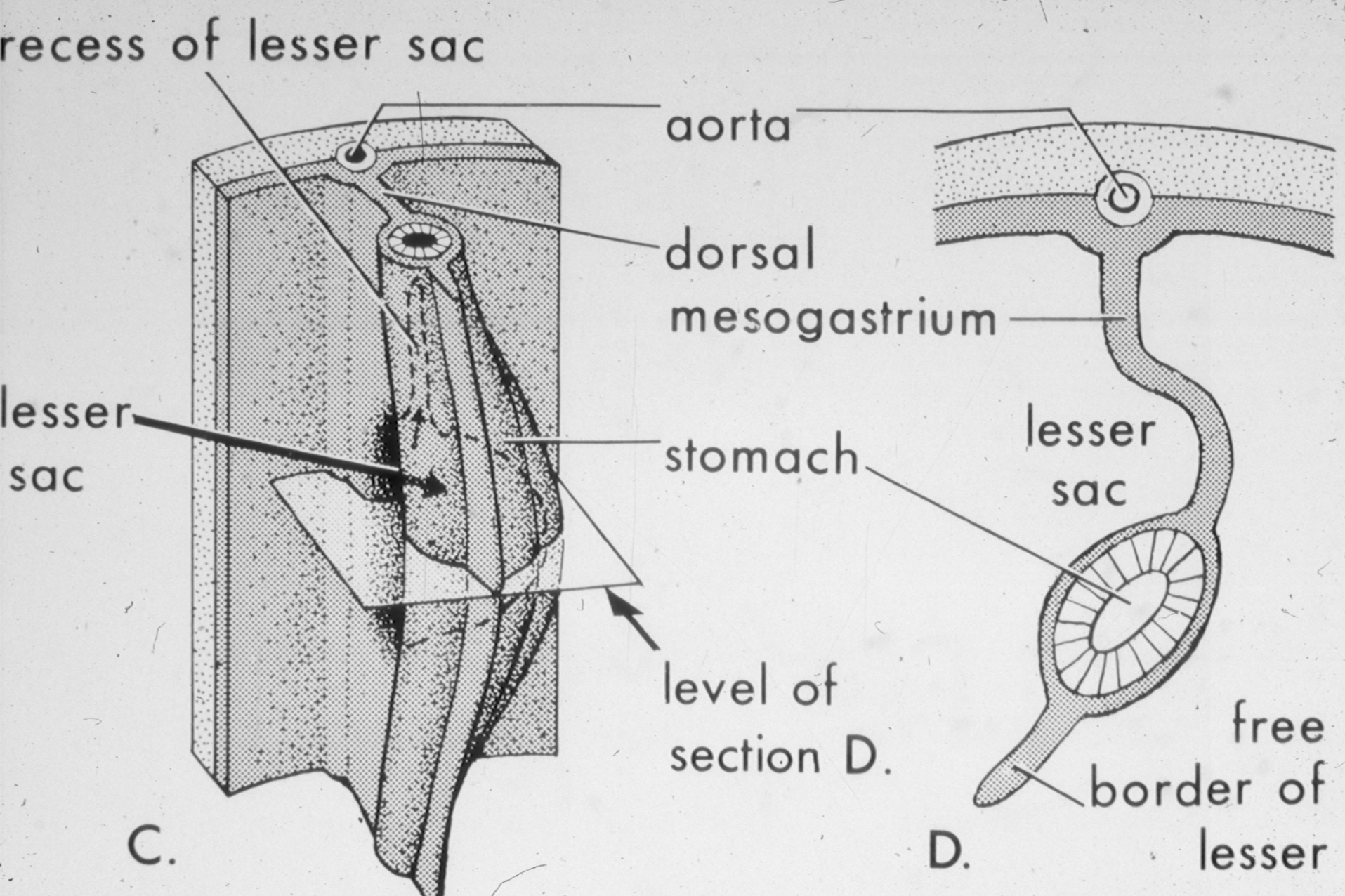
2. Circulation – Part I

ventral mesogastrium

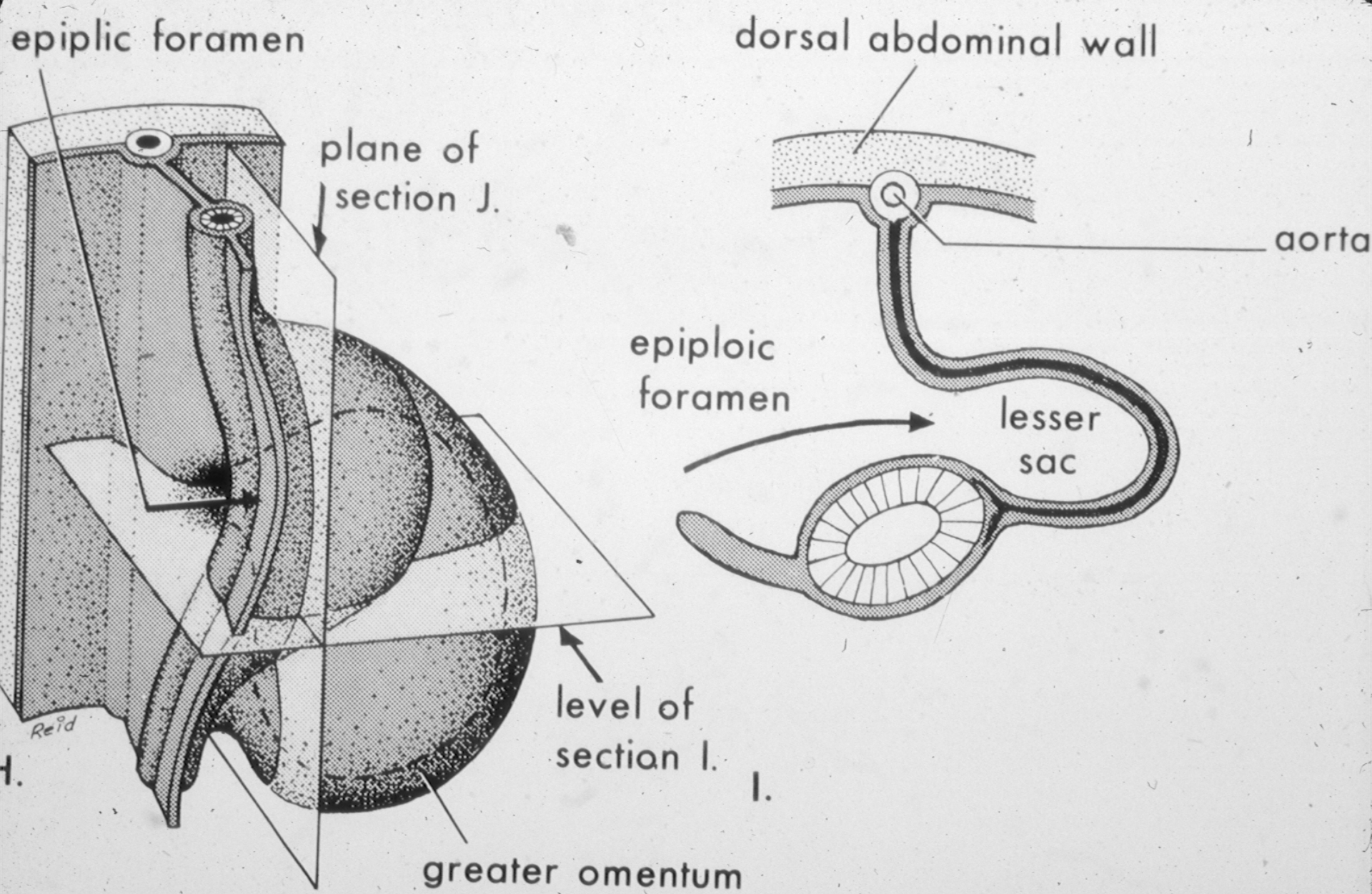
Dorsal vs. Ventral Mesentery Components



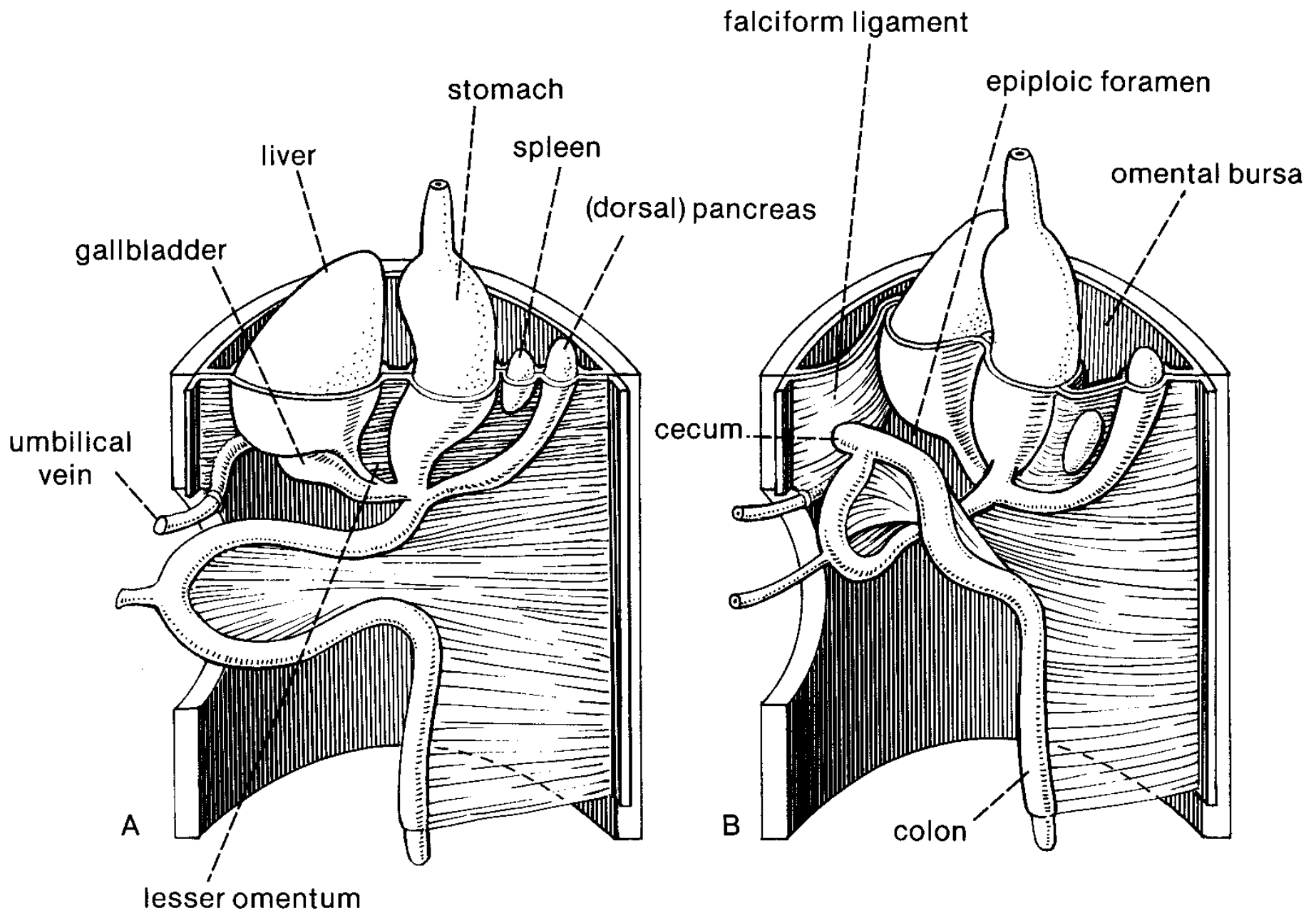




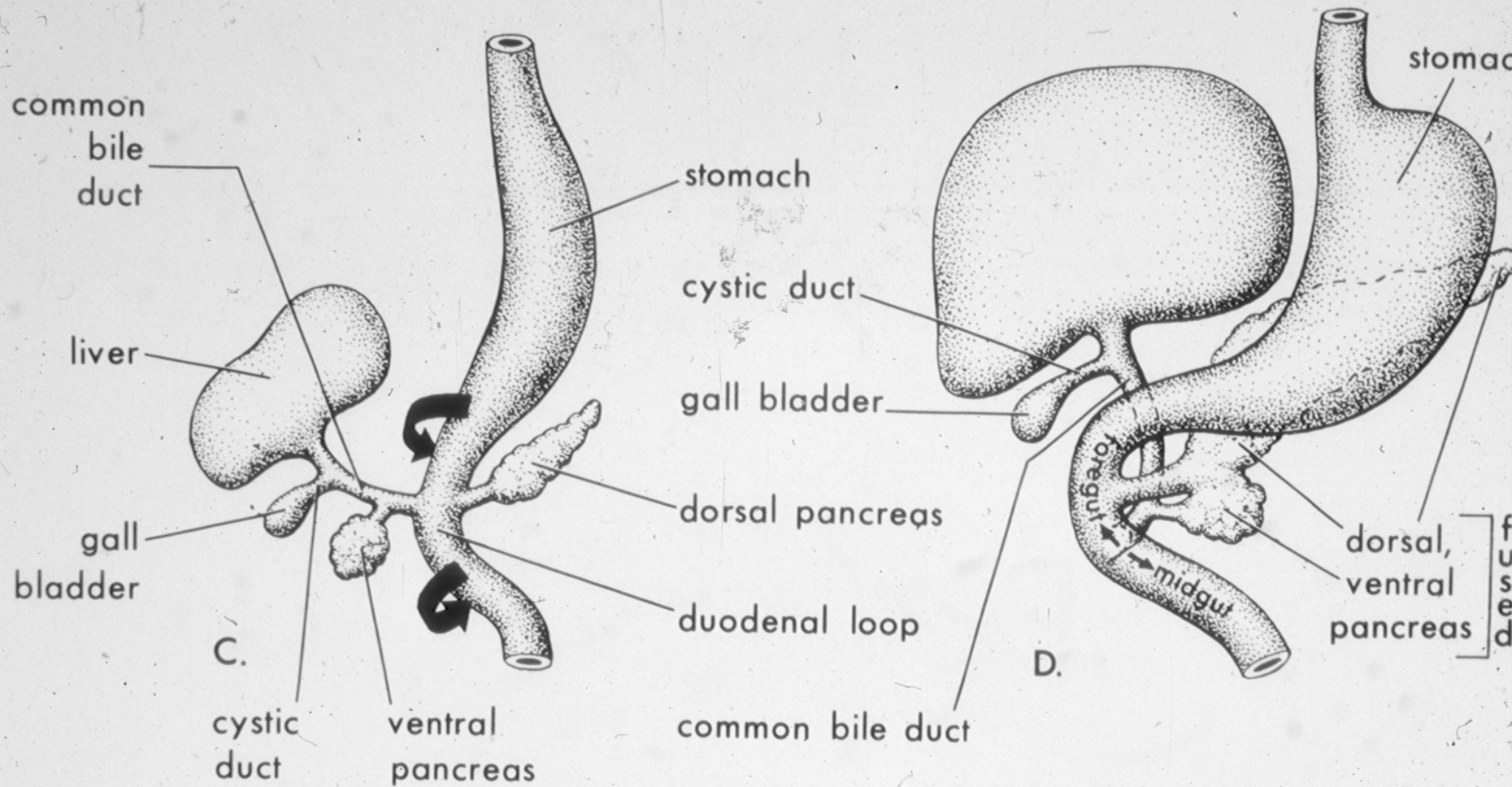
Early Development of the Stomach



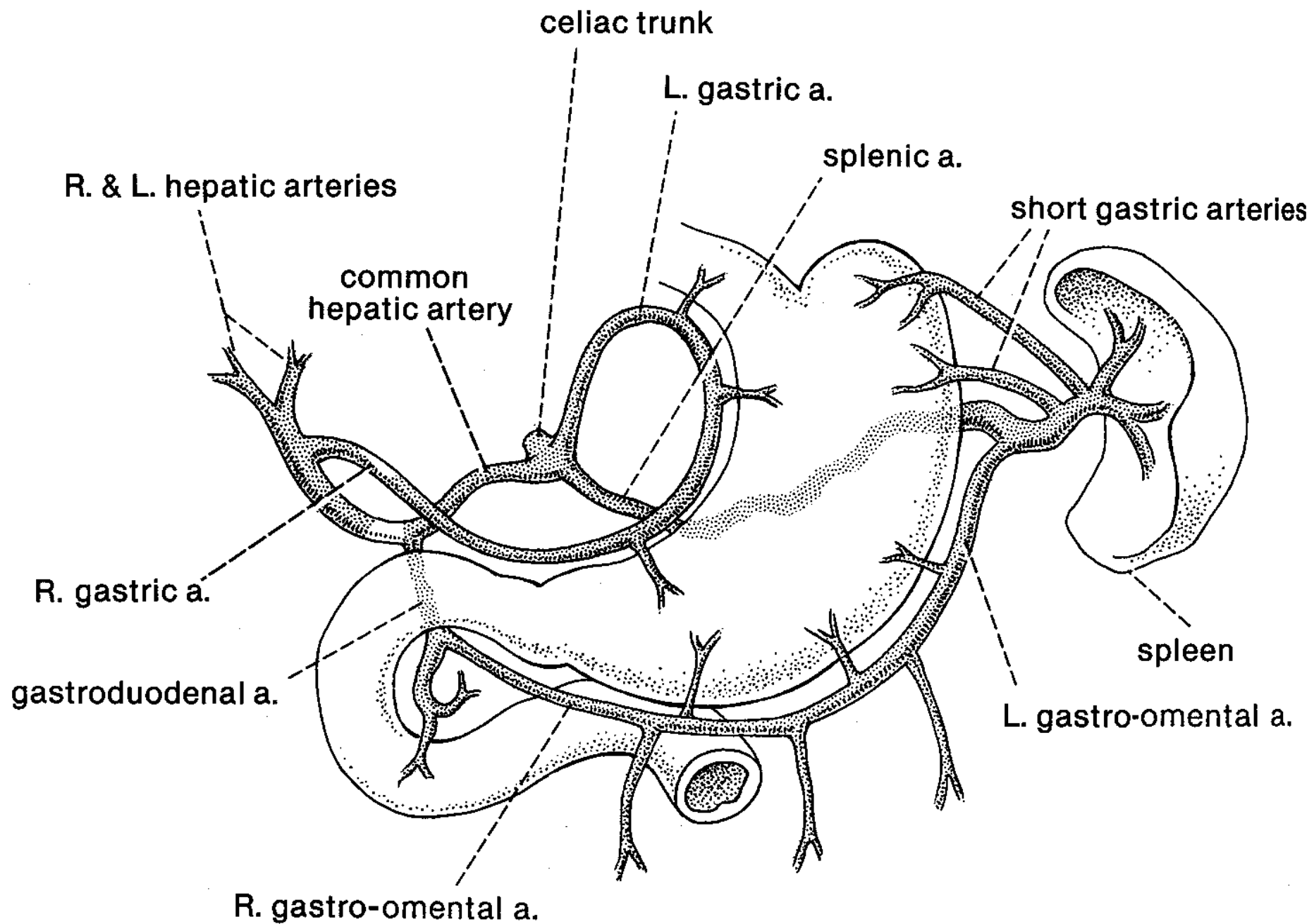
Continued Development of the Stomach

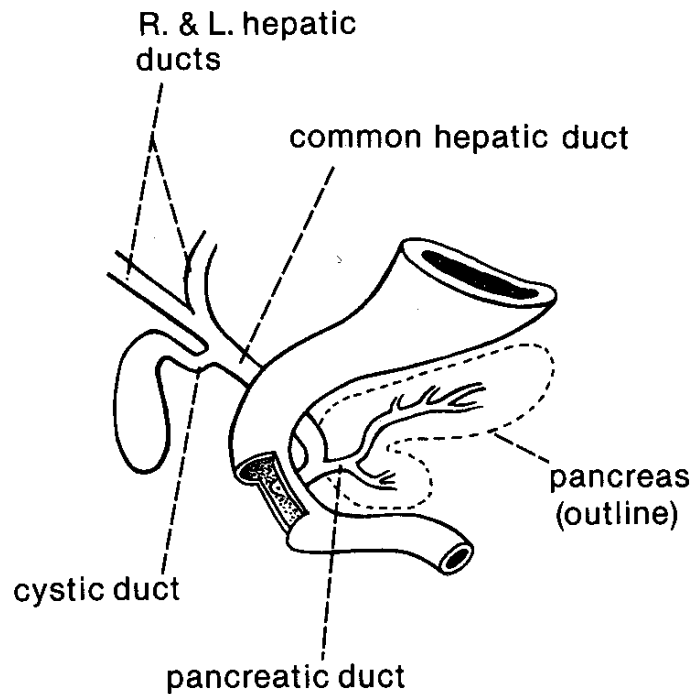
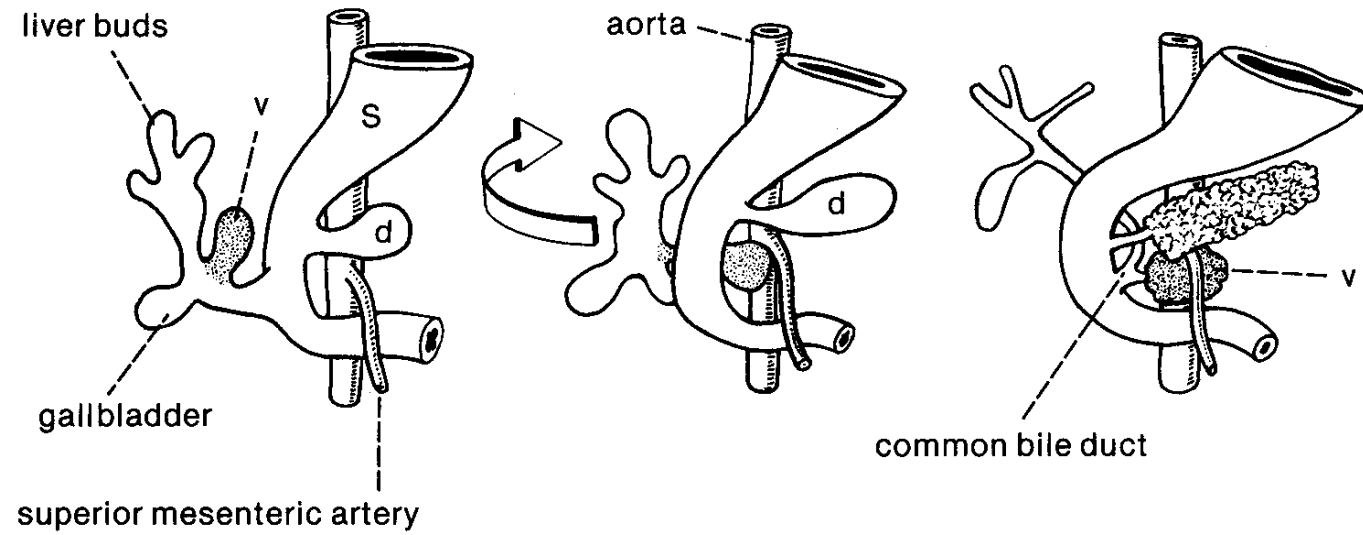


Rotation of the Foregut



Development of diverticula of the foregut





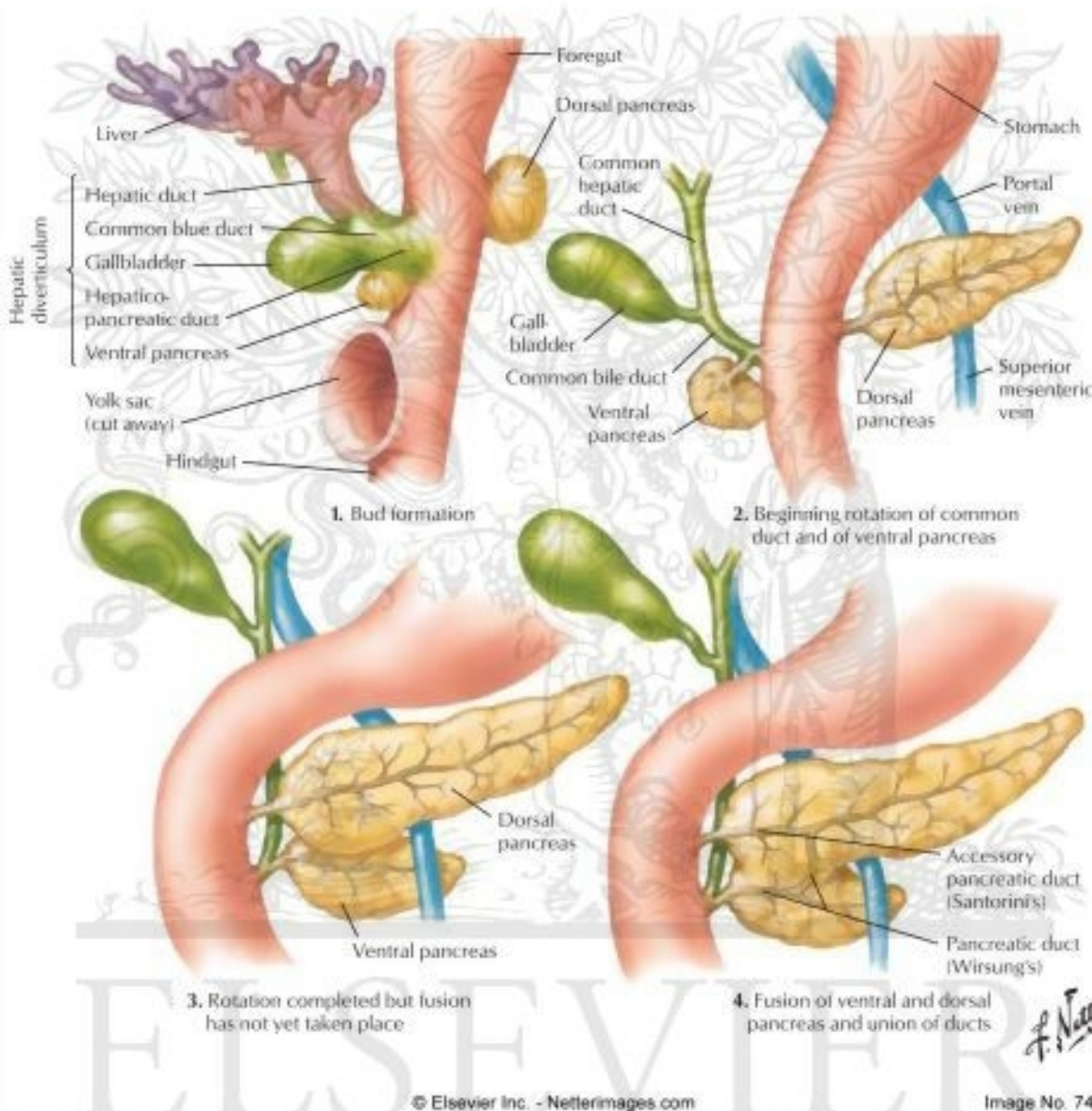
Pancreas Development

