

# Intestines of the dog and cat

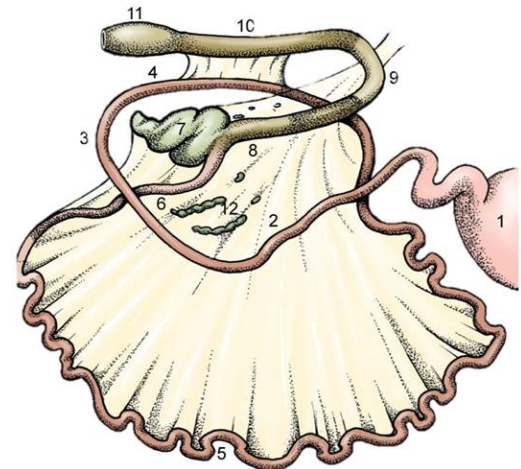
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VETS30016 / VETS90120

# Intended learning outcomes

- Gross anatomy of the small and large intestines
  - Component parts of the intestinal tract
  - Course and position in the body and relationships to other organs
  - Duodenal papillae
  - External and internal features of anal canal, including anal sacs
- Gross anatomy of pancreas



# Intestines

- Commence at the pylorus
- Extend to the anus
- Divided into:
  - Proximal part – small intestine
  - Junction – caecum
  - Distal part – large intestine

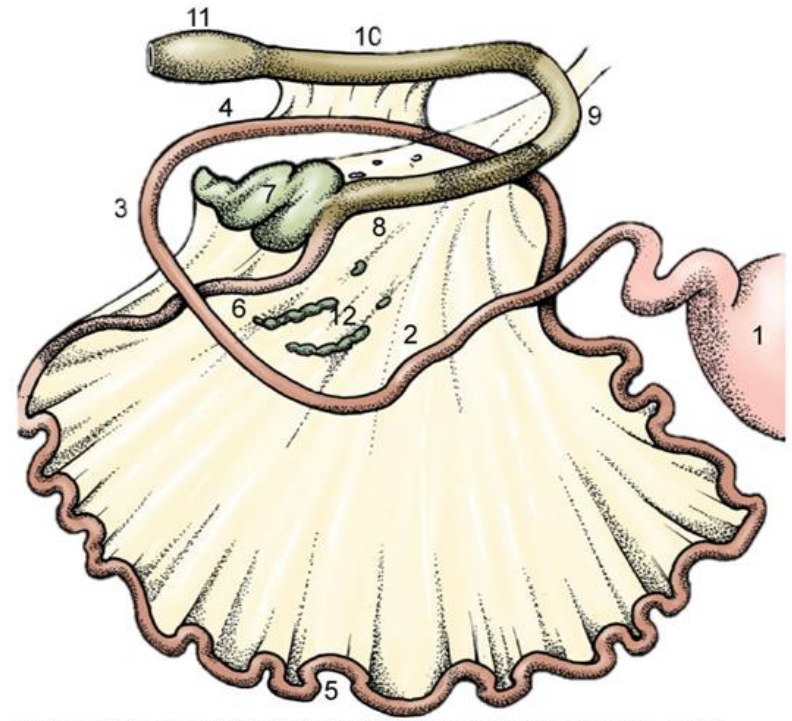


Fig. 3-40. Intestinal tract of the dog (schematic). 1, Stomach; 2, descending duodenum; 3, caudal flexure; 4, ascending duodenum; 5, jejunum; 6, ileum; 7, cecum; 8, ascending colon; 9, transverse colon; 10, descending colon; 11, recta ampulla; 12, jejunal lymph nodes.

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# Small intestine

- Consists of three parts:
  - Duodenum
  - Jejunum
  - Ileum
- Terminates:
  - Ileocolic orifice

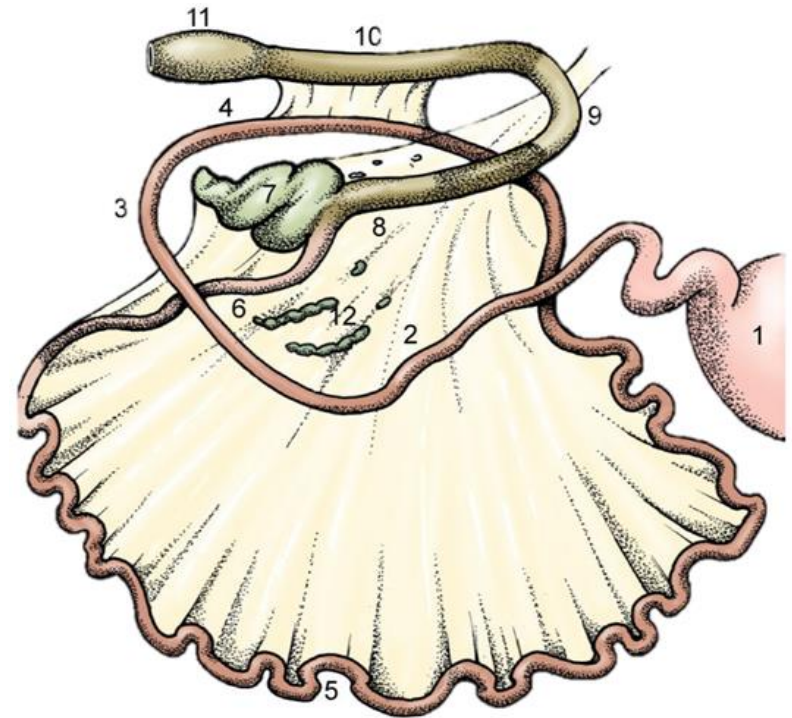


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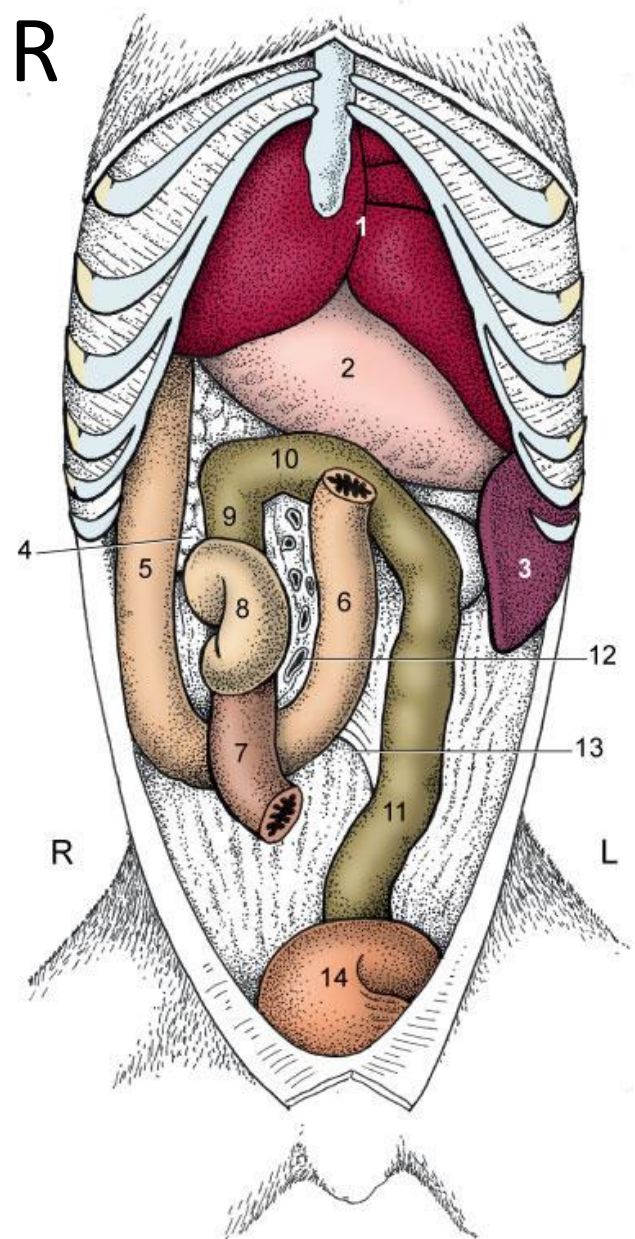
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R



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# Duodenum

- Close to dorsal body wall
- U-shaped
  - Cranial flexure
  - Descending duodenum
  - Caudal flexure
  - Ascending duodenum