Development of Diverticula of Foregut

- Hepatic Diverticulum

- Pancreas originally two separate lobes (ventral part of hepatic diverticulum, dorsal independent.

- Rotation brings dorsal (tail) and ventral components of pancreas together.

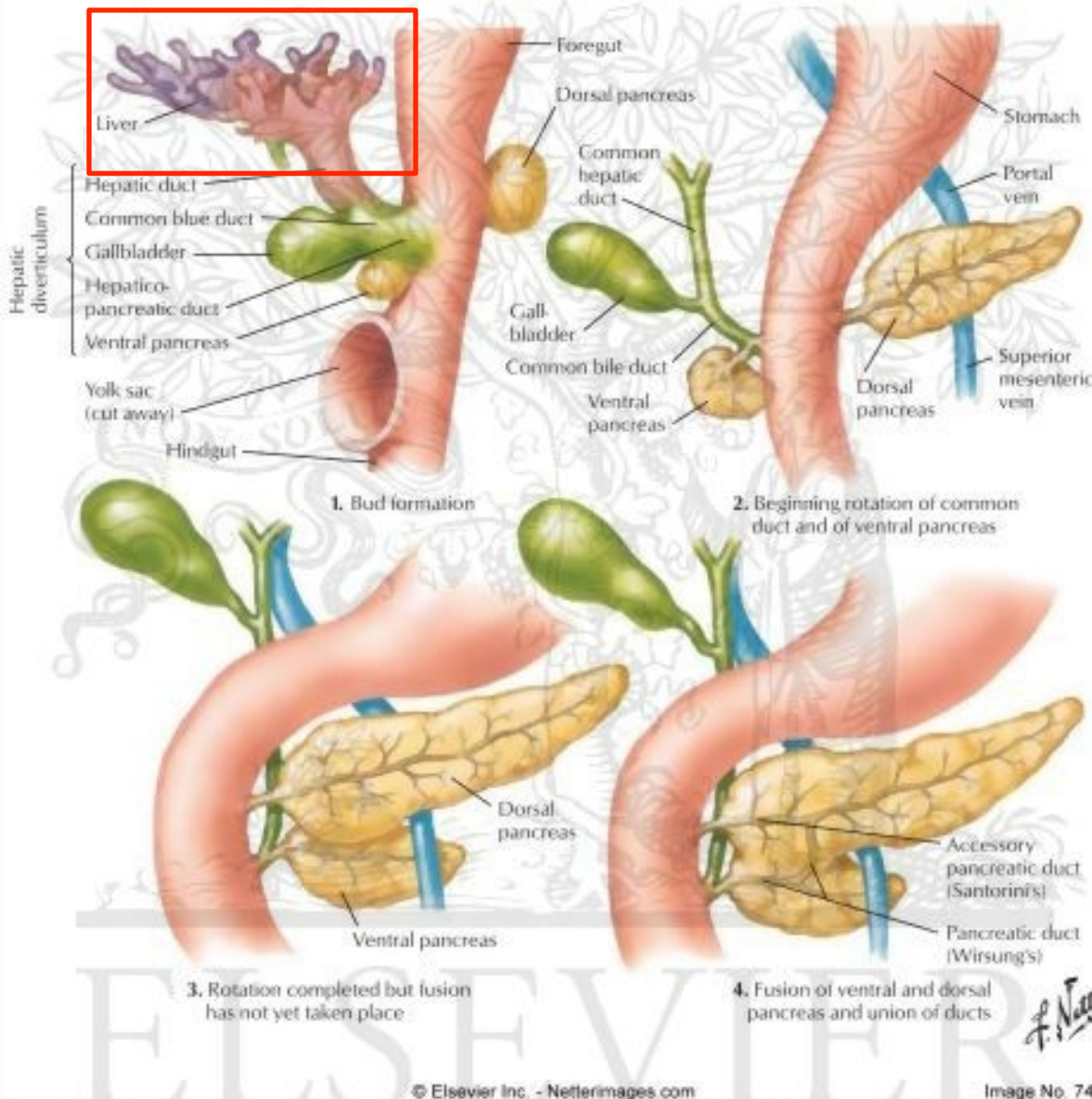


Development of Diverticula of Foregut

Hepatic Diverticulum

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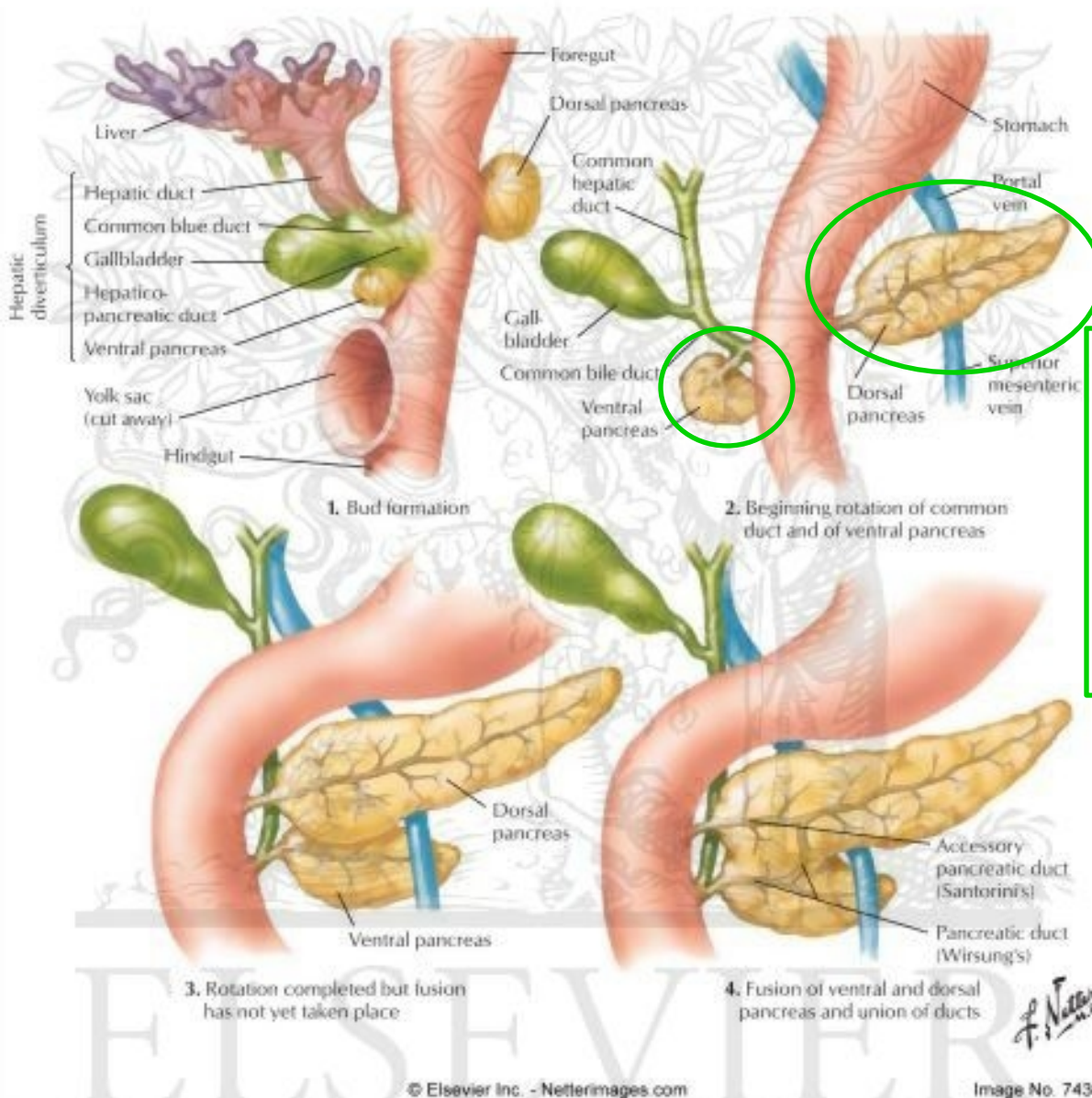


Development of Diverticula of Foregut

•Hepatic Diverticulum

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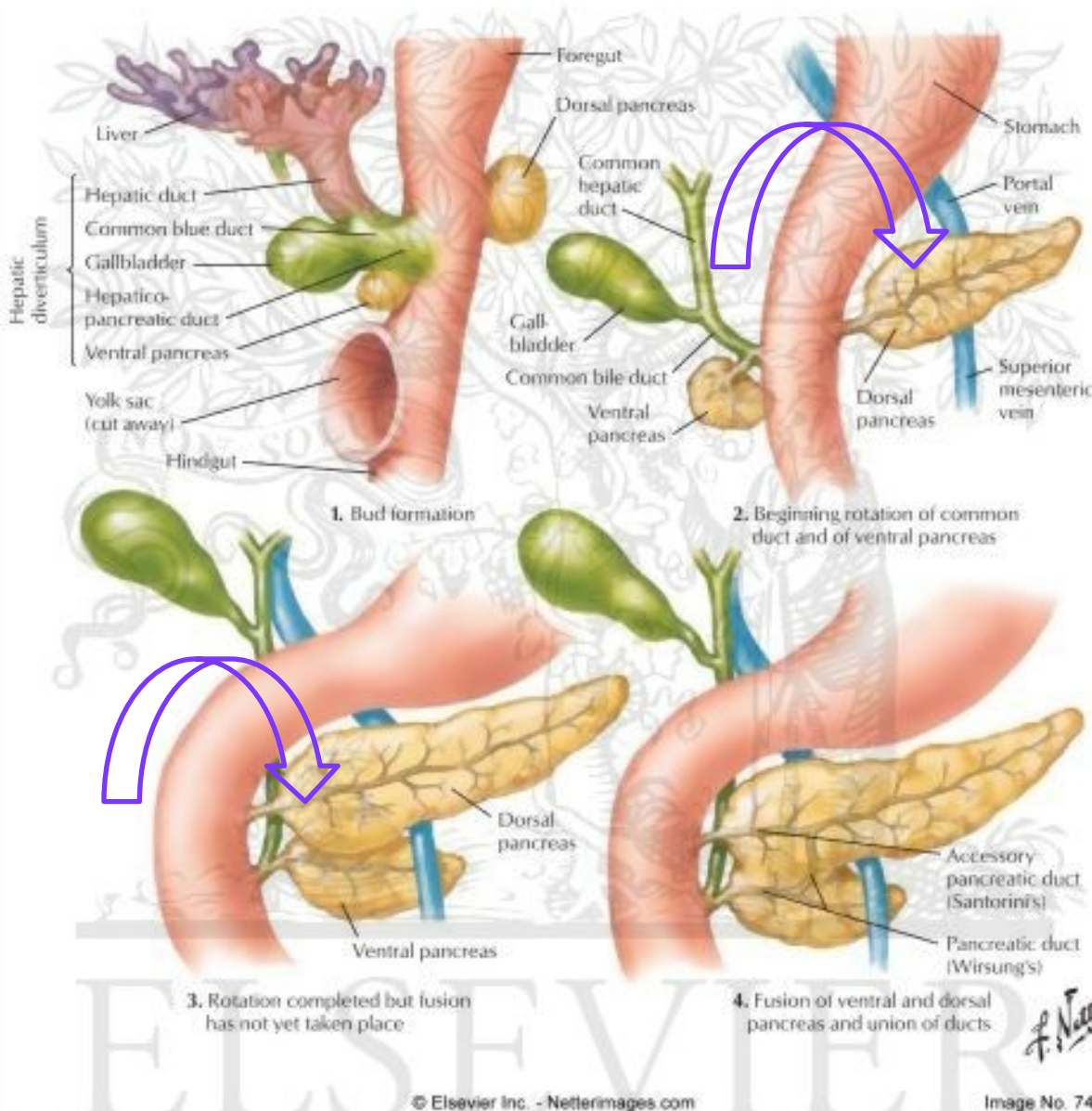
Image No. 7430

Development of Diverticula of Foregut

- Hepatic Diverticulum

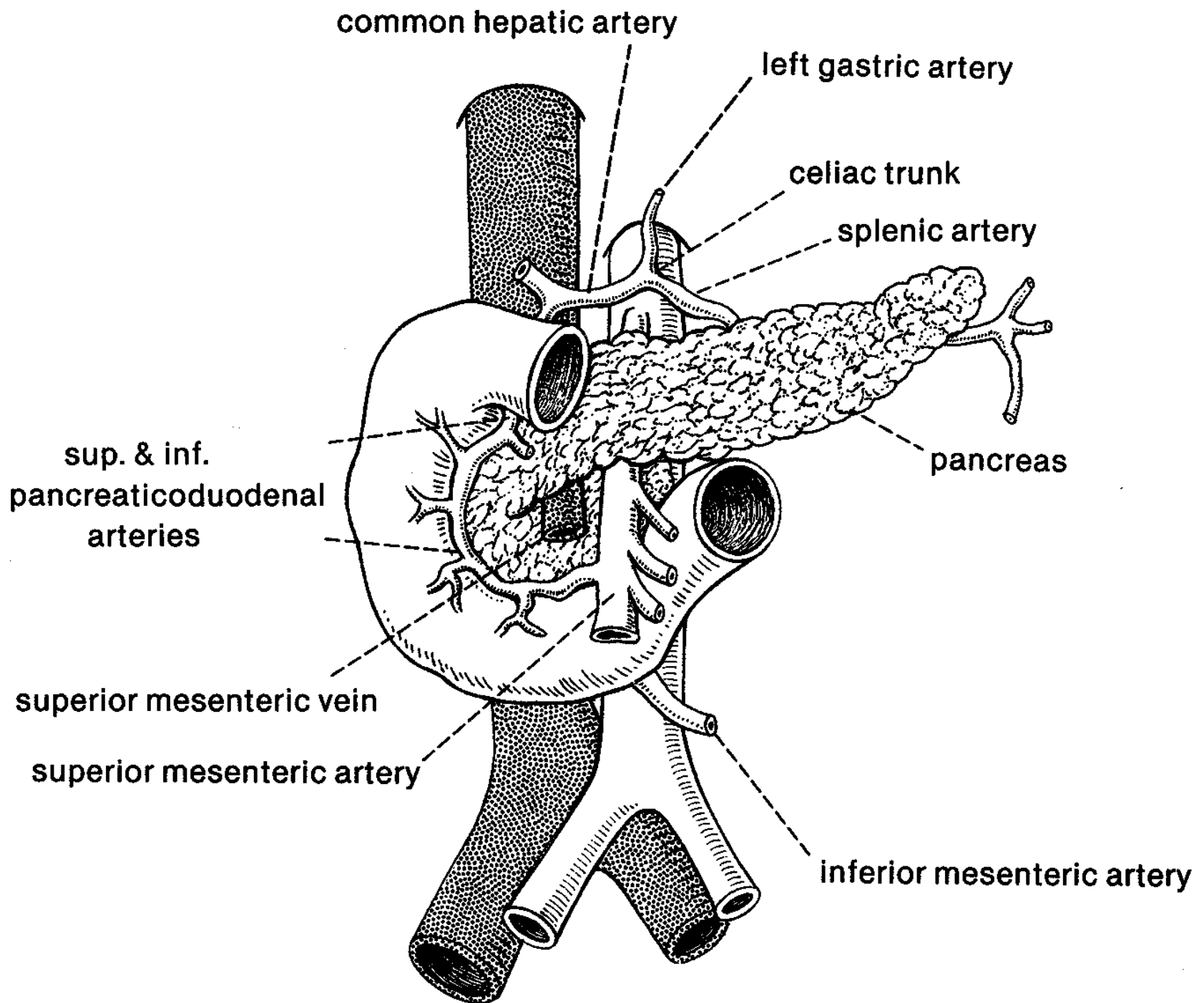
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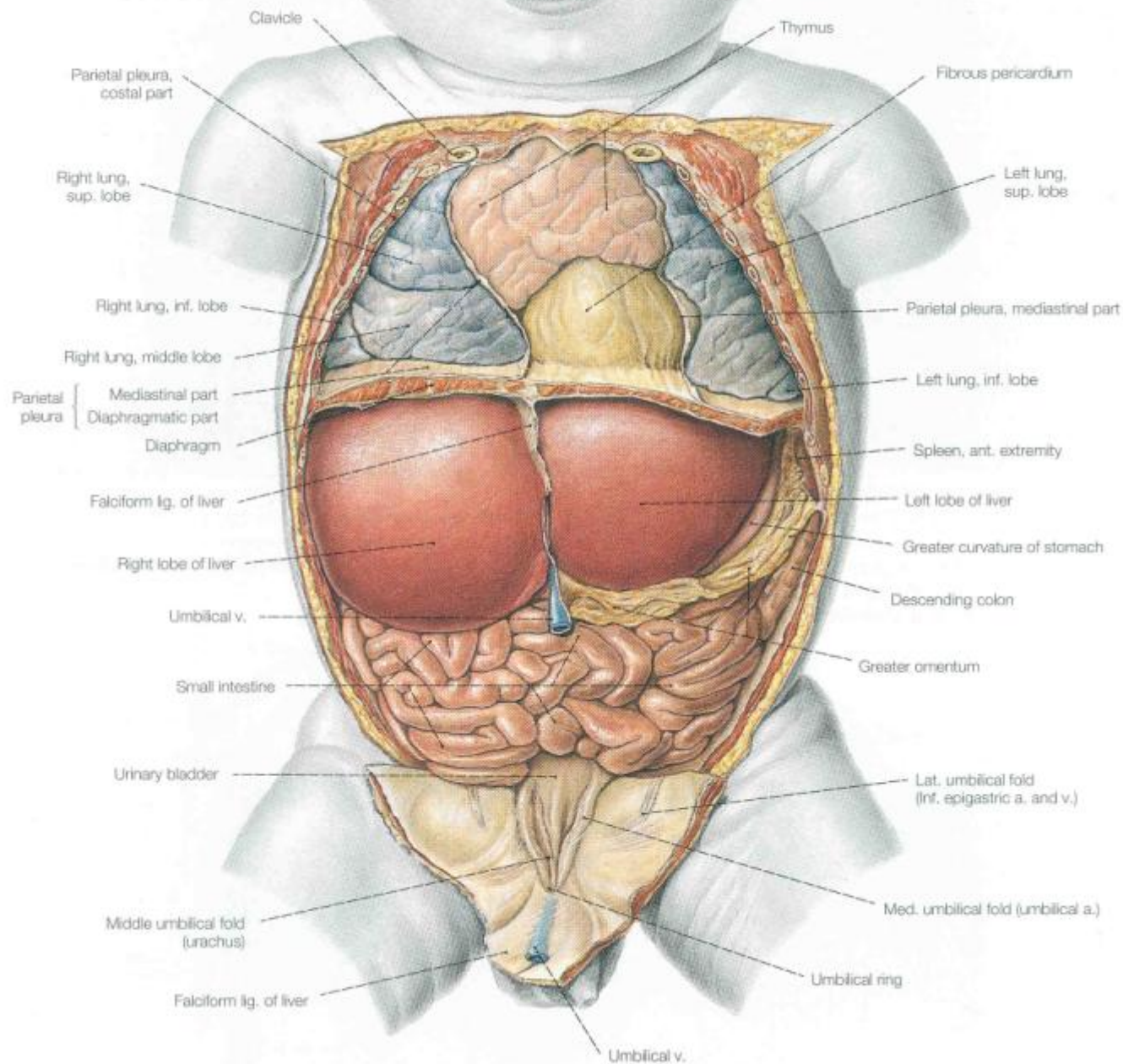
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Image No. 7430





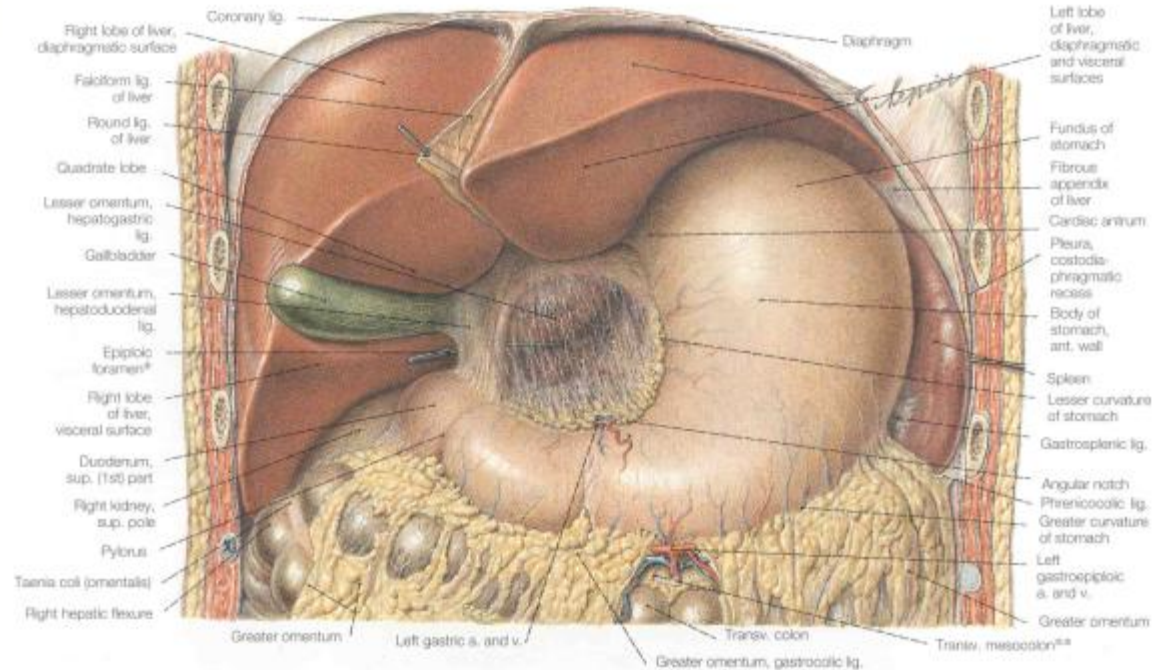
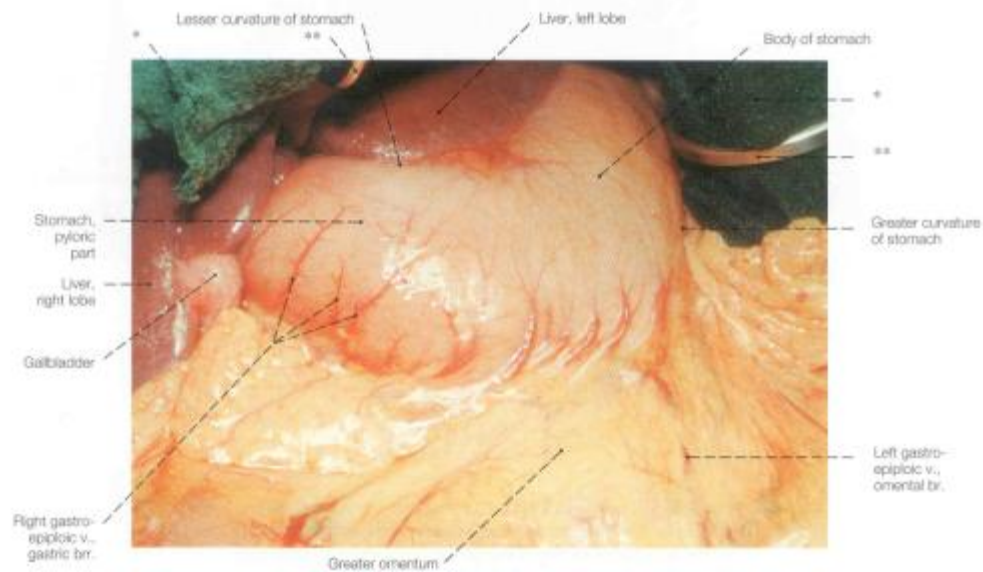


Fig. 969 Position of the viscera in the upper abdomen, ventral view. Parts of the diaphragm and the anterior thoracic and abdominal walls have been removed.

This part of the abdominal cavity is also known as the "glandular abdomen."