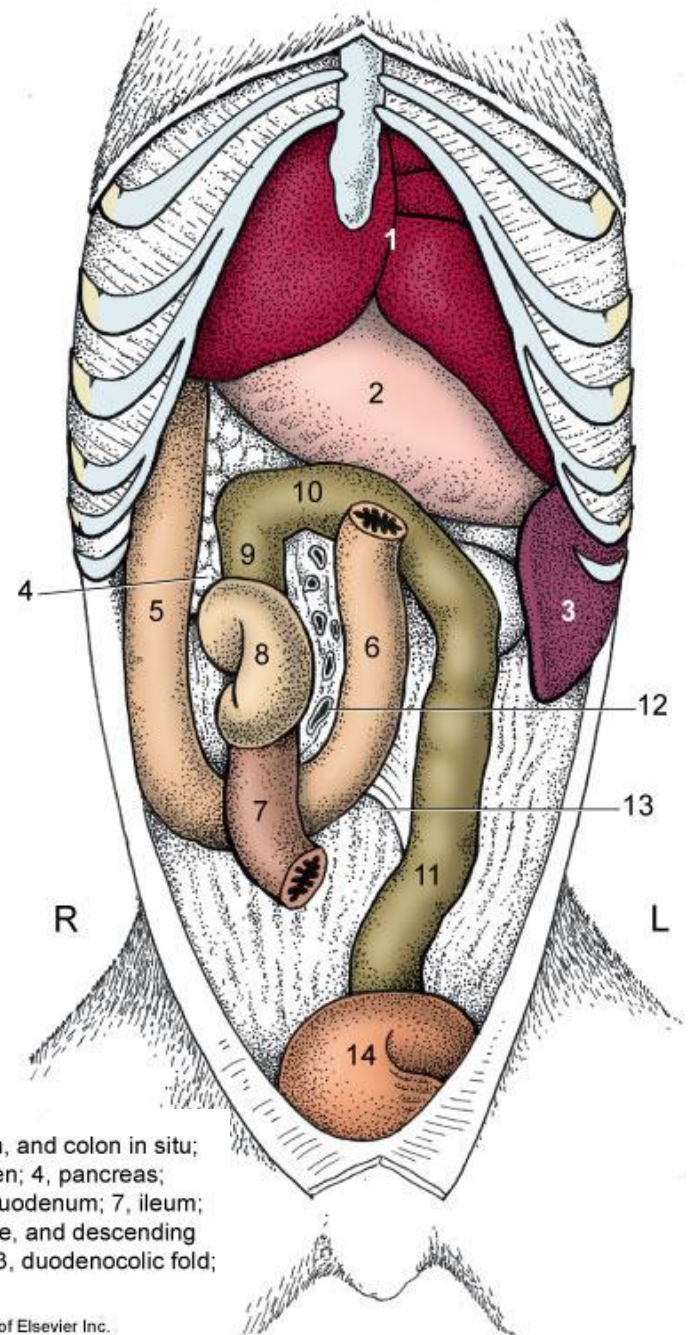
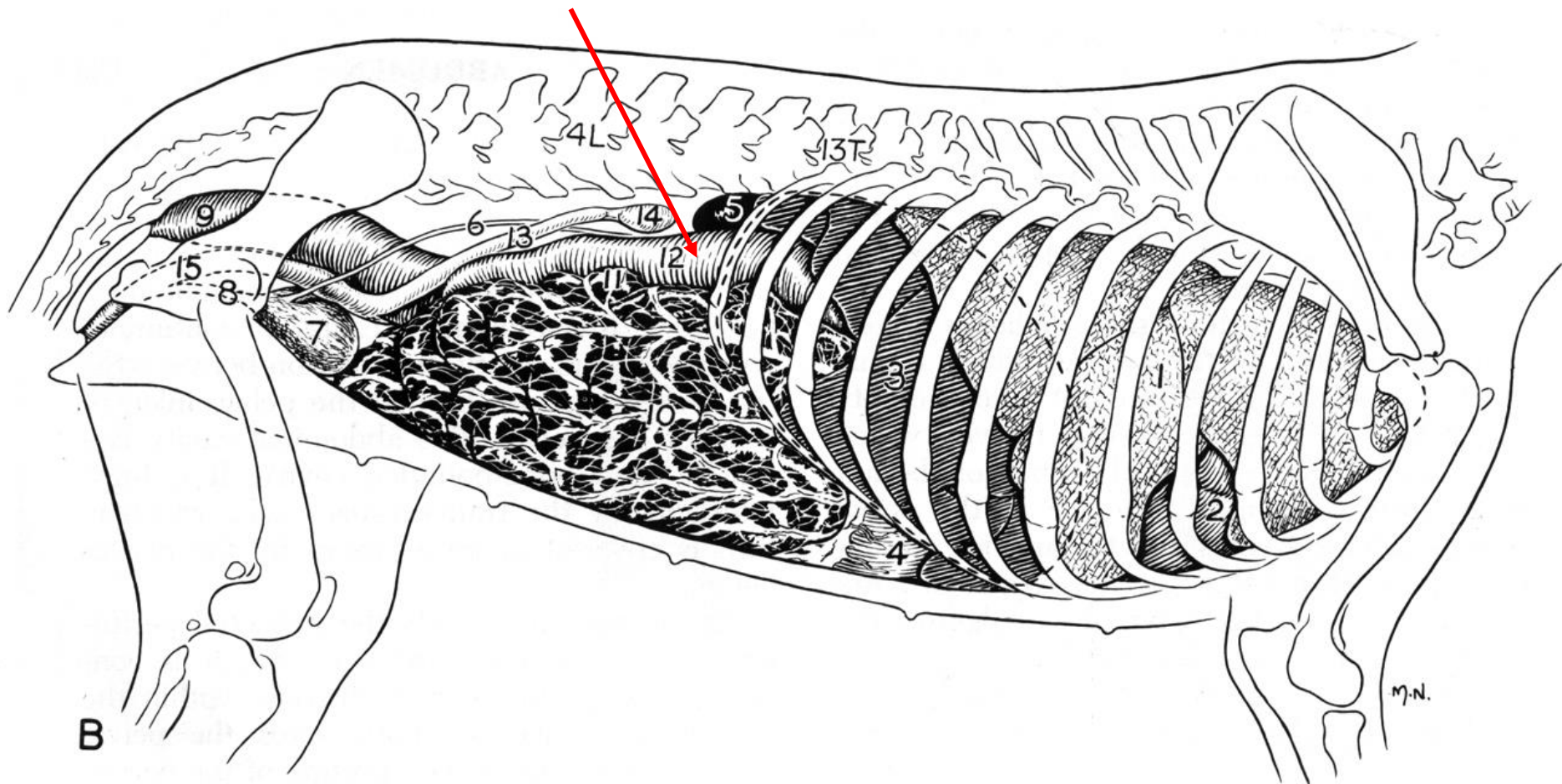


Fig. 14-15. The canine duodenum, cecum, and colon in situ; ventral view. 1, Liver; 2, stomach; 3, spleen; 4, pancreas; 5, descending duodenum; 6, ascending duodenum; 7, ileum; 8, cecum; 9, 10, 11, ascending, transverse, and descending colon; 12, vessels in root of mesentery; 13, duodenocolic fold; 14, bladder.

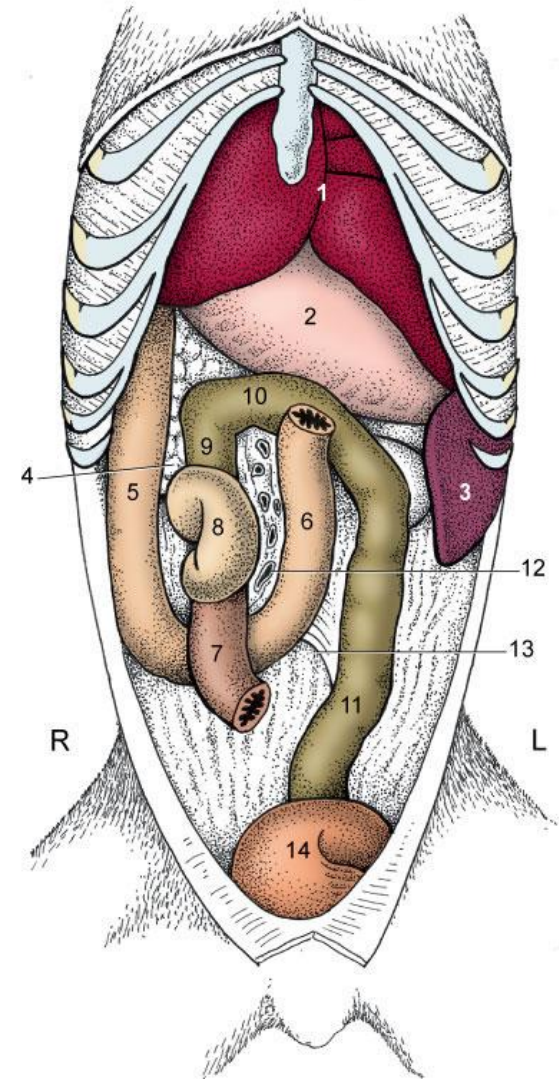
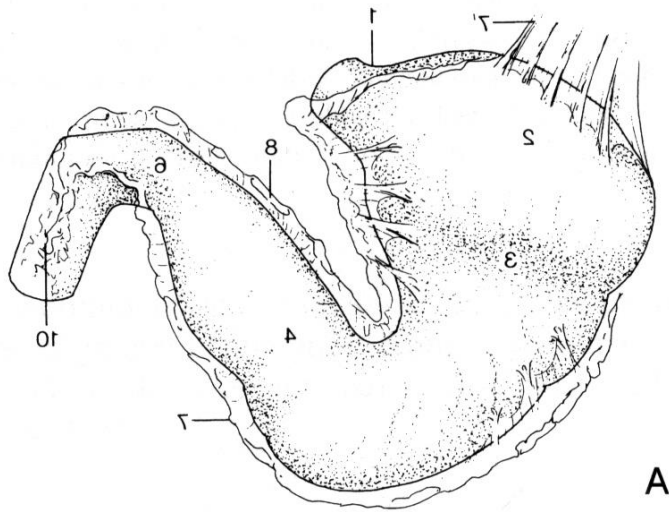


Descending duodenum



# Duodenum – connecting peritoneum

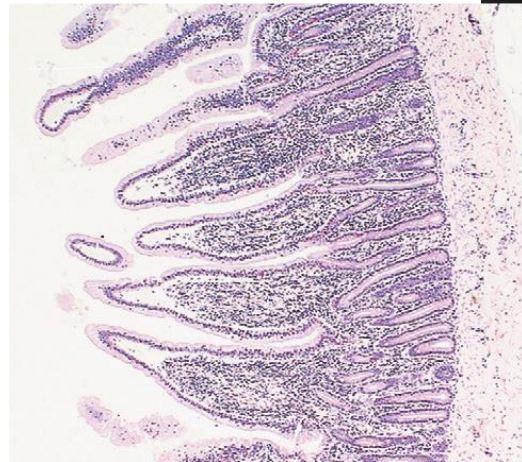
1. Mesoduodenum
2. Hepatoduodenal ligament
3. Duodenocolic fold





# Duodenum – internal features

- Pyloric opening
- Major duodenal papilla
- Minor duodenal papilla
- Mucosal folds covered in numerous microscopic villi
- Brunner's glands  
→ mucus



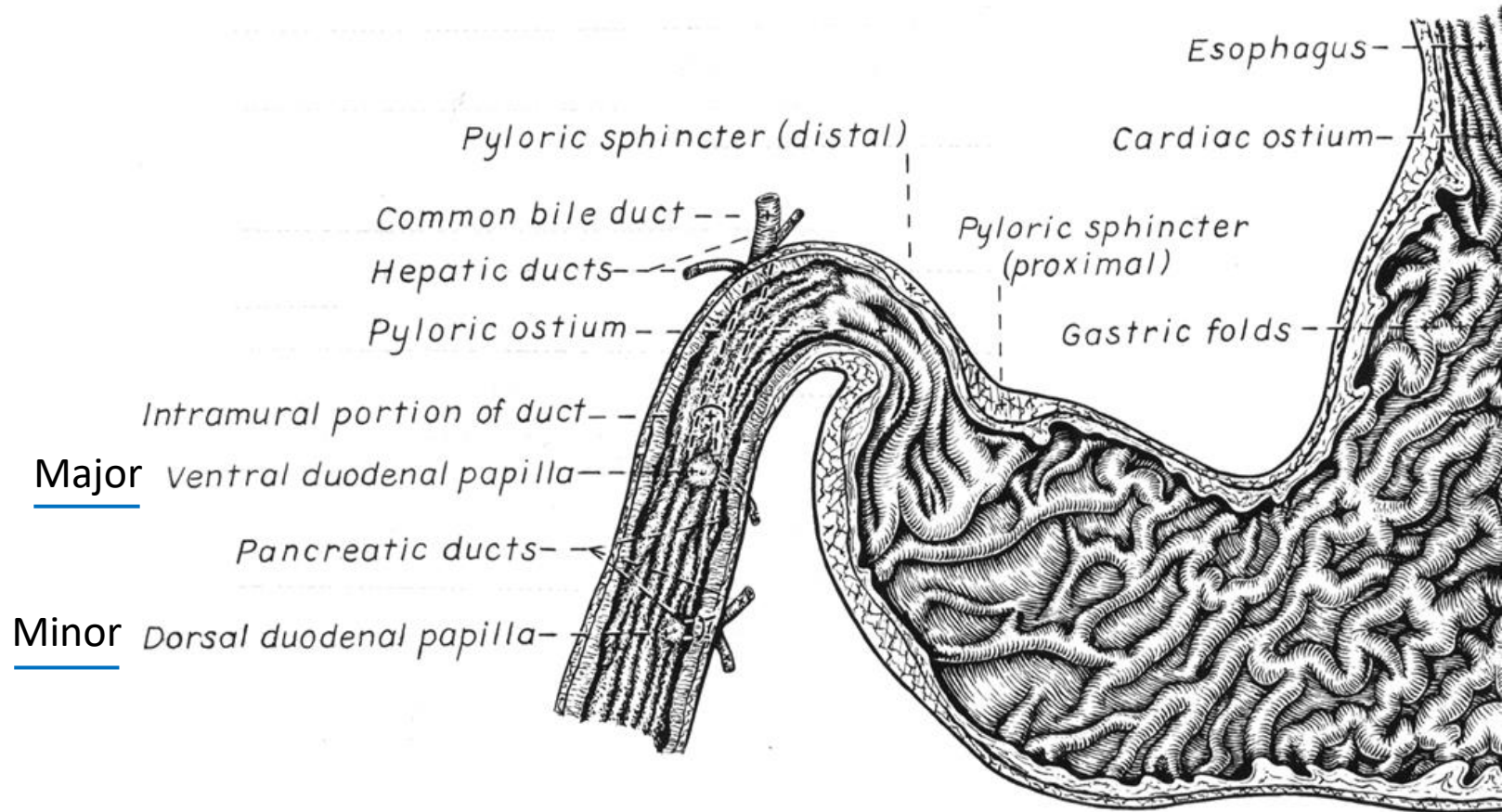
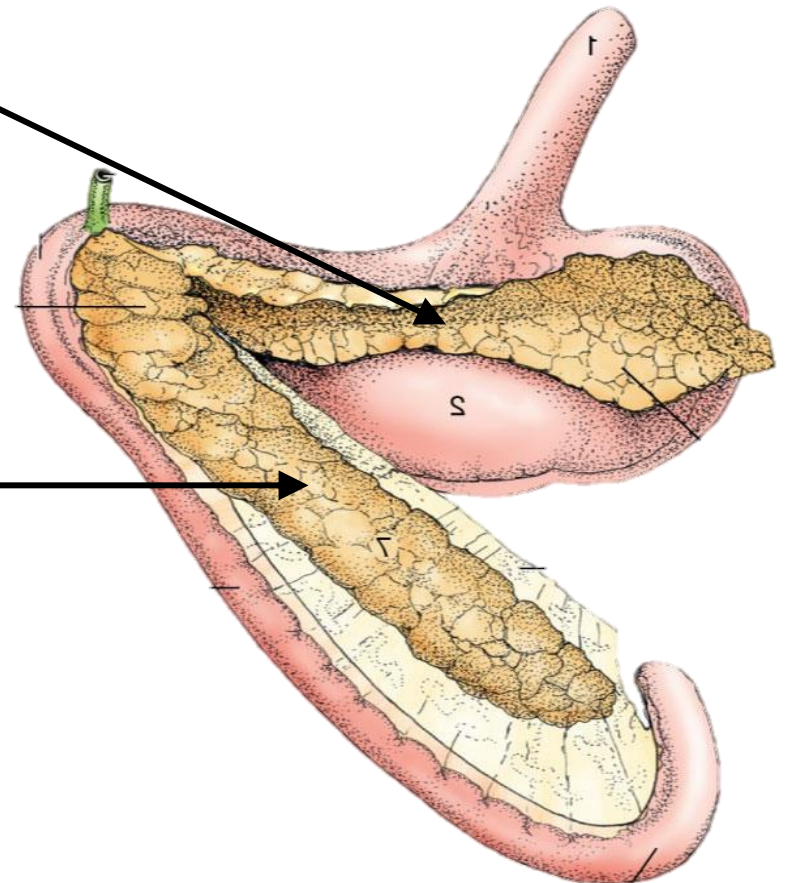