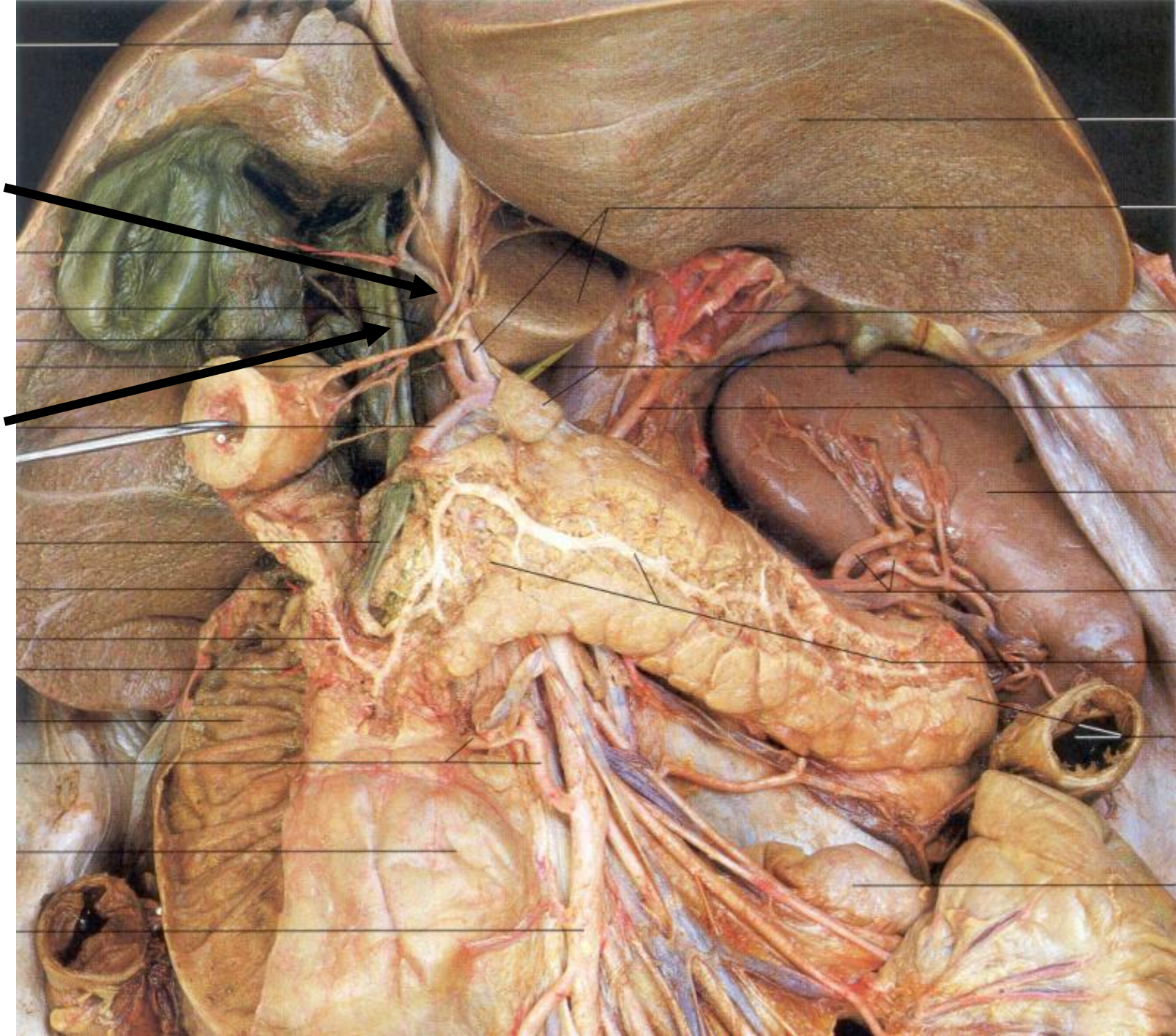
* Also: Foramen of WINSLOW

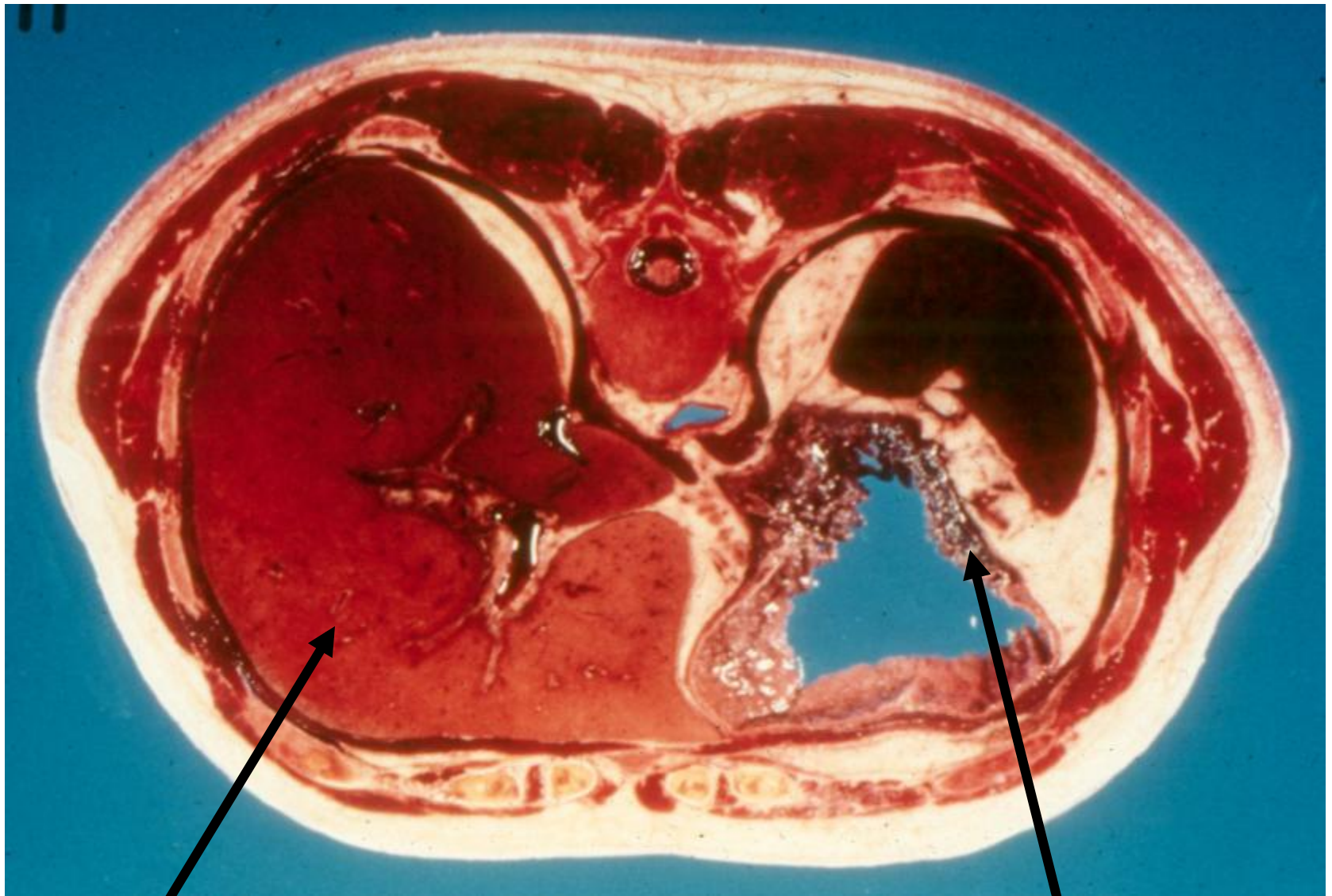
** Omental bursa partially opened



Hepatic
Portal Vein

Bile Duct



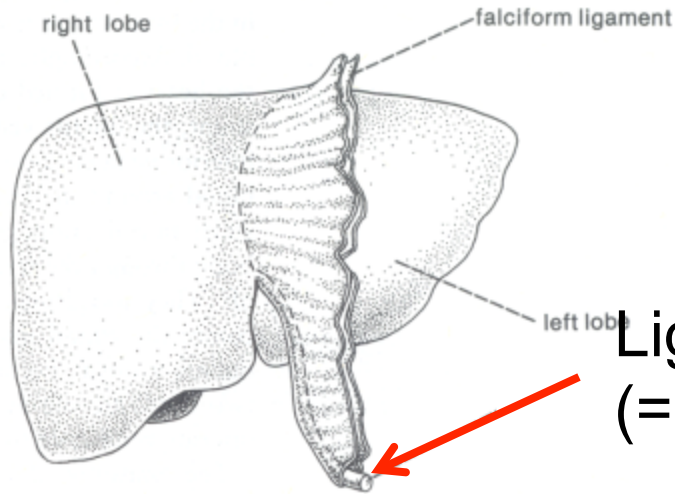


Liver

Stomach

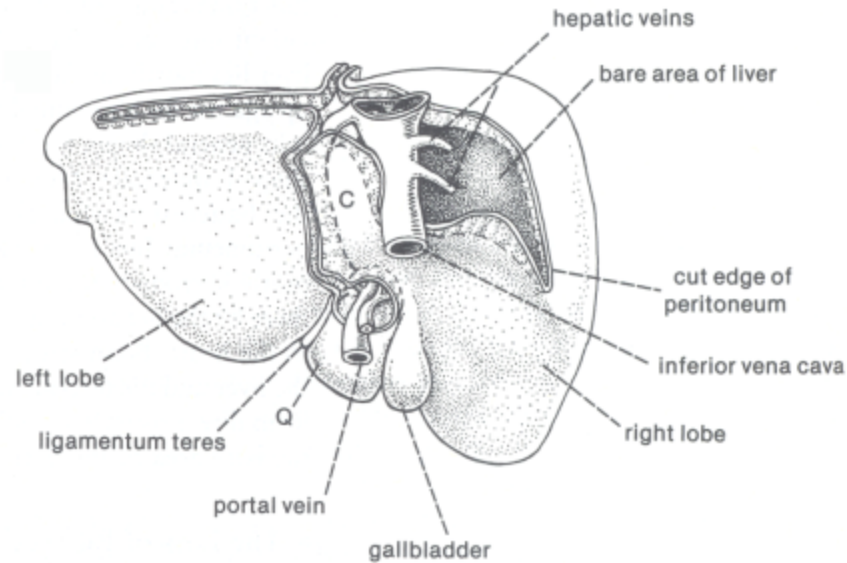
Liver:

Dorsal
View



Ligamentum teres
(= old ductus venosus)

Ventral
View



Foregut - Neurovascular Service:

Unpaired Branch of Abdominal Aorta: **Celiac Artery**

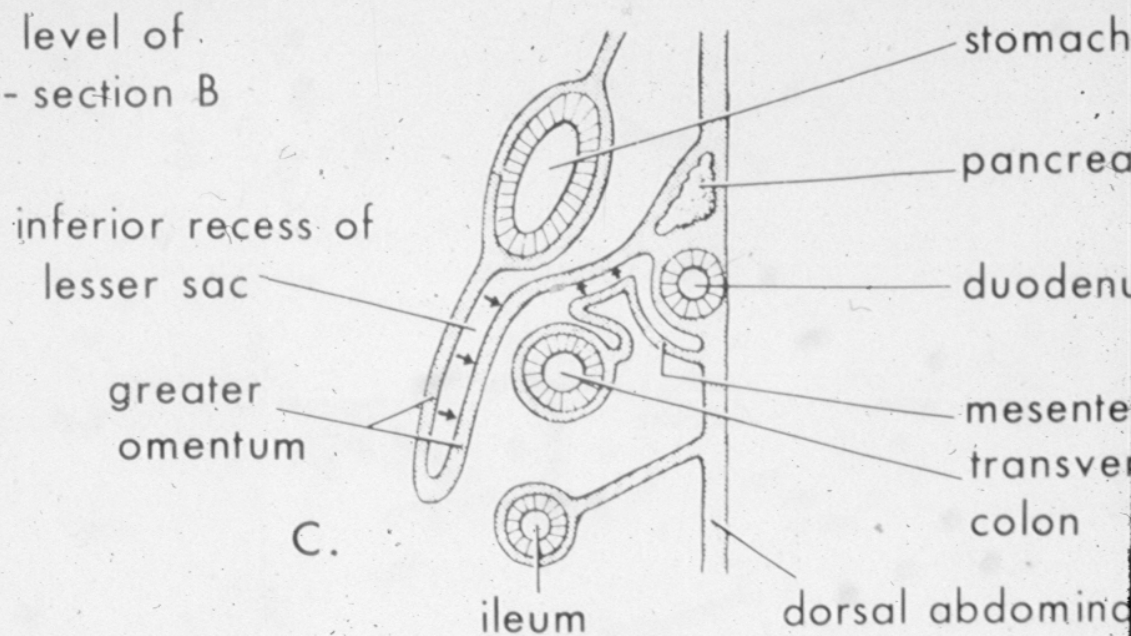
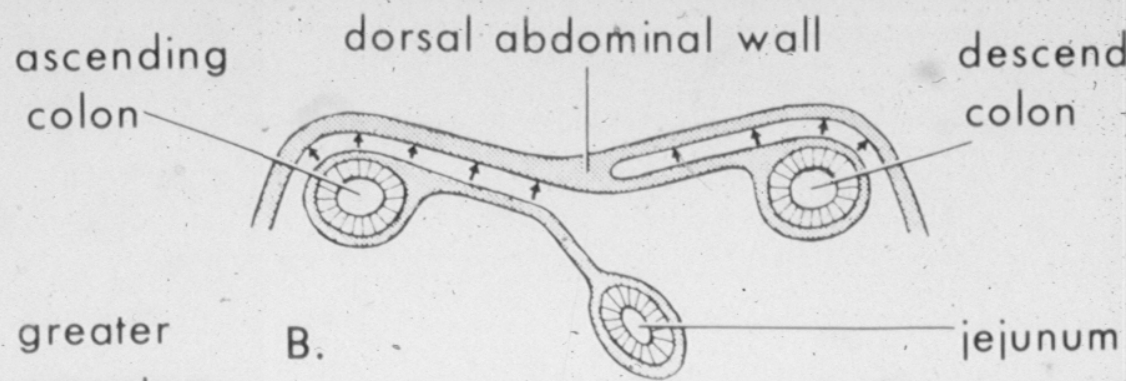
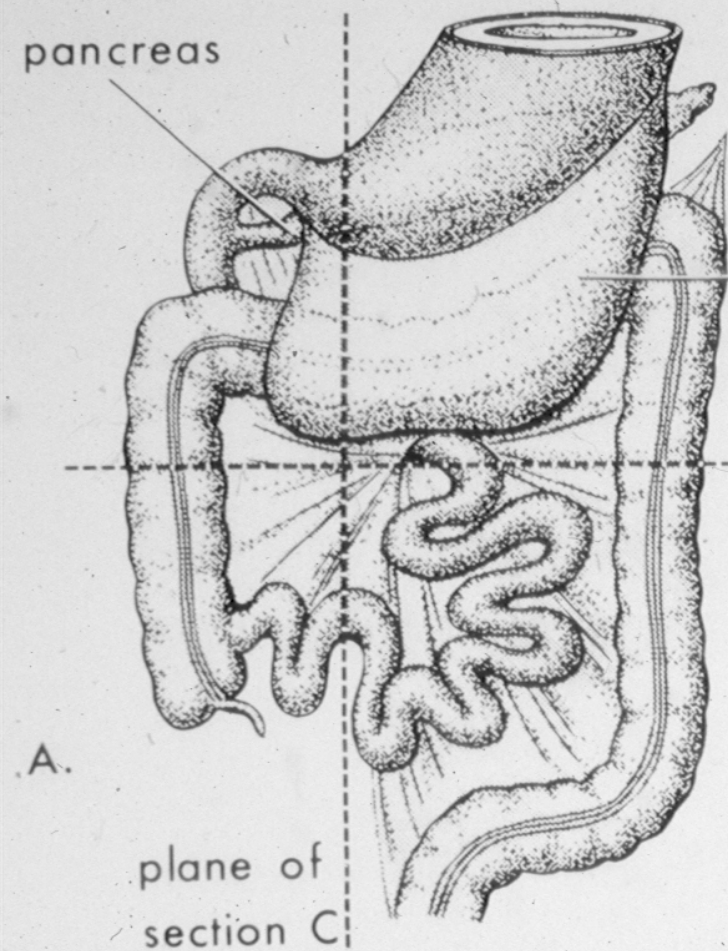
Unpaired Tributary of Hepatic Portal Vein: **Splenic Vein**

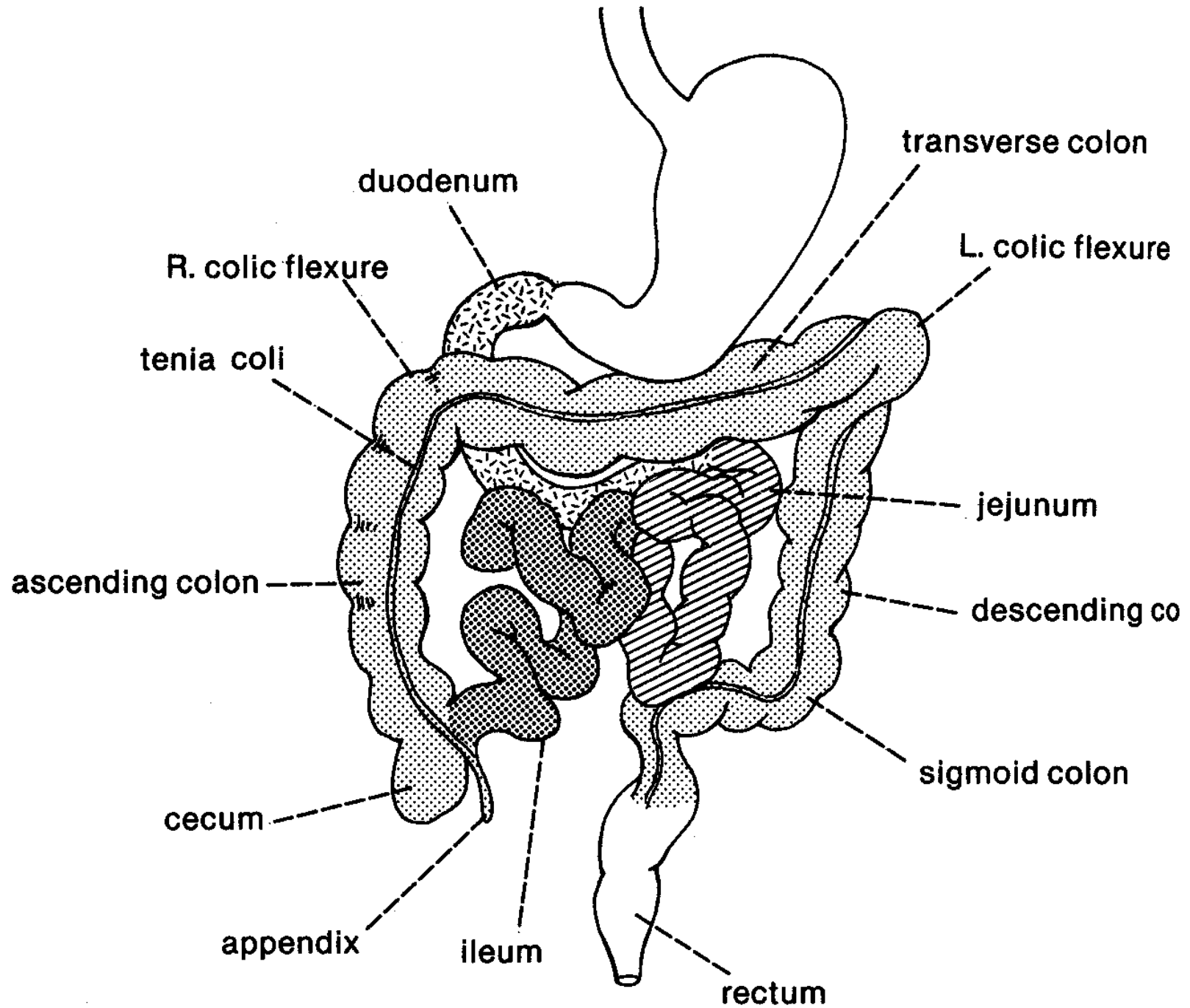
Sympathetic Nerve: **Greater Splanchnic Nerve**

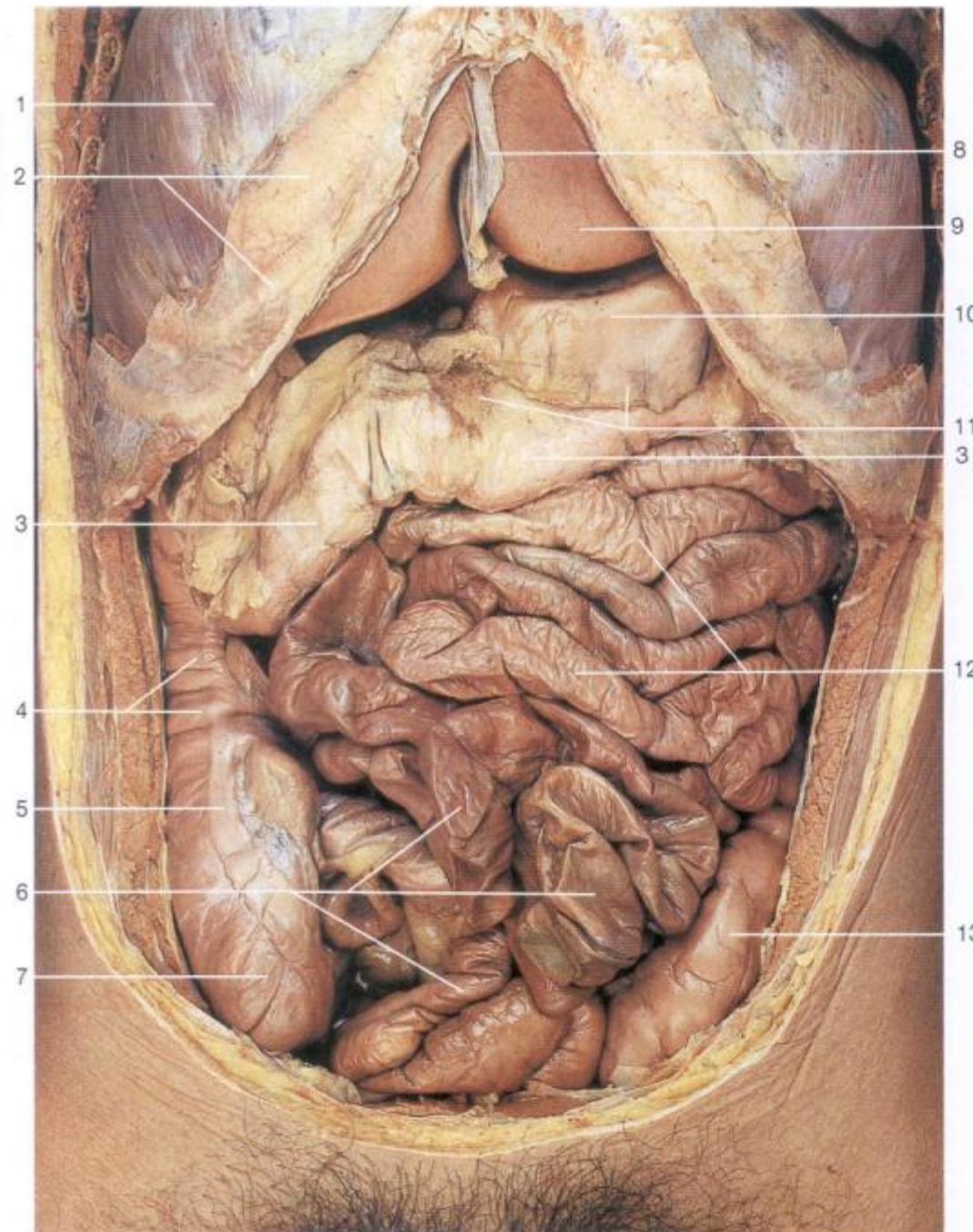
Sympathetic Nerve Segmental Levels: **T5-9**

Sympathetic Ganglion: **Celiac Ganglion**

Parasympathetic Nerve: **Vagus Nerve (CN – X)**







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1. Implications of Gut Development

Foregut Development

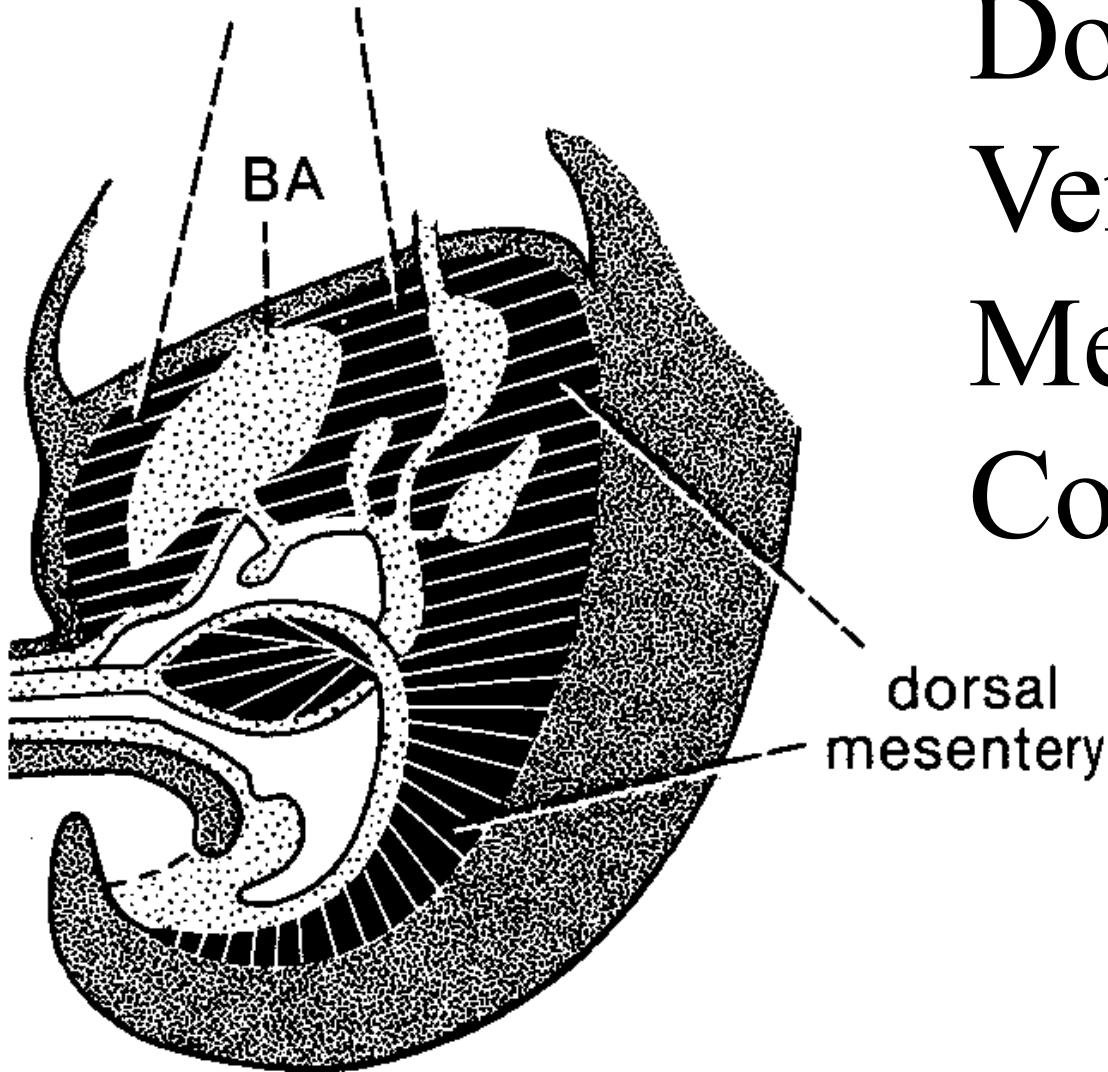
Midgut Development

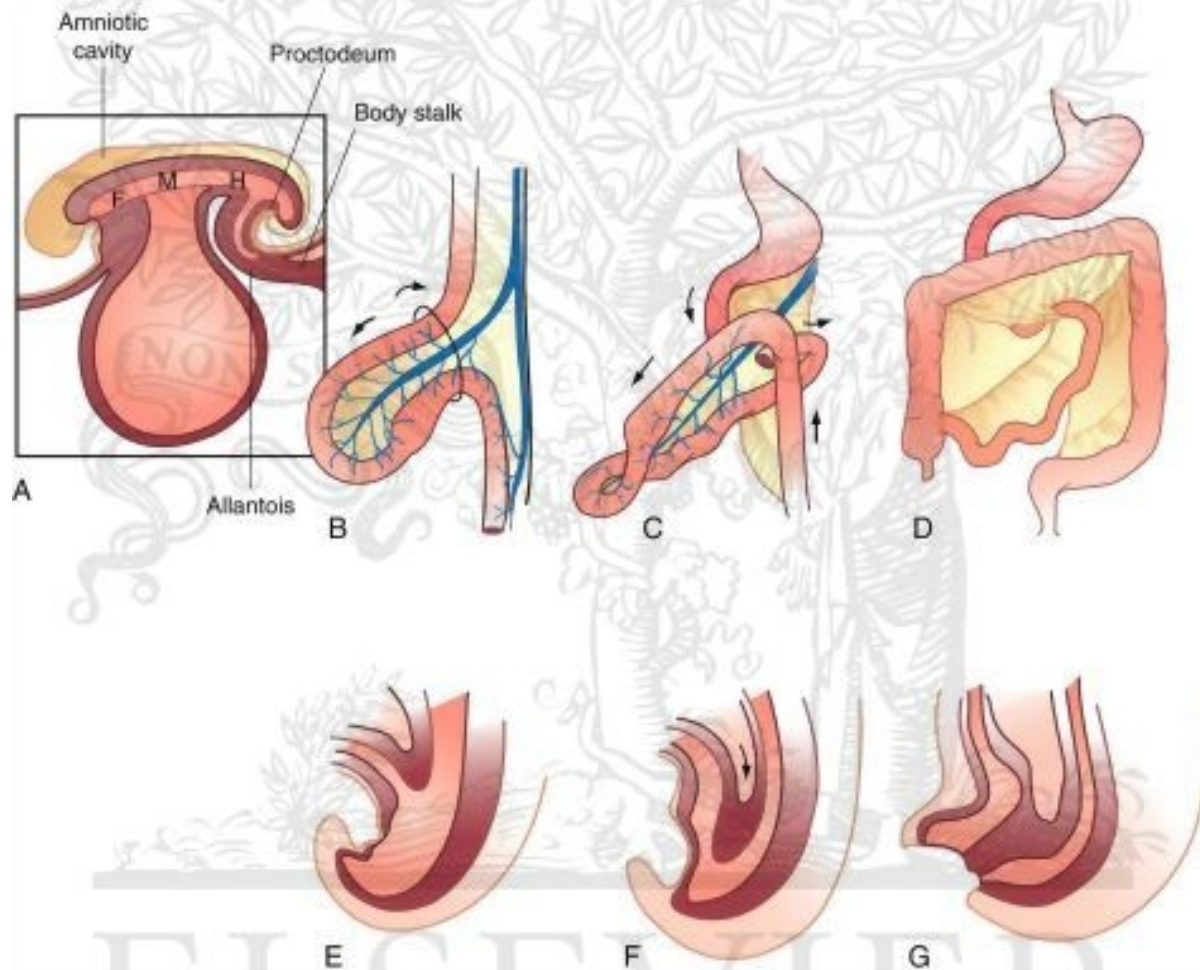
Hindgut Development

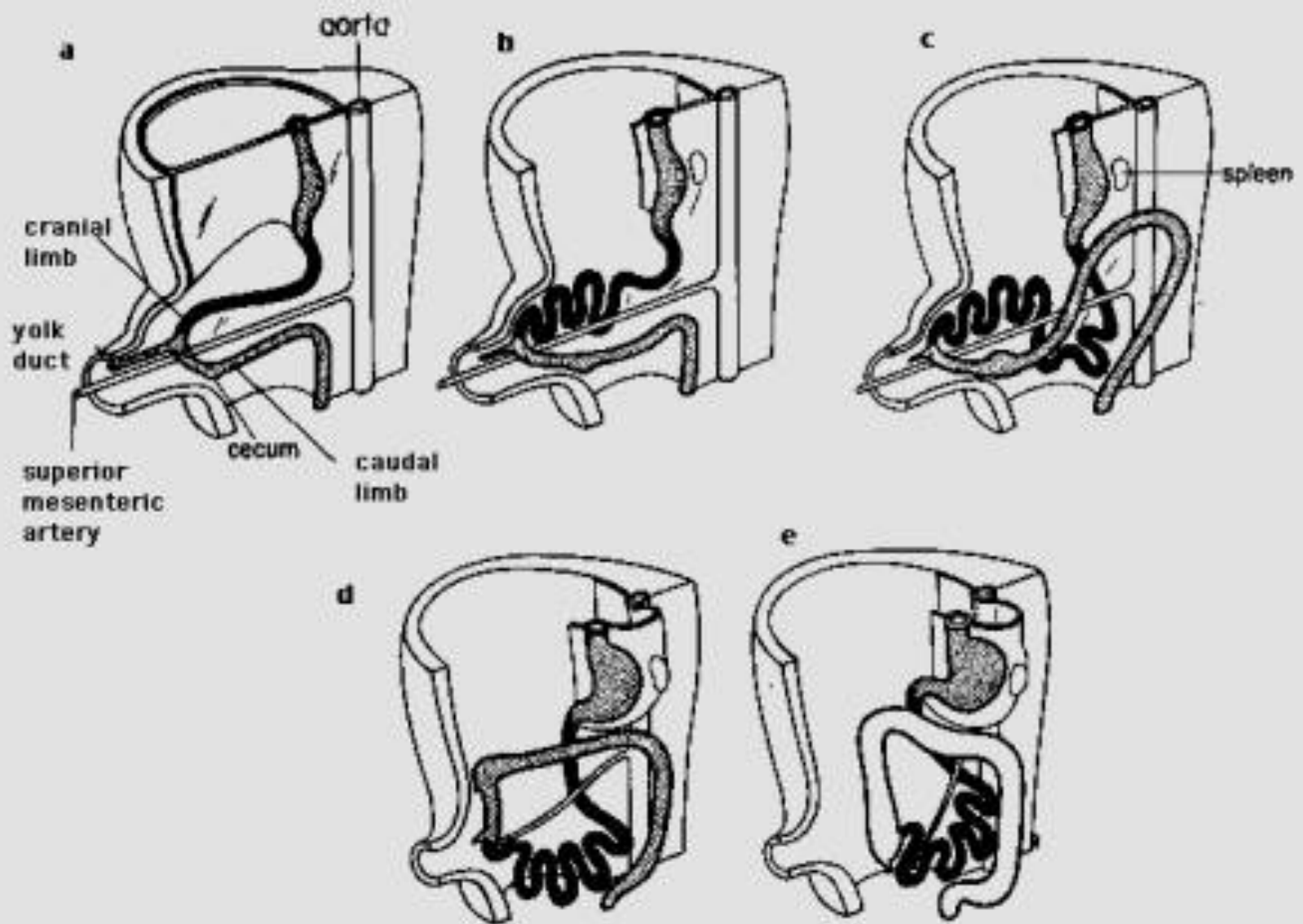
2. Circulation – Part I

ventral mesogastrium

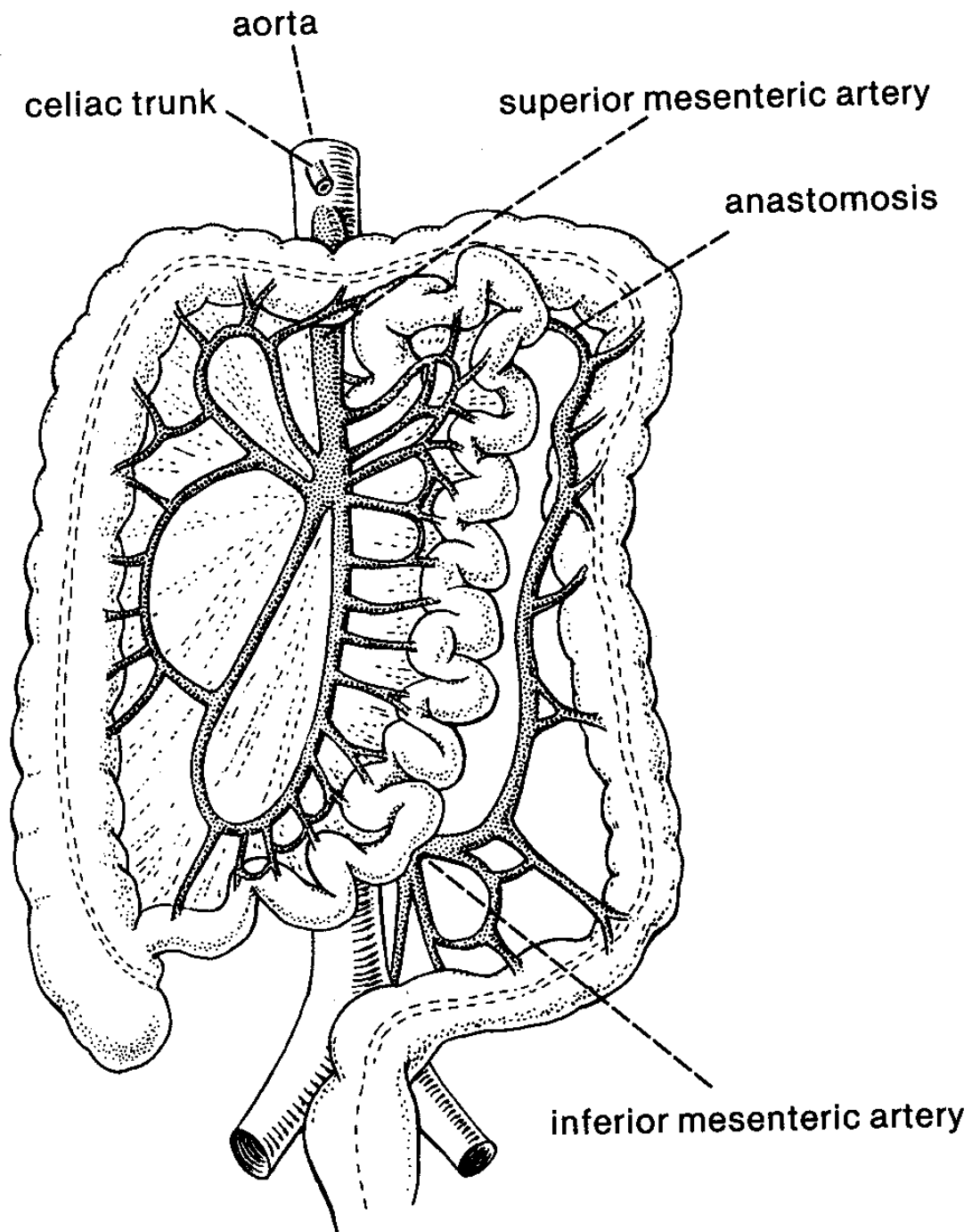
Dorsal vs. Ventral Mesentery Components

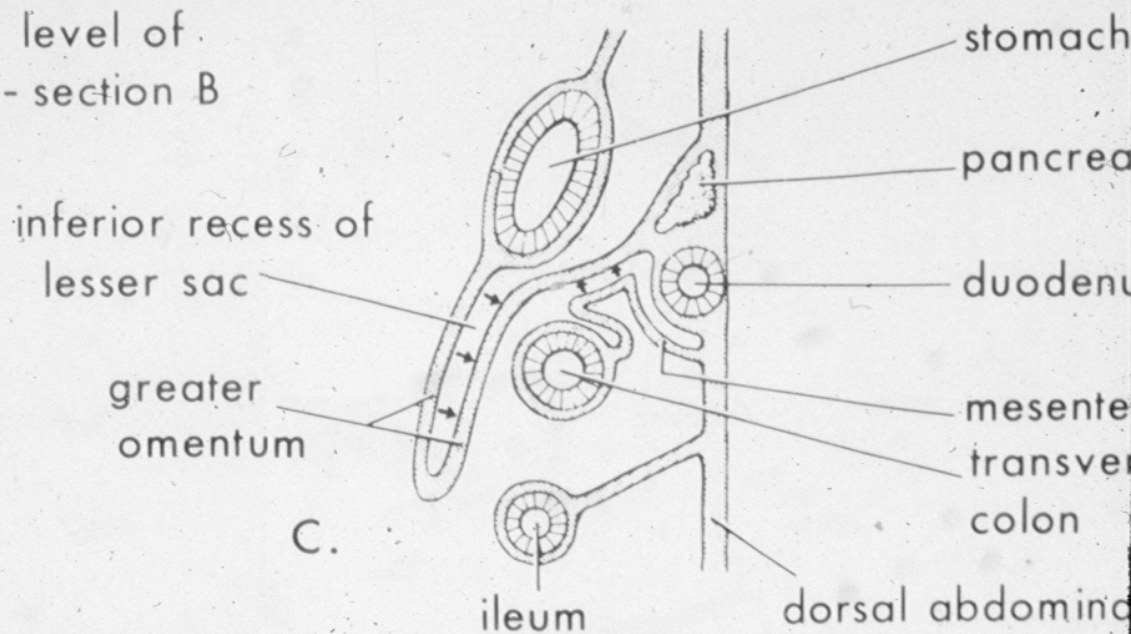
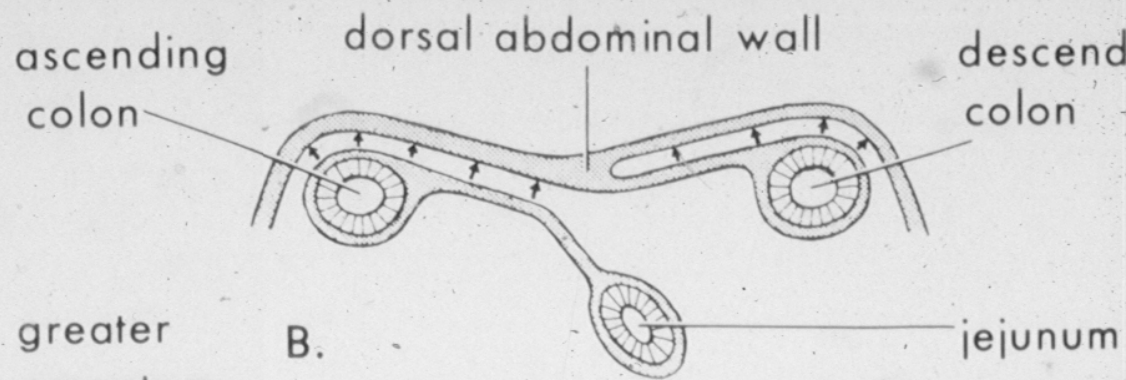
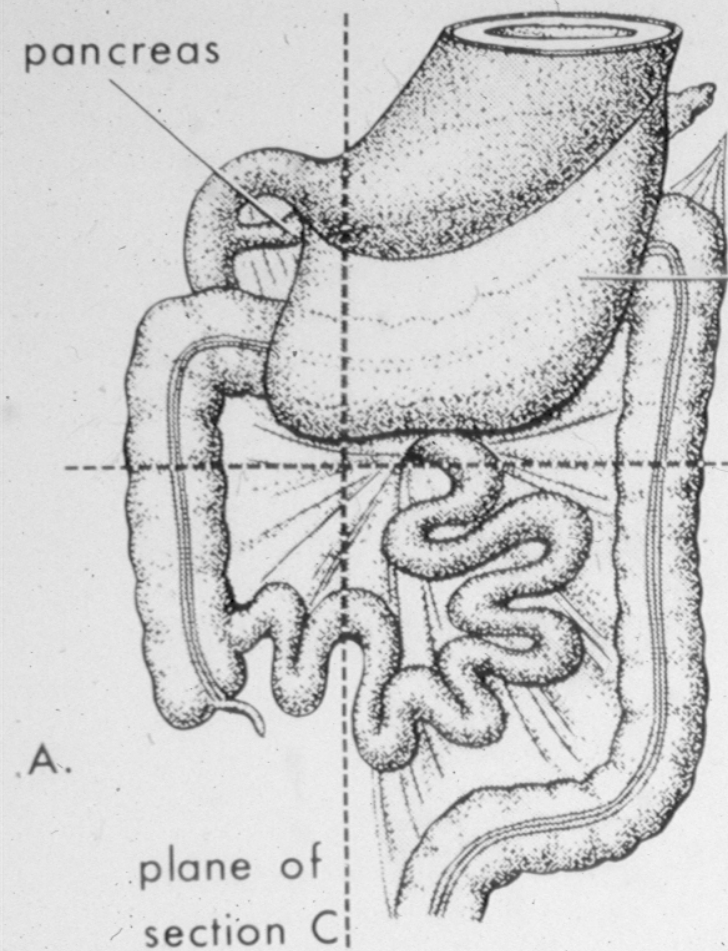