FIG. 13-15. Longitudinal section of stomach and proximal portion of duodenum.

# Pancreas

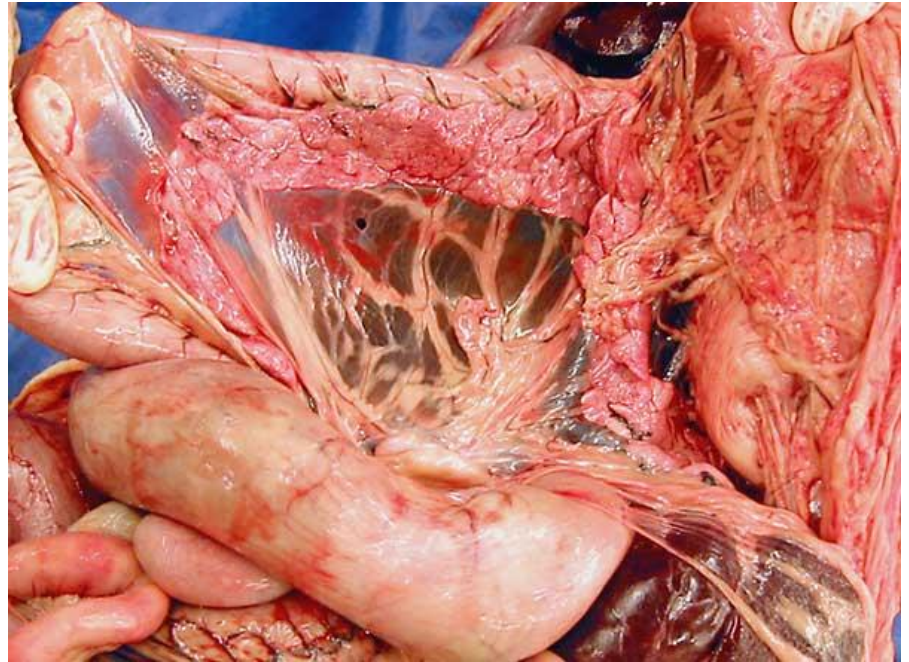
- Body
- Two lobes (V-shape, unite caudomedial to pylorus)
  - Left lobe: shorter & thicker
    - Associated with caudal surface of the stomach; within the greater omentum
  - Right lobe: long & slender
    - Runs within the mesoduodenum





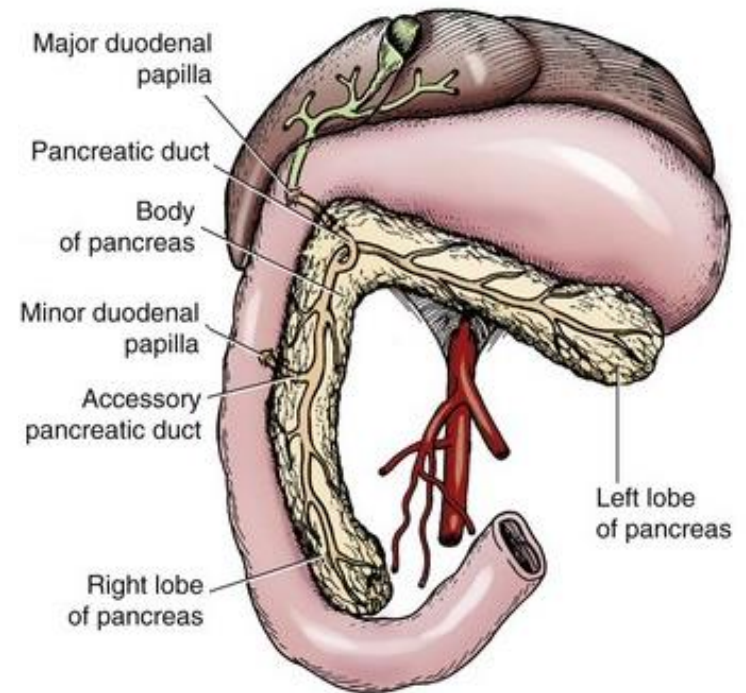
# Pancreas

- External features:
  - Body & two lobes
  - Yellowish-pink in colour
  - Coarsely lobulated and forms a nodular surface



# Pancreas

- Pancreatic Duct
  - Drains ventral primordium
  - Opens on major duodenal papilla
    - In conjunction with bile duct
- Accessory Pancreatic Duct
  - Drains dorsal primordium
  - Opens on minor duodenal papilla
    - 3-5 cm distal



# Cat – duodenum and pancreas



- Duodenum
  - ~10cm long
  - (Total small intestine length: 1-1.2m)
- Pancreas
  - Only one duodenal papilla
  - Only one pancreatic duct





# Jejunum & ileum

- Forms the bulk of small intestine
- Occupies the ventral part of abdomen – between stomach and bladder
- May be exteriorised



# Jejunum & ileum – external features

- Jejunum

- Most convoluted part of s.i.
- Long mesentery

- Ileum

- Straight and usually contracted (firmer)
- Additional (antimesenteric) blood vessel and ileocaecal fold
- Ends at the ileocolic junction

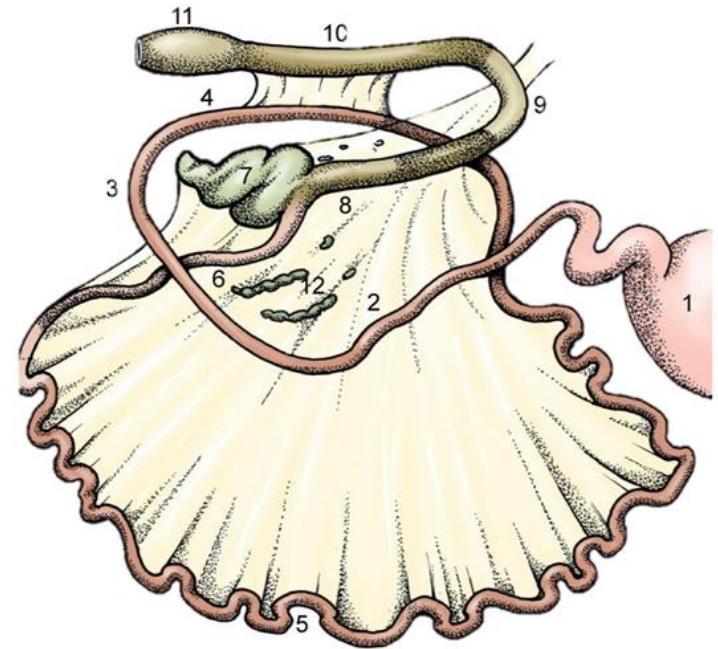


Fig. 3-40. Intestinal tract of the dog (schematic). 1, Stomach; 2, descending duodenum; 3, caudal flexure; 4, ascending duodenum; 5, jejunum; 6, ileum; 7, cecum; 8, ascending colon; 9, transverse colon; 10, descending colon; 11, recta ampulla; 12, jejunal lymph nodes.