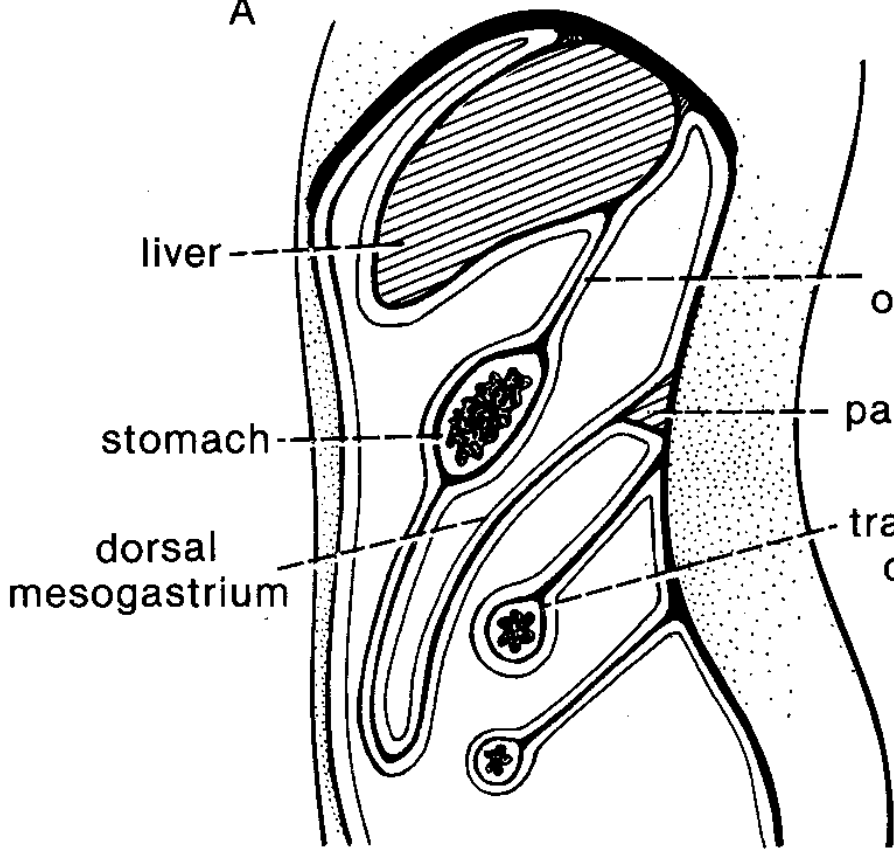


“Repackaging” of the Midgut

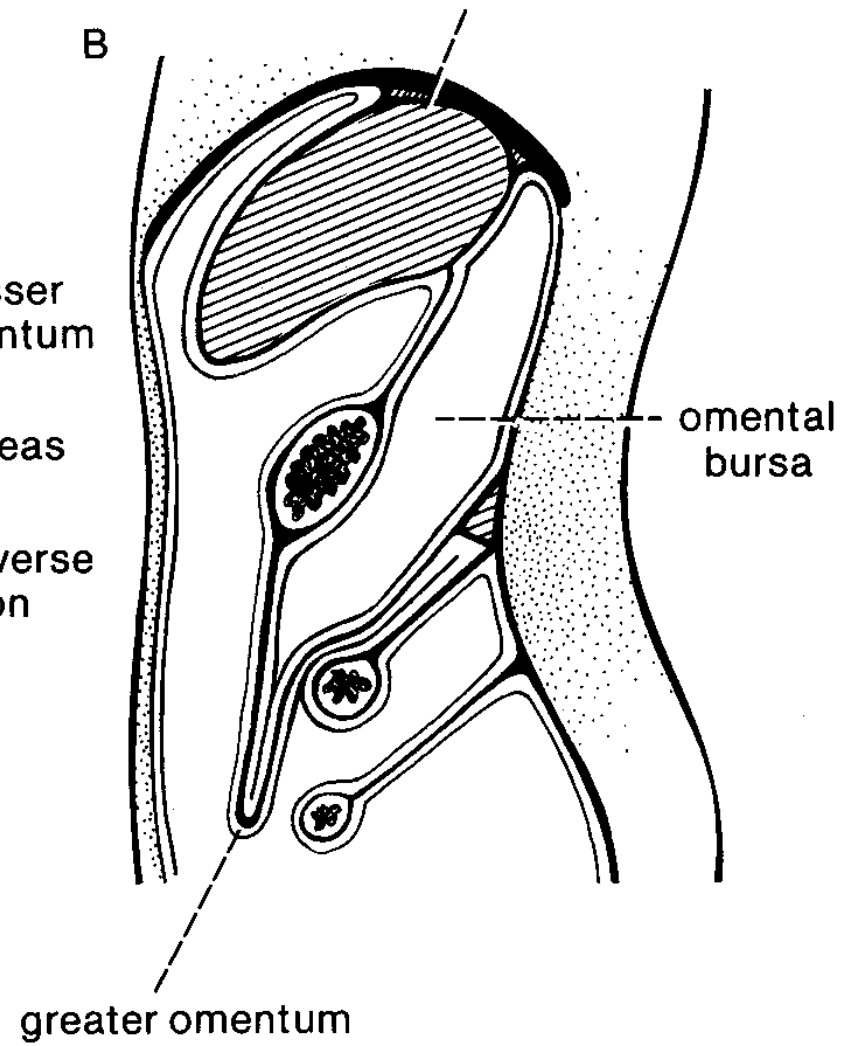


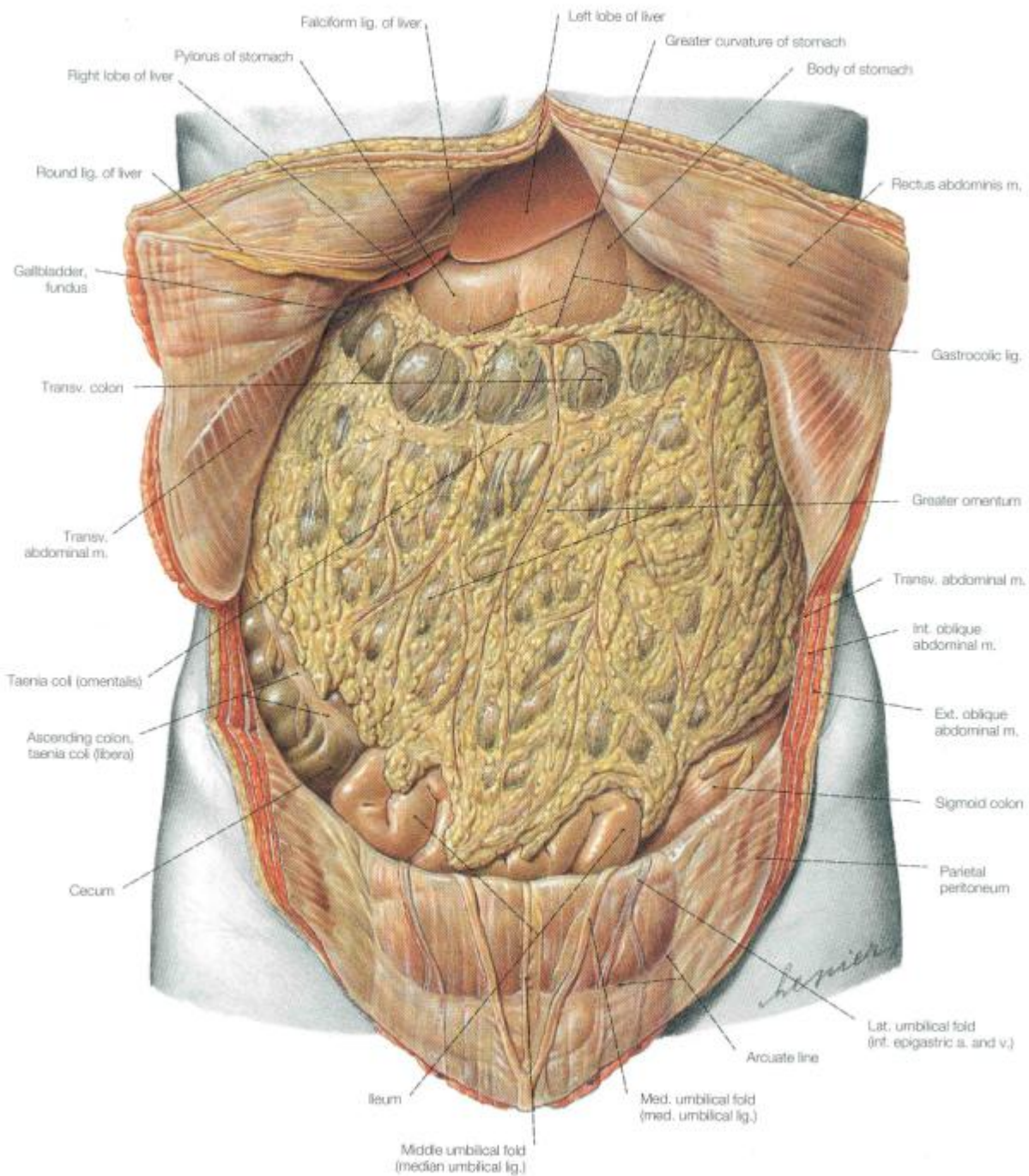


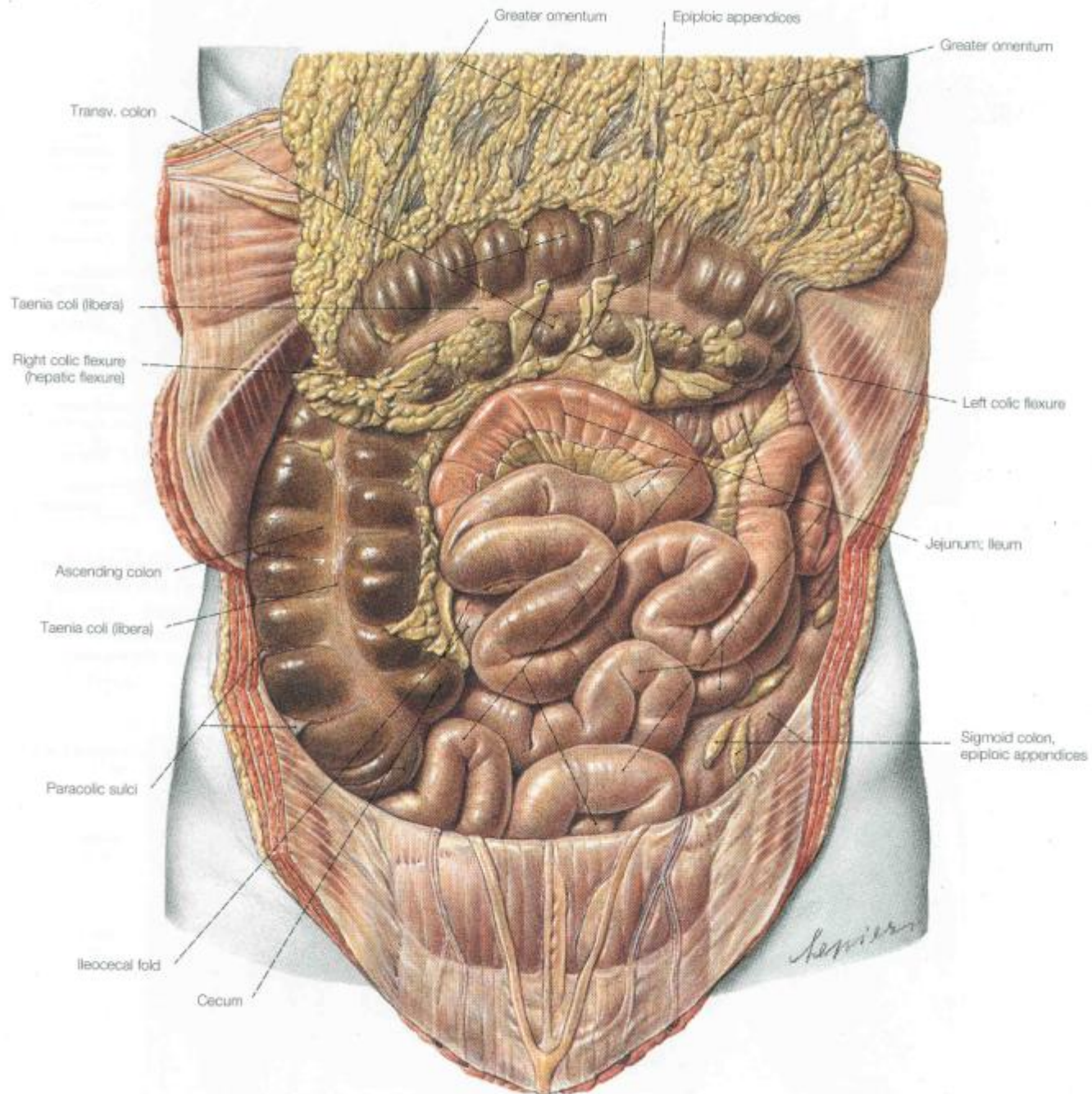
A



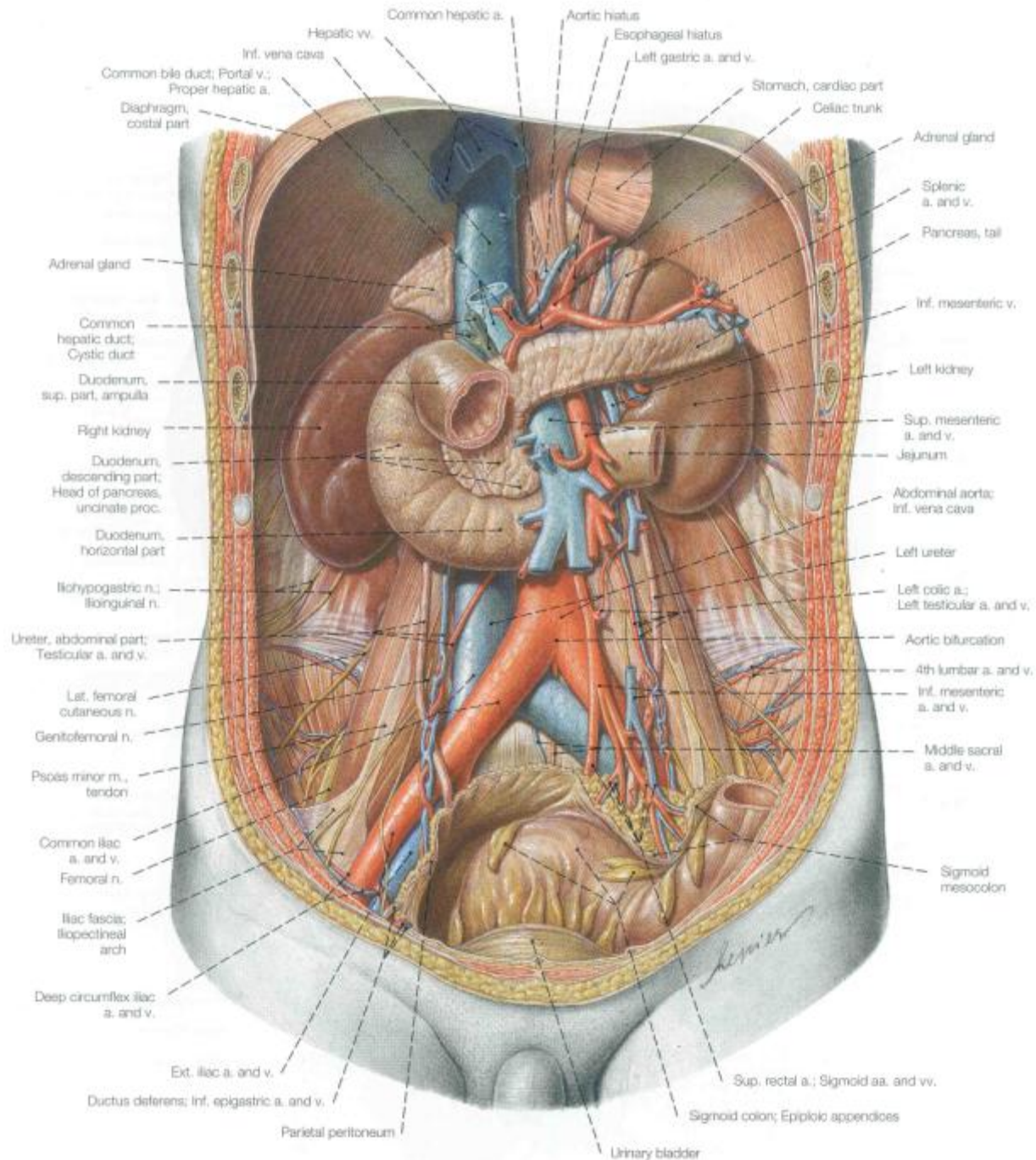
B







Retroperitoneal components of abdominal cavity



Midgut - Neurovascular Service:

Unpaired Branch of Abdominal Aorta: **Superior Mesenteric Artery**

Unpaired Tributary of Hepatic Portal Vein: **Superior Mesenteric Vein**

Sympathetic Nerve: **Lesser Splanchnic Nerve**

Sympathetic Nerve Segmental Levels: **T10-11**

Sympathetic Ganglion: **Superior Mesenteric Ganglion**

Parasympathetic Nerve: **Vagus Nerve (CN – X)**

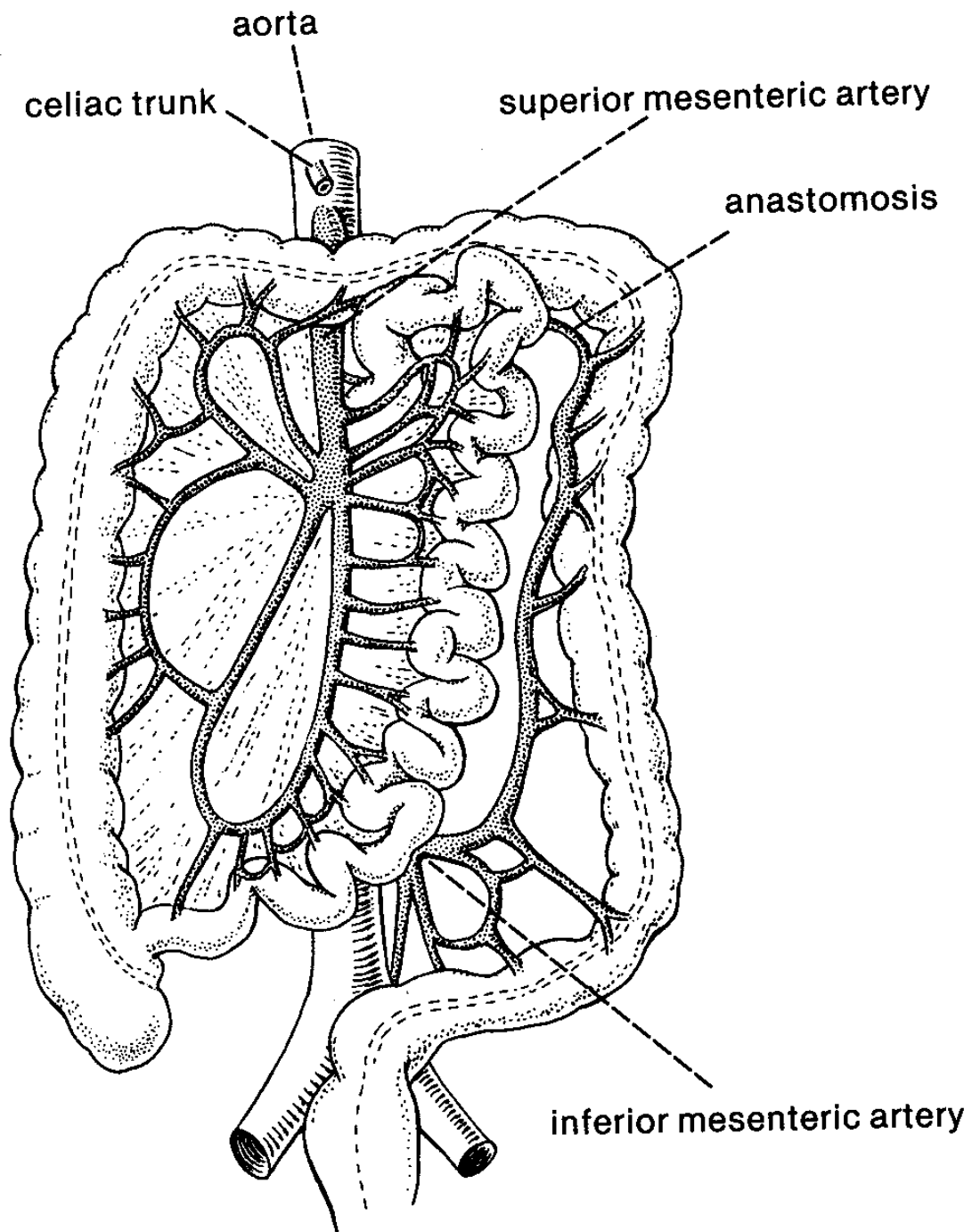
1. Implications of Gut Development

Foregut Development

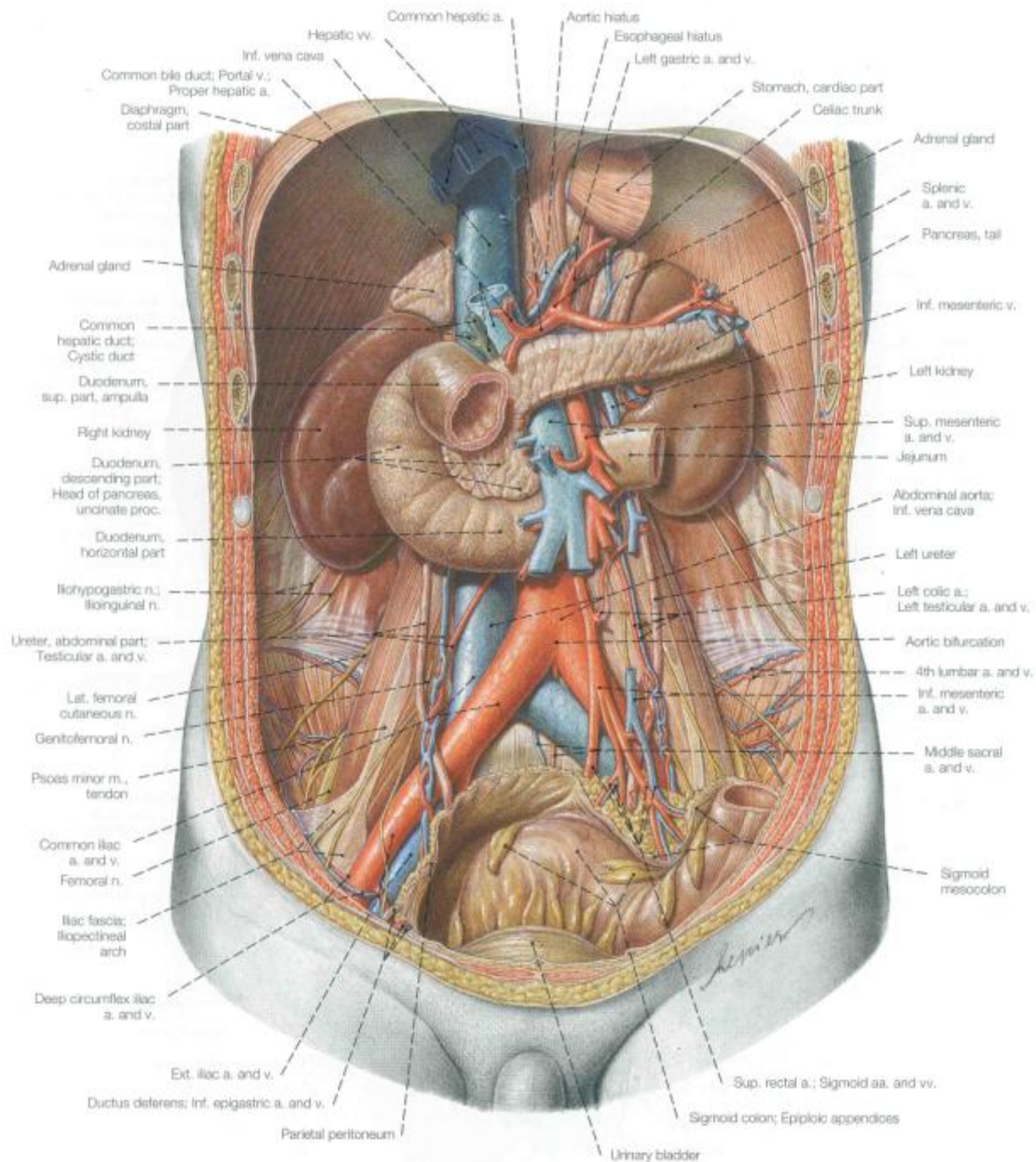
Midgut Development

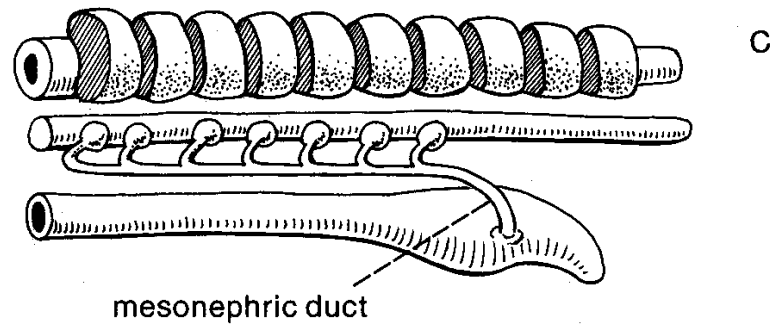
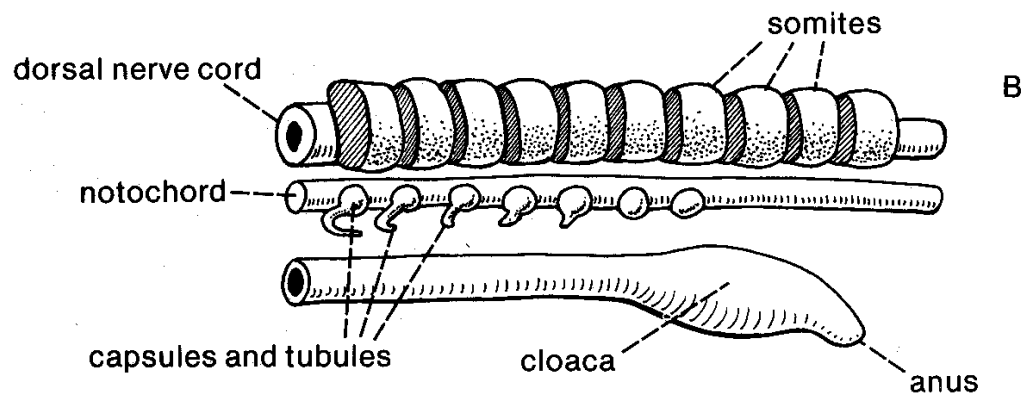
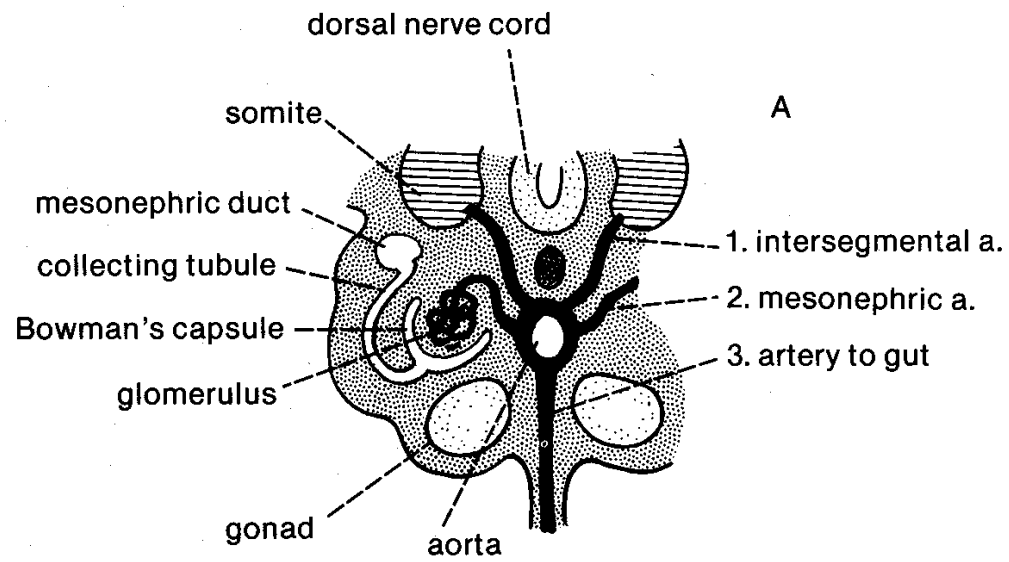
Hindgut Development