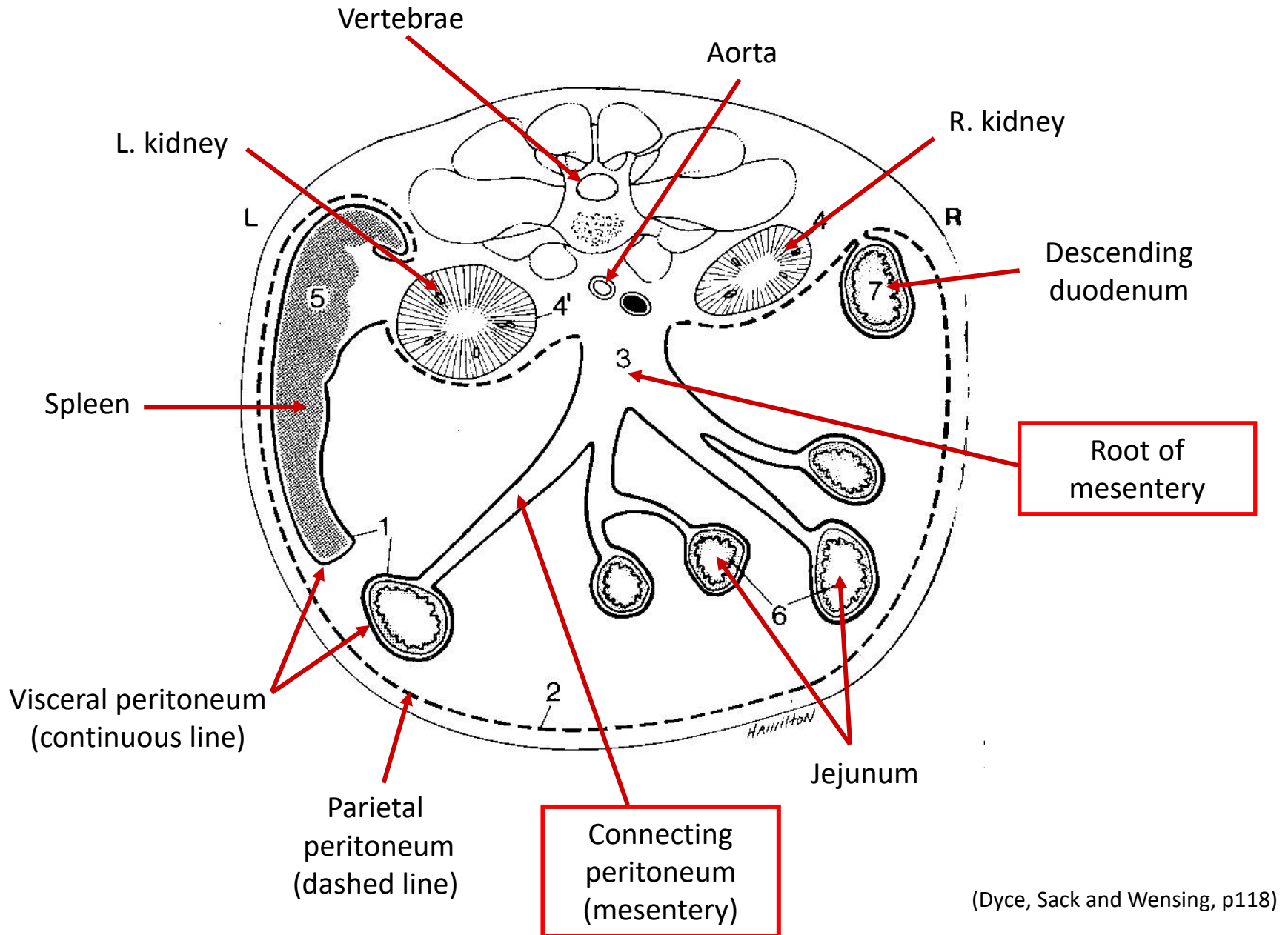
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# Jejunum & ileum – connecting peritoneum

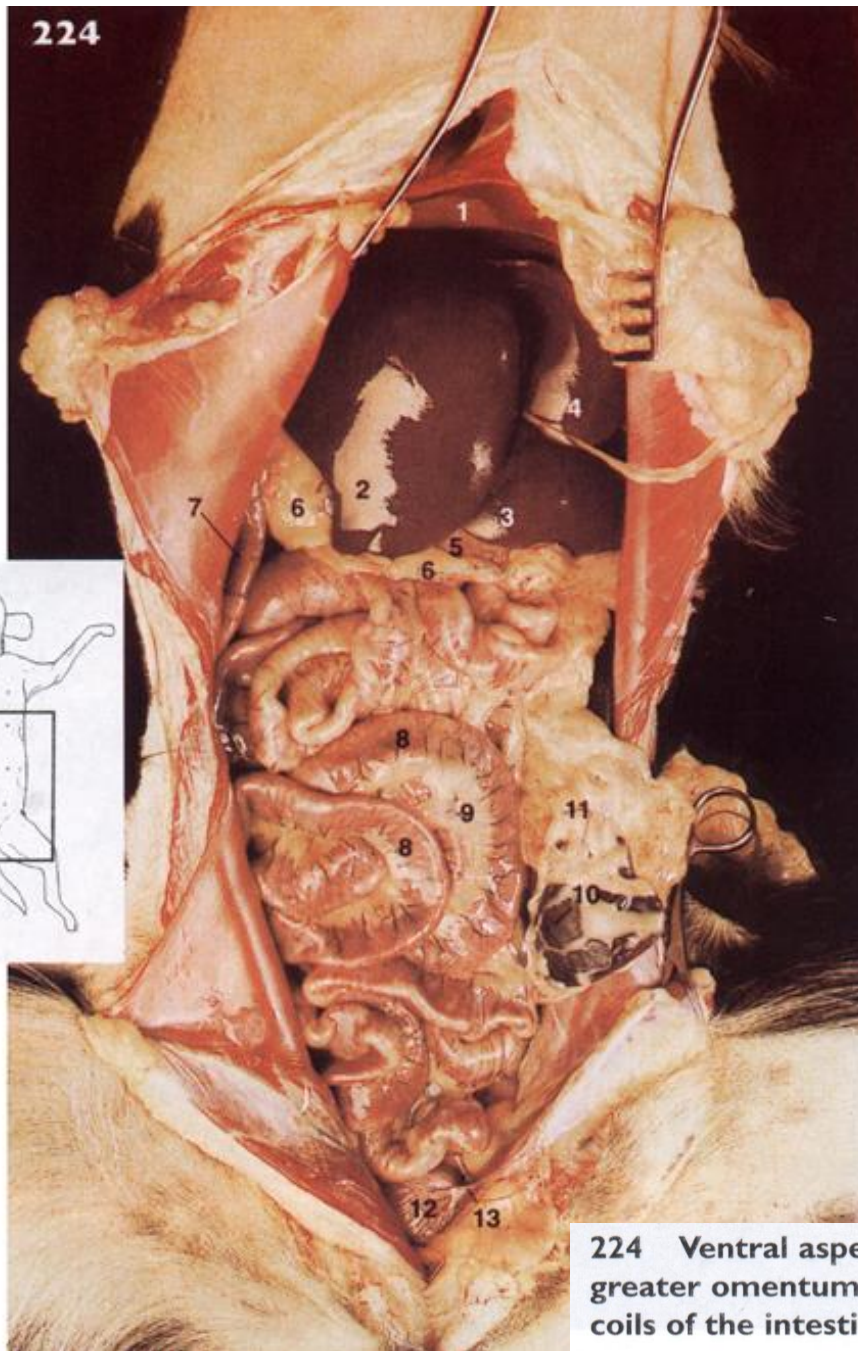
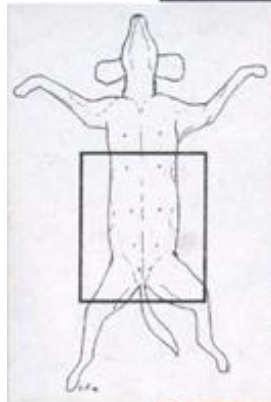
- Great mesentery (long mesentery)
  - Connecting peritoneum (two layers)
  - Vessels and nerves between layers
  - Gathered at its root at the origin of the cranial mesenteric artery
- (Intestinal mass covered ventrally by greater omentum)







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**224** Ventral aspect of the open abdomen of a male dog. The greater omentum has been reflected cranially to reveal the coils of the intestinal tract.

# Omentum

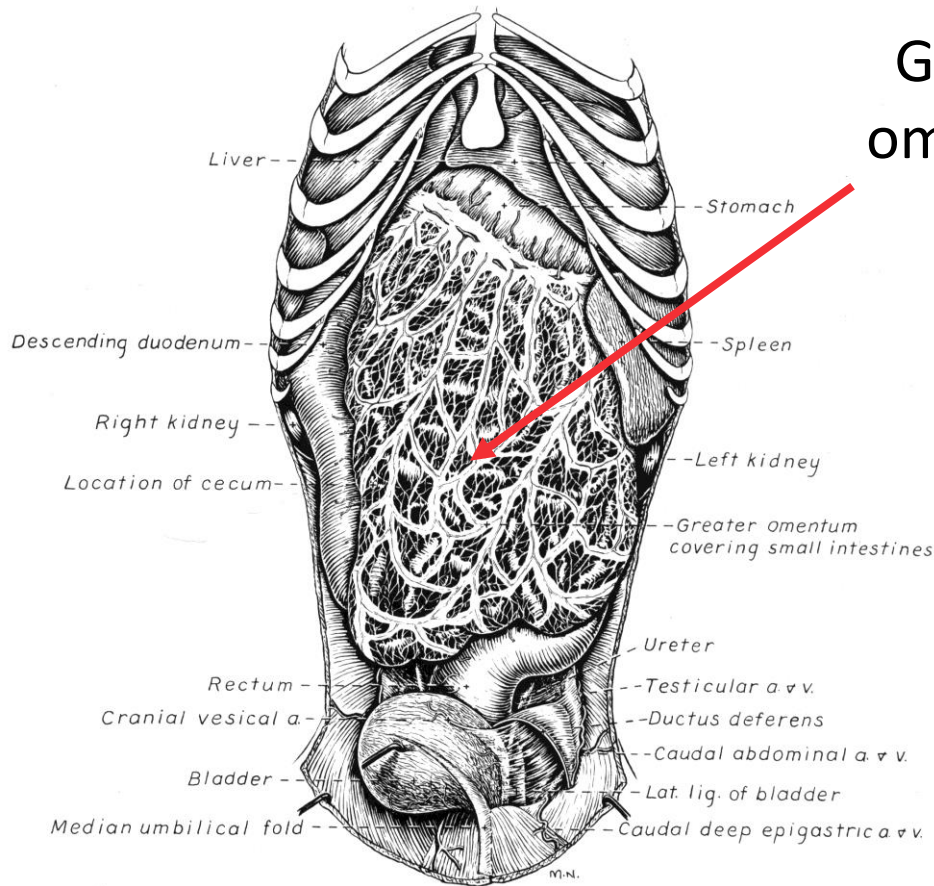
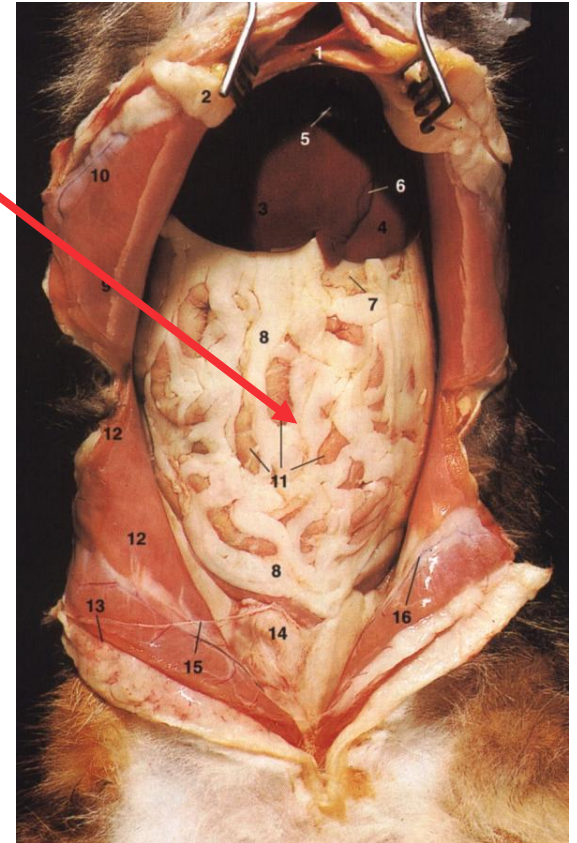


FIG. 13-11. Abdominal viscera of male dog, ventral aspect.

Greater  
omentum

Cranial

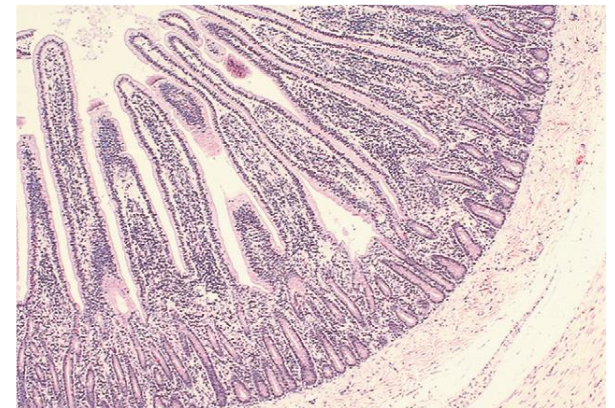


Caudal



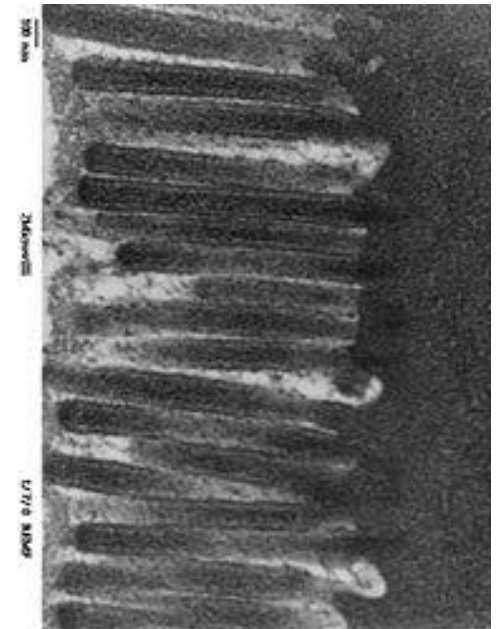
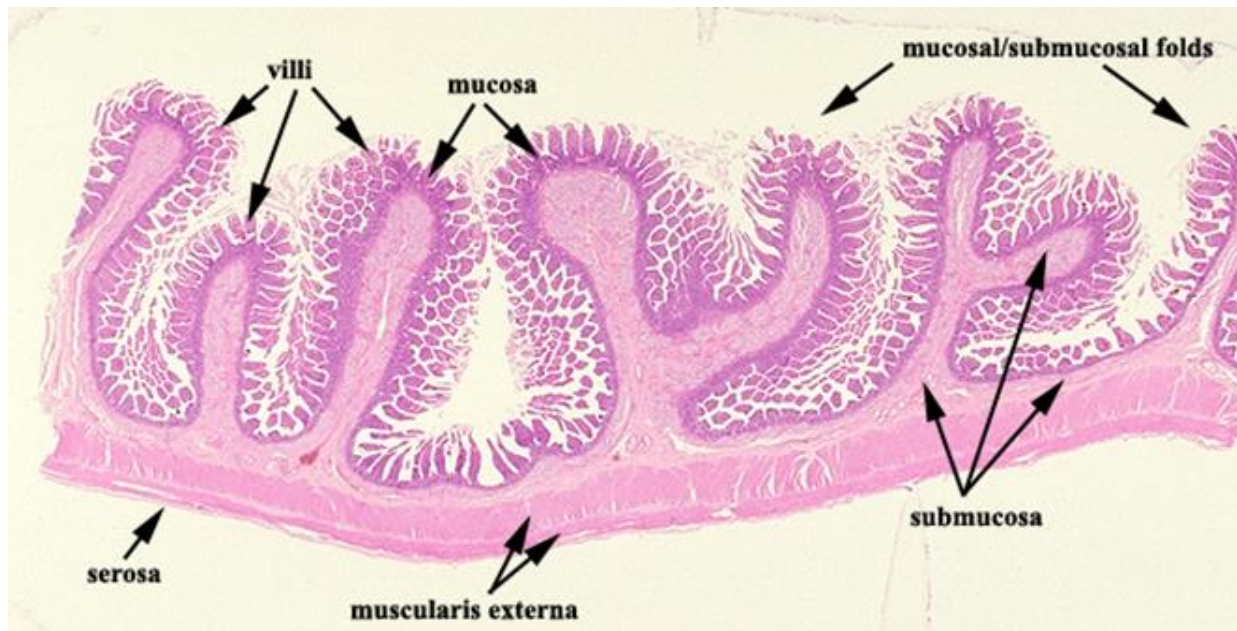
# Jejunum & ileum – internal features

- Velvety appearance – villi
- Longitudinal and spiral folds
- Peyer's patches
- Ileocolic orifice/ - sphincter



# Small intestine – internal features

- Surface area ↑↑↑
  - Gross folds
  - Villi
  - Microvilli: “Brush borders”



# Ileocolic junction

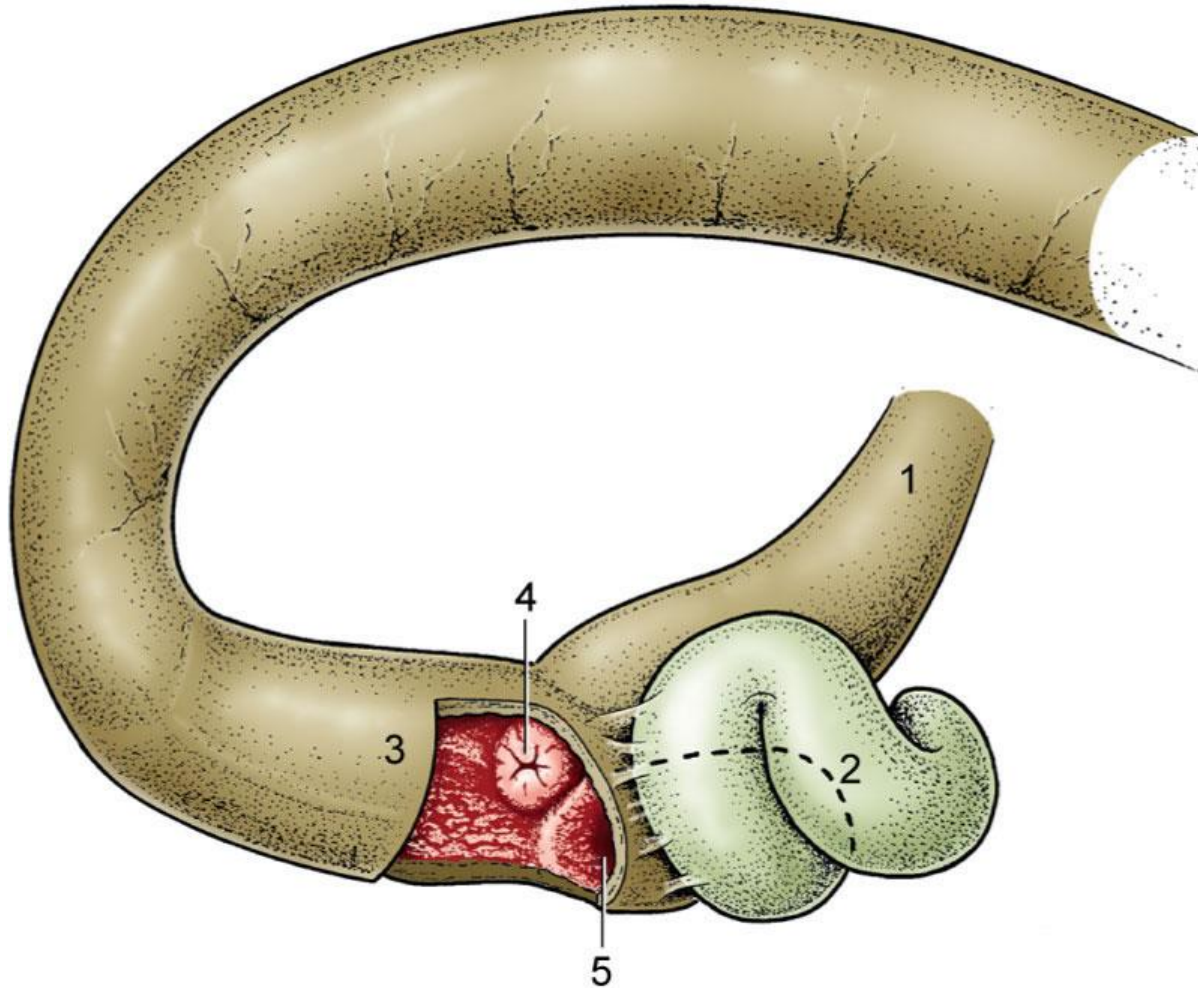


Fig. 3-46. The ileocolic junction and its relation to the cecum in the dog. 1, ileum; 2, cecum; 3, ascending colon; 4, ileal orifice surrounded by annular fold; 5, cecocolic orifice.



# Large intestine

- Consists of four segments:
  - Caecum
  - Colon
  - Rectum
  - Anal canal

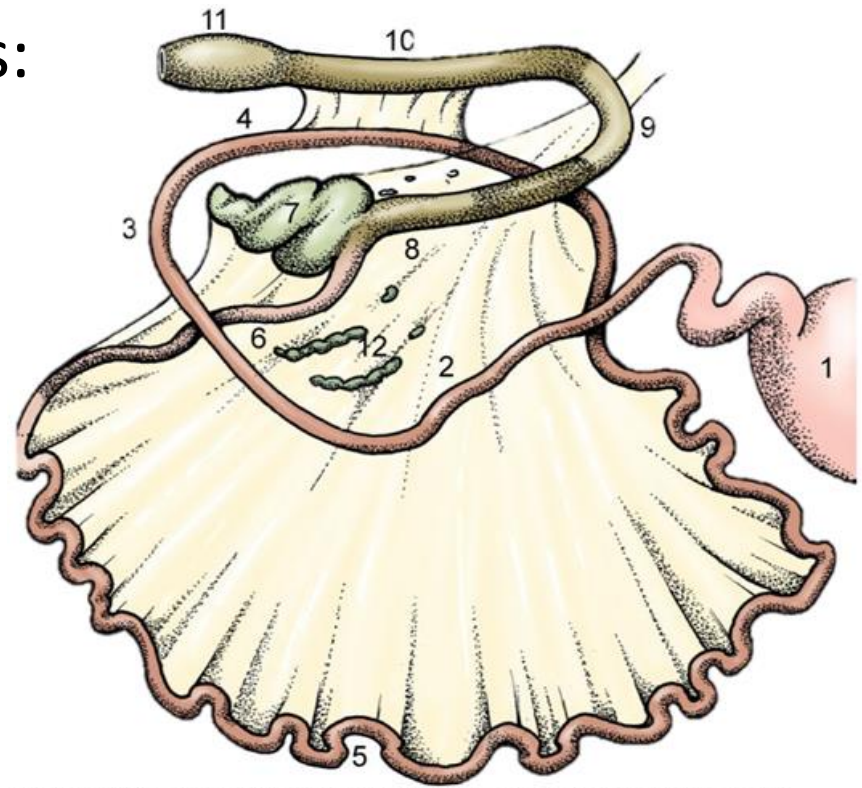
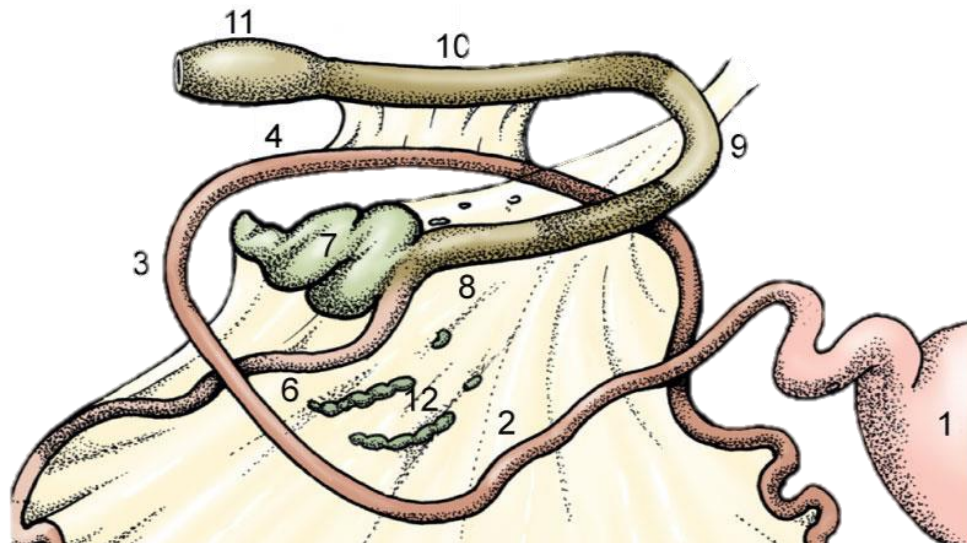