2. Circulation – Part I



Review of Retroperitoneal components of abdominal cavity

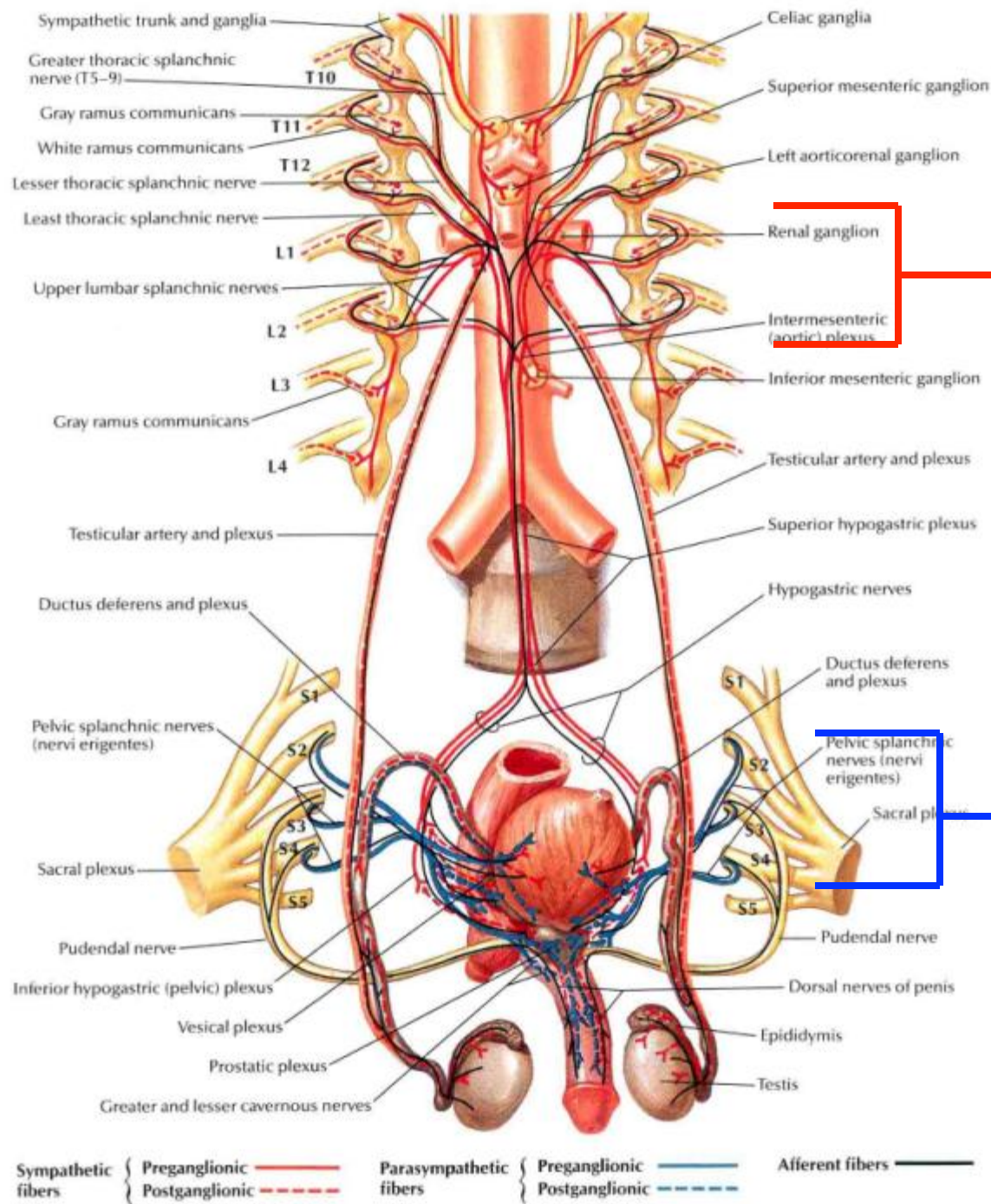


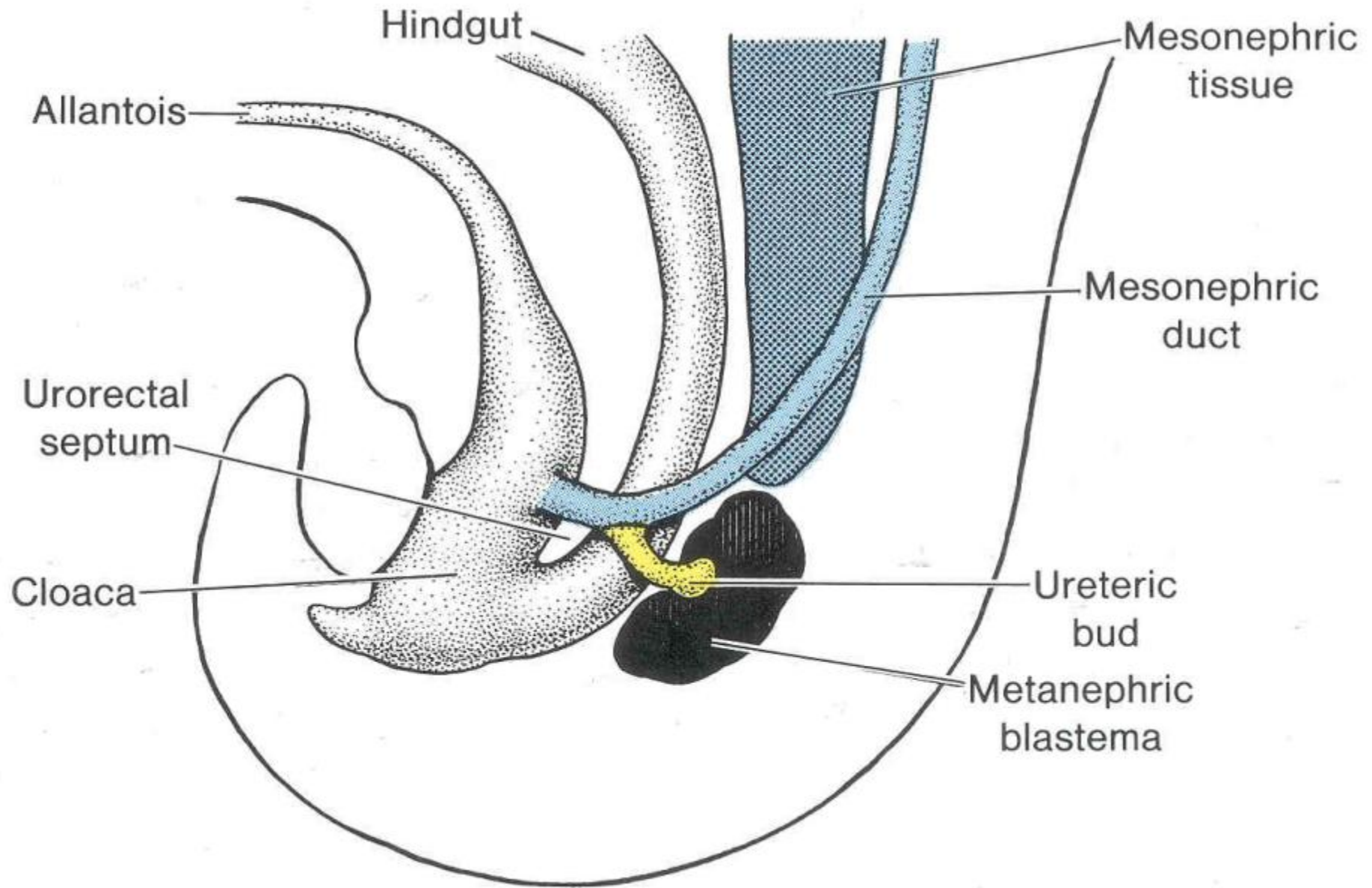


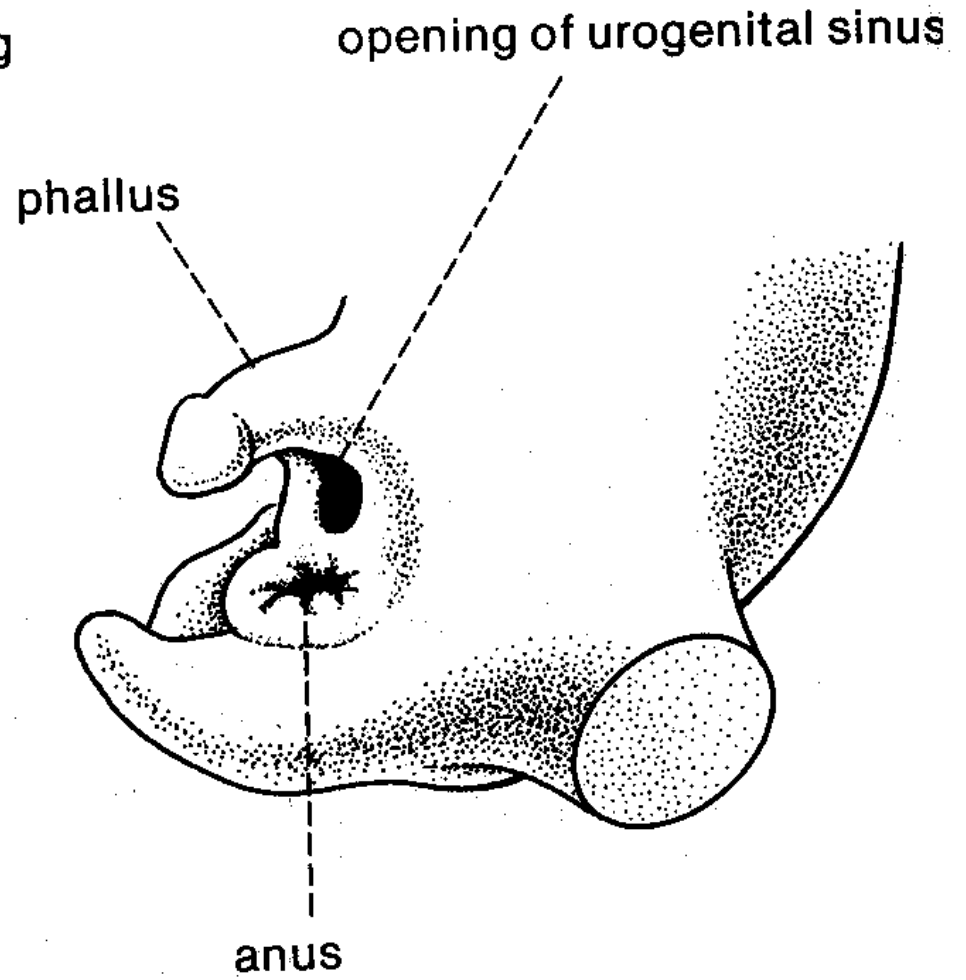
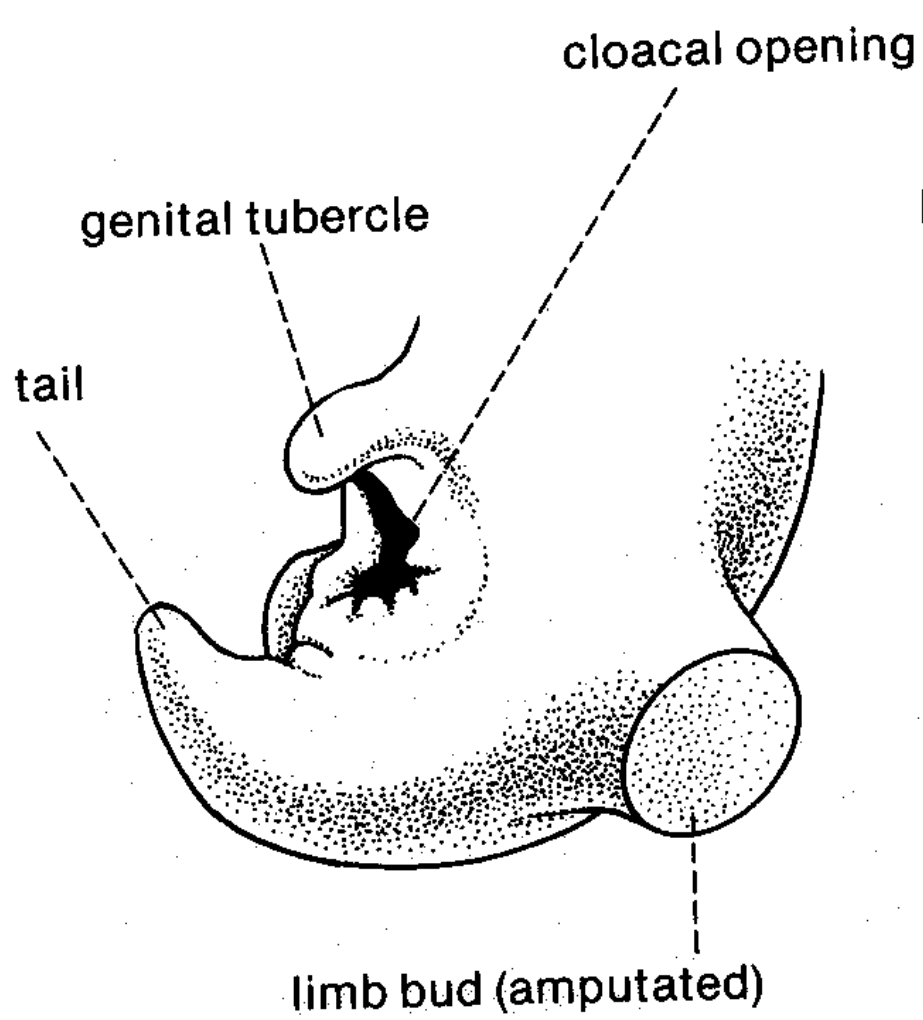
Innervation of Bladder

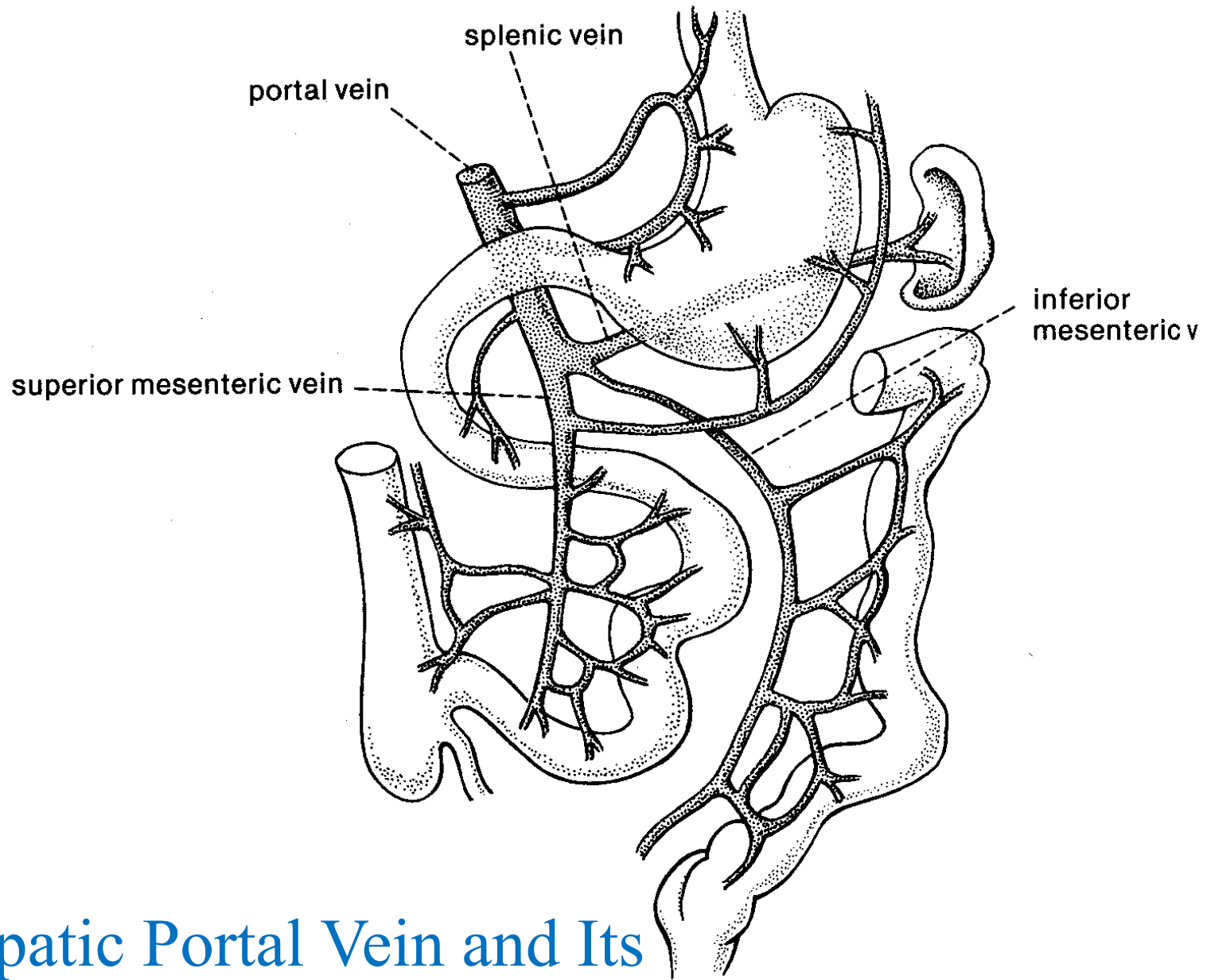
Sympathetic:
predominantly L1-2 via
hypogastric plexus

Parasympathetic:
S2-4 (as you would
expect of a hindgut
derivative).

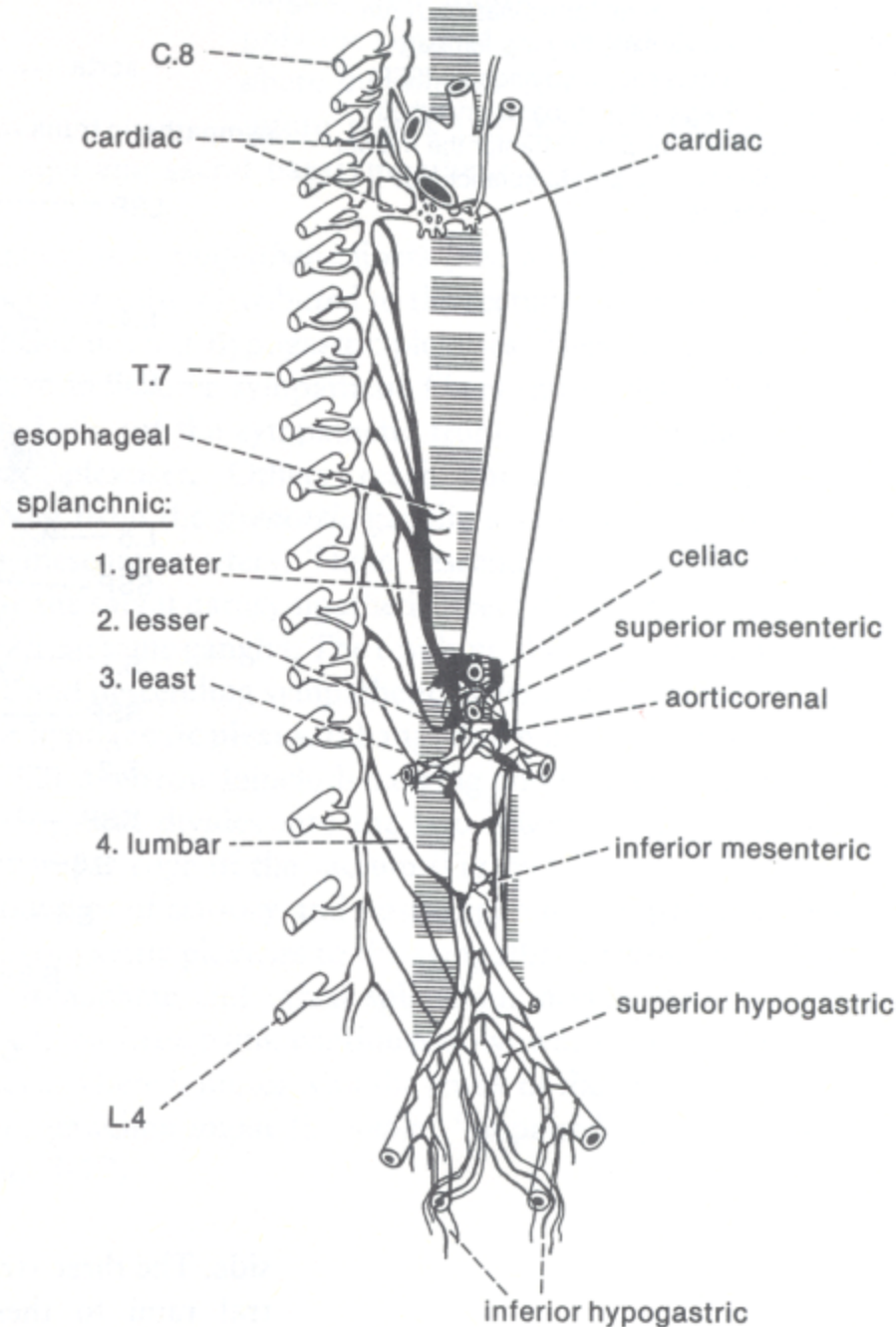




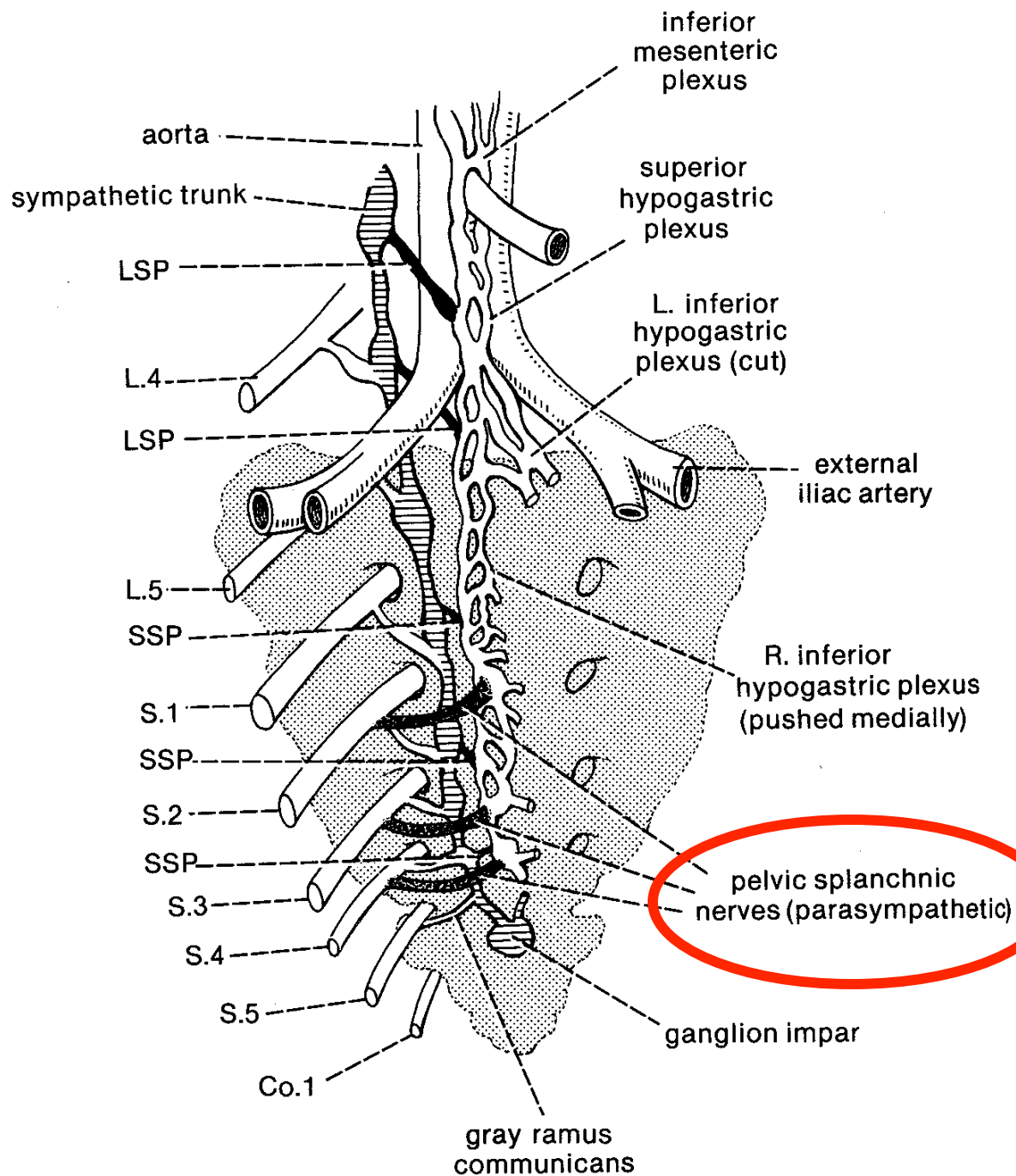




Hepatic Portal Vein and Its Tributaries



Sympathetic Supply of the Abdominal Gut



Parasympathetic
Supply to the
Hindgut: S2-4)

Hindgut - Neurovascular Service:

Unpaired Branch of Abdominal Aorta: **Inferior Mesenteric Artery**

Unpaired Tributary of Hepatic Portal Vein: **Inferior Mesenteric Vein**

Sympathetic Nerve: **Least Splanchnic Nerve + Lumbar splanchnics**

Sympathetic Nerve Segmental Levels: **T12, L1(2)**

Sympathetic Ganglion: **Superior Mesenteric Ganglion**

Parasympathetic Nerve: **Pelvic Outflow, S2-4**

Foregut, Midgut, & Hindgut Summary

Embryonic Gut	Boundaries	Sympathetic nerve	Levels
Foregut	Through first ½ of duodenum	Greater Splanchnic	T5-9
Midgut	2 nd ½ of duodenum through left colic flexure	Lesser Splanchnic	T10-11
Hindgut	Left colic flexure to anus	Least Splanchnic + Lumbar splanchnics	T12, L1(2)

Summary Continued.....

Embryonic gut	Preaortic ganglia	Arteries of Abdominal aorta	Hepatic portal vein	Parasymp. innervation
Foregut	Celiac ganglion	Celiac artery	Splenic vein	Vagus Nerve (X)
Midgut	Superior mesenteric ganglion	Superior mesenteric artery	Superior mesenteric vein	Vagus Nerve (X)
Hindgut	Inferior mesenteric ganglion	Inferior mesenteric artery	Inferior mesenteric vein	Sacral Outflow (S1-S4)