Fig. 3-40. Intestinal tract of the dog (schematic). 1, Stomach; 2, descending duodenum; 3, caudal flexure; 4, ascending duodenum; 5, jejunum; 6, ileum; 7, cecum; 8, ascending colon; 9, transverse colon; 10, descending colon; 11, recta ampulla; 12, jejunal lymph nodes.

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# Caecum – external features

- Located in right dorsal region of abdominal cavity
- Ileocaecal fold
- Blind ending
  - Spiral-shaped in dogs



# Caecum – internal features

- Opens into ascending colon via caecocolic orifice
- Guarded by muscular ring – caecocolic sphincter

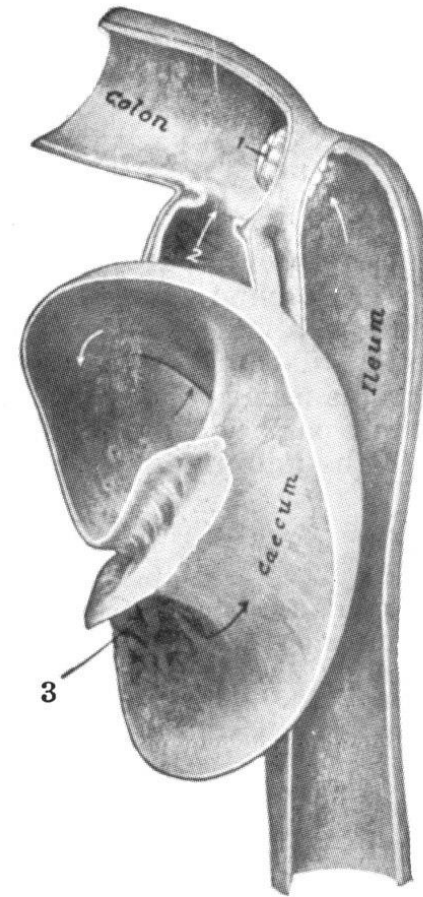
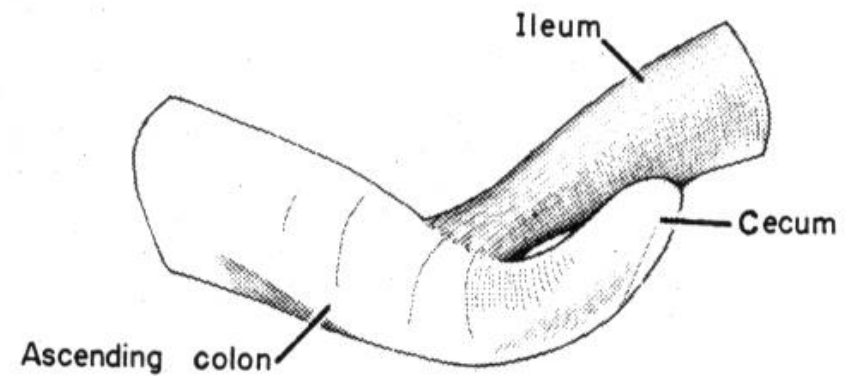
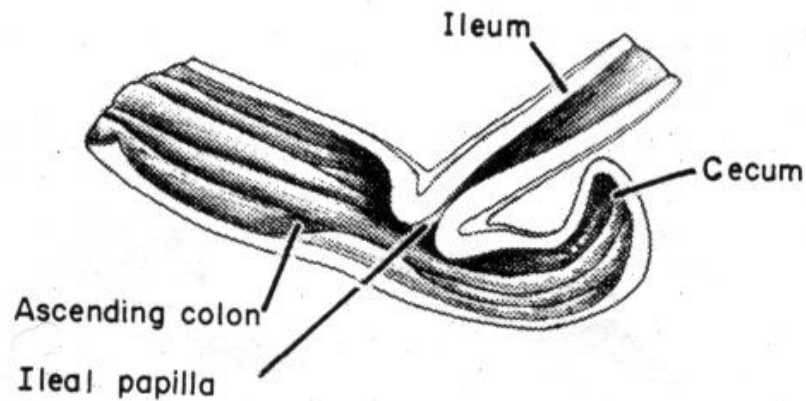


FIGURE 51-18. Sectional view of ileum, cecum, and colon of dog.

1, Ileal opening; 2, caecocolic orifice; 3, apex of cecum.



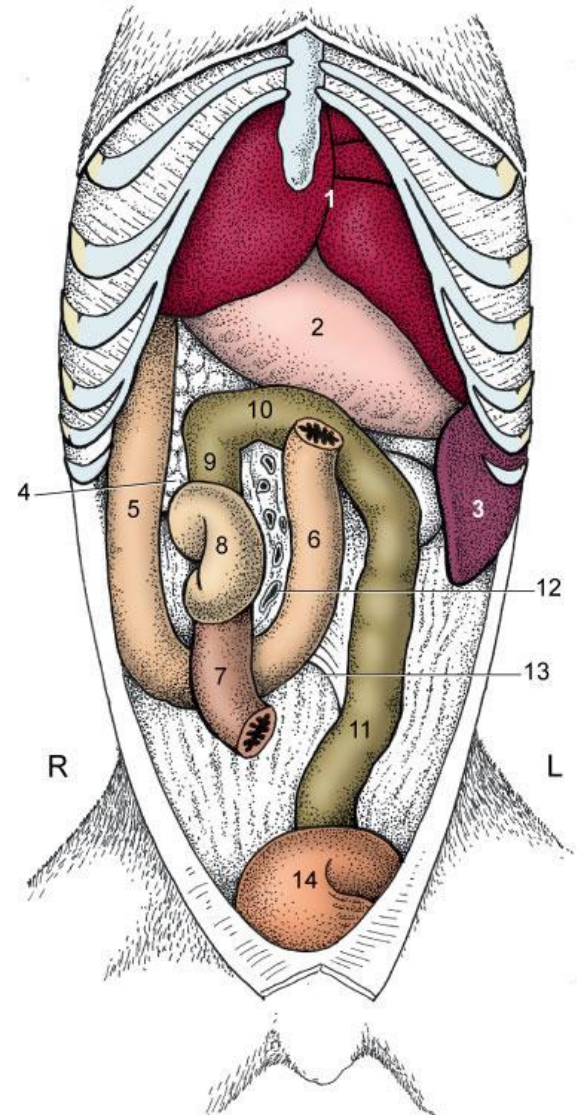
# Cat – caecum



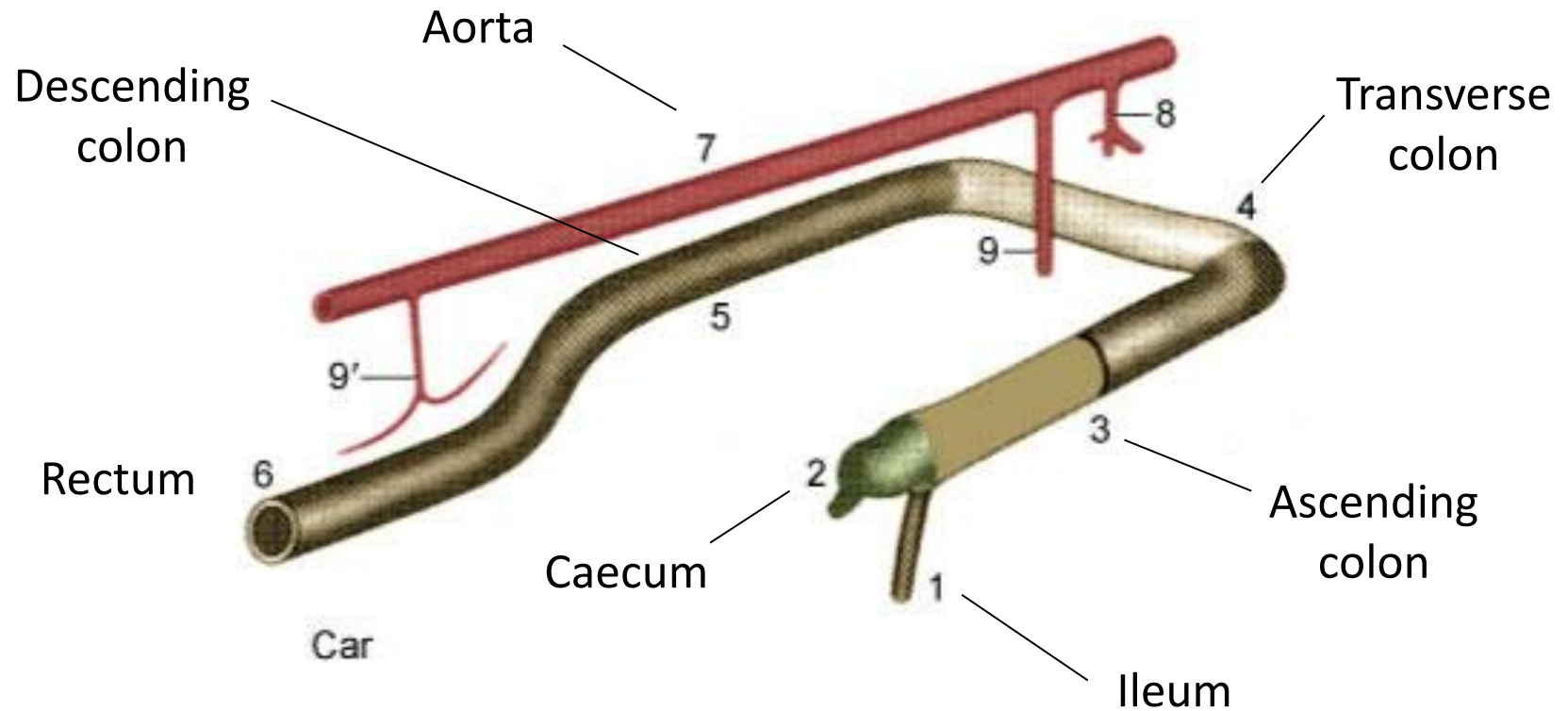
**FIGURE 51-19. Ileum, cecum and colon of cat.**

# Colon – external features

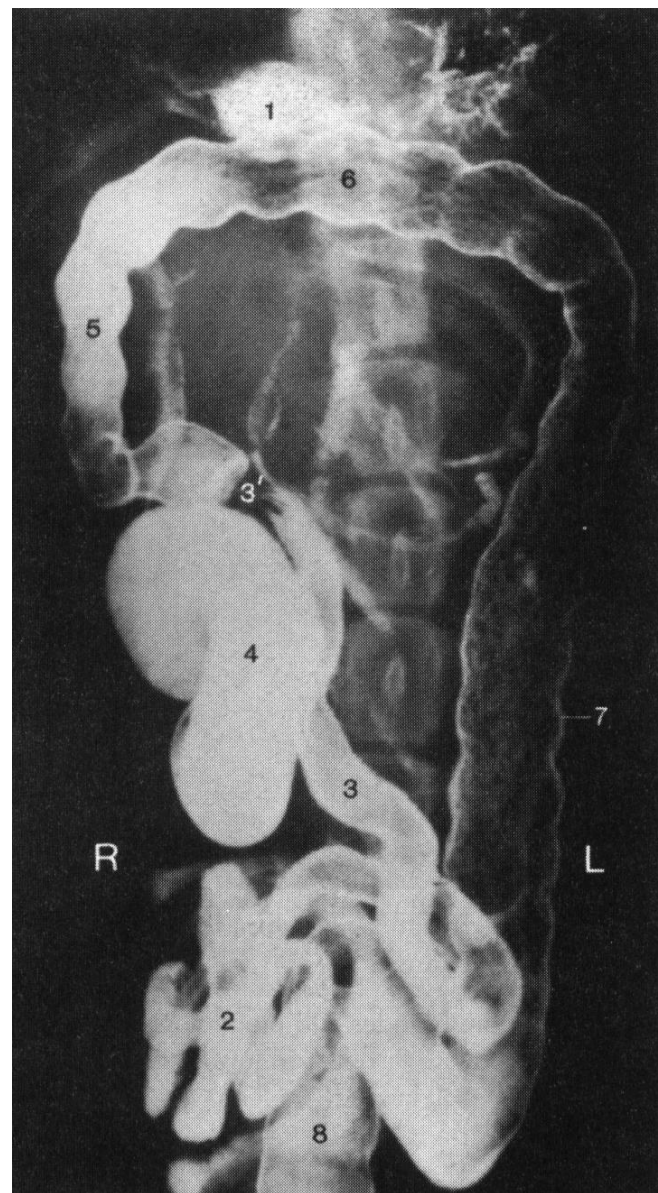
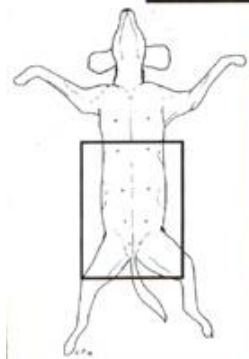
- Three parts:
  - Ascending colon
  - Transverse colon
  - Descending colon
- Connecting peritoneum:
  - Mesocolon
  - Duodenocolic fold



# Large intestine - schematic

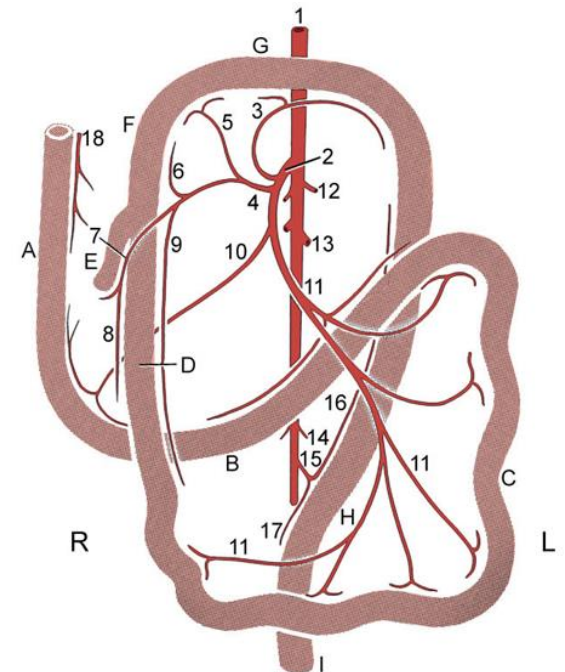


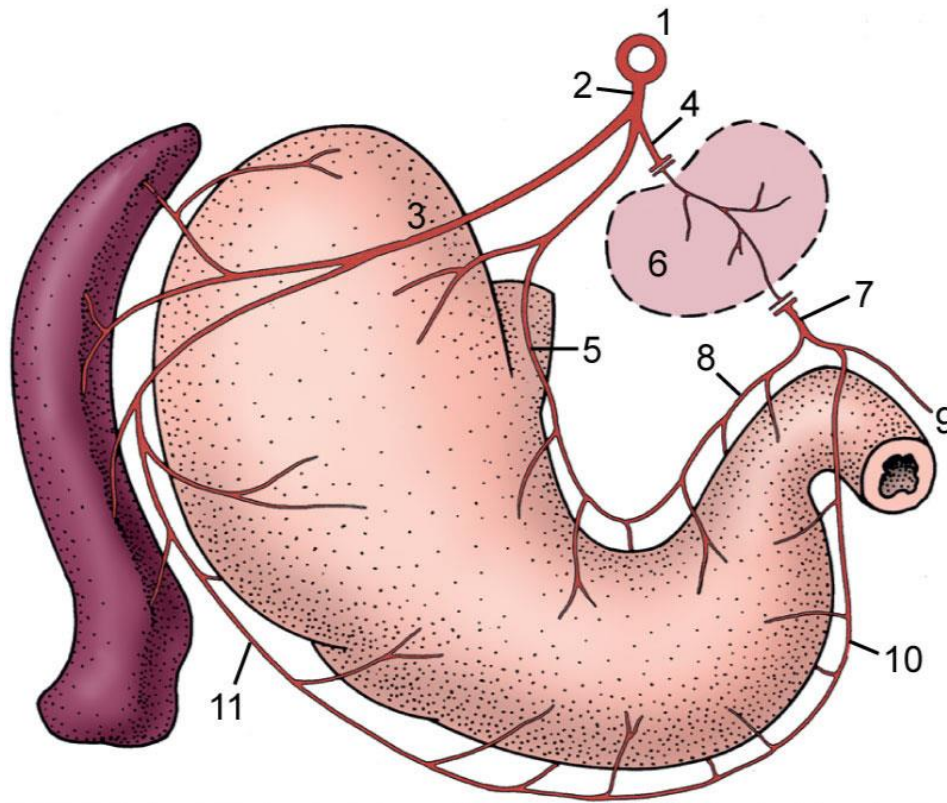




# Blood supply to the intestines

- Celiac artery
  - Hepatic branch to proximal duodenum
- Cranial mesenteric artery
  - Small intestine, caecum and most of colon
- Caudal mesenteric artery
  - Descending colon, cranial rectum
- Internal pudendal artery
  - Caudal rectum and anus





- 1 – Aorta
- 2 – Celiac a.
- 4 – Hepatic a.
- 7 – Gastroduodenal a.
- 9 – Cranial pancreatico-  
duodenal a.



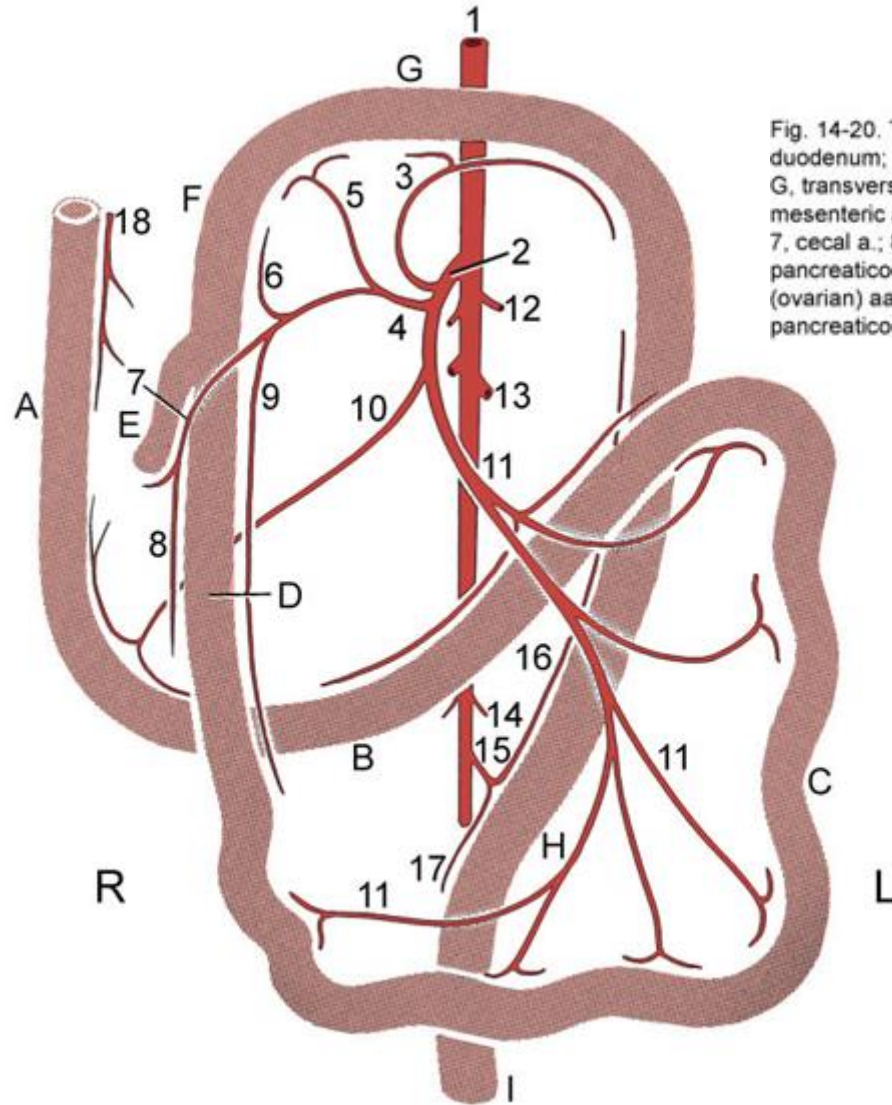


Fig. 14-20. The blood supply of the intestinal tract, ventral view; schematic. A, Descending duodenum; B, ascending duodenum; C, jejunum; D, ileum; E, cecum; F, ascending colon; G, transverse colon; H, descending colon; I, rectum. 1, Abdominal aorta; 2, cranial mesenteric a.; 3, middle colic a.; 4, ileocolic a.; 5, right colic a.; 6, colic branch of ileocolic a.; 7, cecal a.; 8, antimesenteric ileal branch; 9, mesenteric ileal branch; 10, caudal pancreaticoduodenal a.; 11, jejunal aa.; 12, phrenicoabdominal aa.; 13, renal aa.; 14, testicular (ovarian) aa.; 15, caudal mesenteric a.; 16, left colic a.; 17, cranial rectal a.; 18, cranial pancreaticoduodenal a.

# Venous drainage

- Tributaries of portal vein

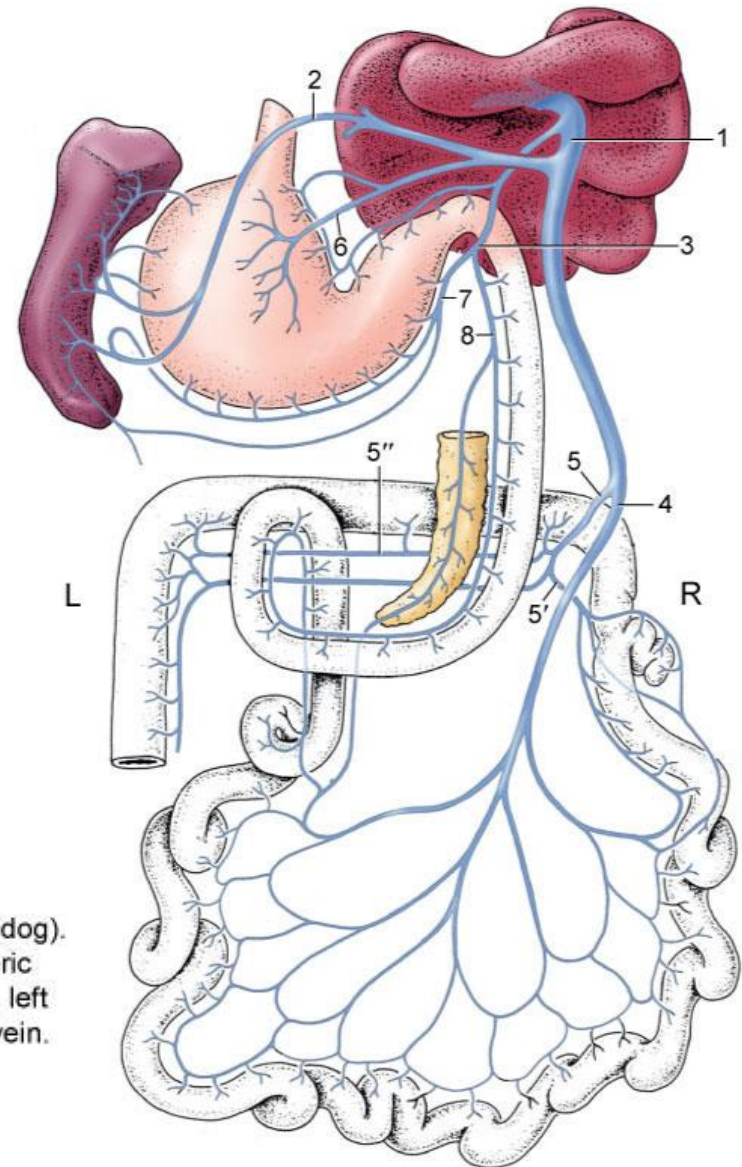
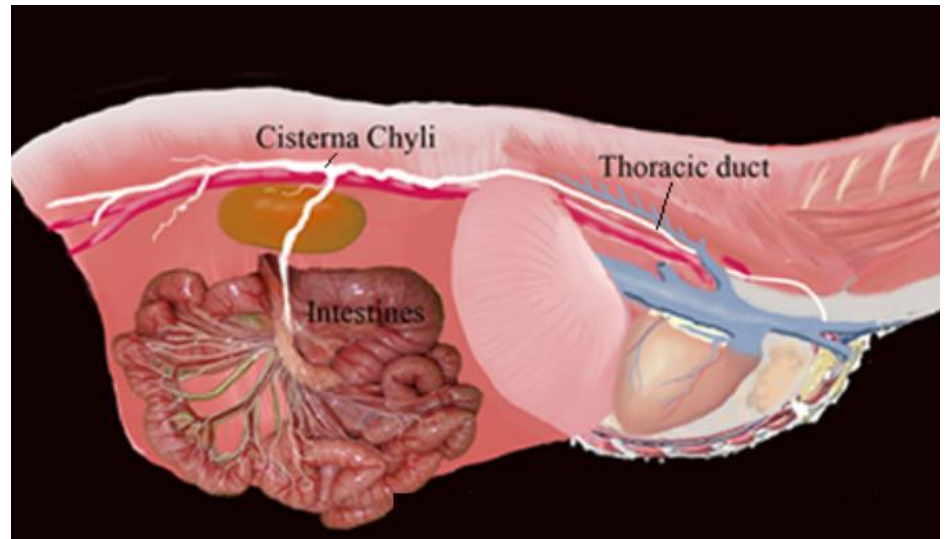


Fig. 3-50. Semischematic dorsal view of the formation of the portal vein (dog).  
1, Portal vein; 2, splenic vein; 3, gastroduodenal vein; 4, cranial mesenteric  
vein; 5, caudal mesenteric vein; 5', ileocolic vein; 5'', middle colic vein; 6, left  
gastric vein; 7, right gastroepiploic vein; 8, cranial pancreaticoduodenal vein.

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# Lymphatic drainage

- Particularly in small intestines
- Lymphatic vessels in mesentery
  - Flow to mesenteric lymph nodes at root of mesentery
  - Lymph then enters the cisterna chyli – origin of the thoracic duct



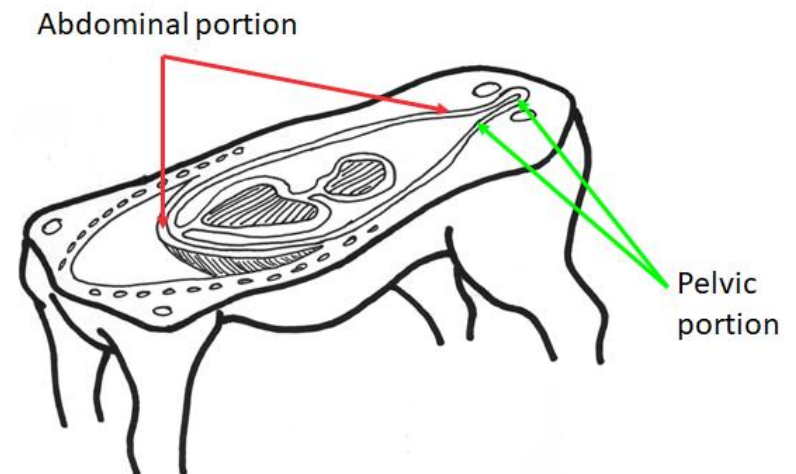


# Nerve supply to intestines

- Parasympathetic nerves: ↑ motility/secretions
  - Vagus nerve (Latin: wanderer)
    - Long nerve from the neck
    - Branches pass through ganglia in dorsal abdomen and synapse in the wall of the intestine
      - Myenteric (Auerbach's) plexus in muscularis externa
  - Pelvic nerves (to rectum and distal colon)
- Sympathetic nerves: ↓ motility/secretions
  - Splanchnic nerves (Greek: splanchna – viscera)
    - Originate from thoraco-lumbar spinal cord
    - Synapse at ganglia in dorsal abdomen
      - Celiac, Cranial mesenteric, Caudal mesenteric

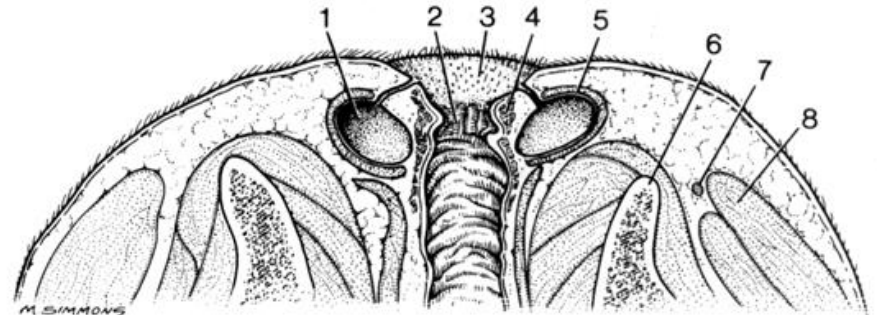
# Rectum

- Pelvic inlet to anal canal
- Most dorsal of the pelvic viscera
- Suspended by the mesorectum
- Terminal end is retroperitoneal



# Anal canal

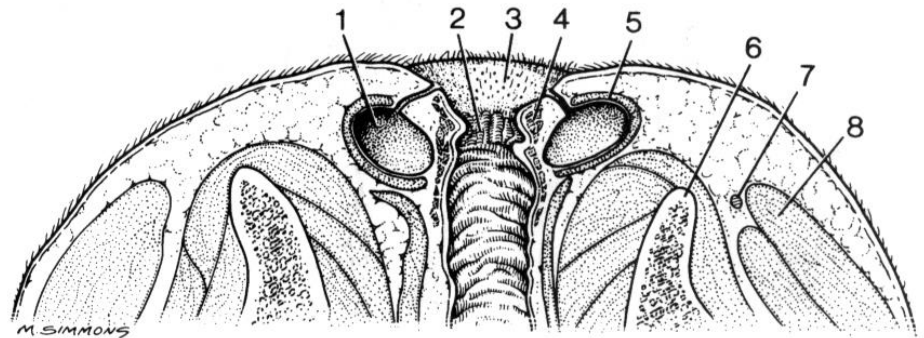
- Very short – connects rectum to the exterior
- External surface covered by skin
  - Thin
  - Hairless
  - Contains numerous circumanal glands
    - Sebaceous glands
    - Sweat glands



**Figure 3-46.** Dorsal (horizontal) section through the canine anal canal.

# Anal canal – internal features

- Recto-anal junction – lumen narrows
- Mucosa thrown into longitudinal folds
- Two sphincters:
  - Internal anal sphincter
    - Smooth muscle
  - External anal sphincter
    - Skeletal muscle



**Figure 3-46.** Dorsal (horizontal) section through the canine anal canal.

1, Anal sac; 2, columnar zone of the anal canal; 3, cutaneous zone; 4, internal and sphincter; 5, external anal sphincter; 6, ischium; 7, sacrotuberous ligament; 8, gluteus superficialis.



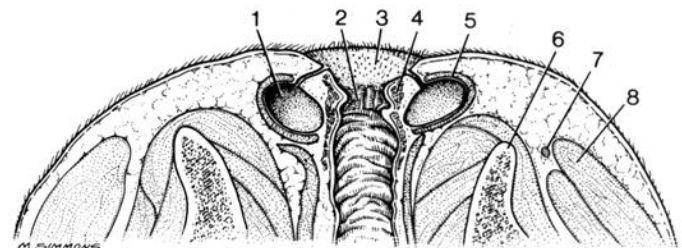
# Anal sacs

- Two large sacs ventrolateral to the anus
- Between the internal and external anal sphincters
- Single duct from each sac
- Glands line the walls of the sacs



283 Caudal aspect of the anal region of a dog. The ducts of the anal sacs have been cannulated.

- |                           |                                                |
|---------------------------|------------------------------------------------|
| 1 Tail                    | 4 Opening of anal sac (cannulated)             |
| 2 Anus (with cotton plug) | 5 Elevations for openings of circumanal glands |
| 3 Cutaneous zone          |                                                |



**Figure 3-46.** Dorsal (horizontal) section through the canine anal canal.

# Summary

- Gross anatomy of the small and large intestines
  - Component parts of the intestinal tract
  - Course and position in the body and relationships to other organs
  - Duodenal papillae
  - External and internal features of anal canal, including anal sacs
- Gross anatomy of pancreas

\*Reinforced in practical class\*

