



Abdominal Pain

Mr Colin Dibble

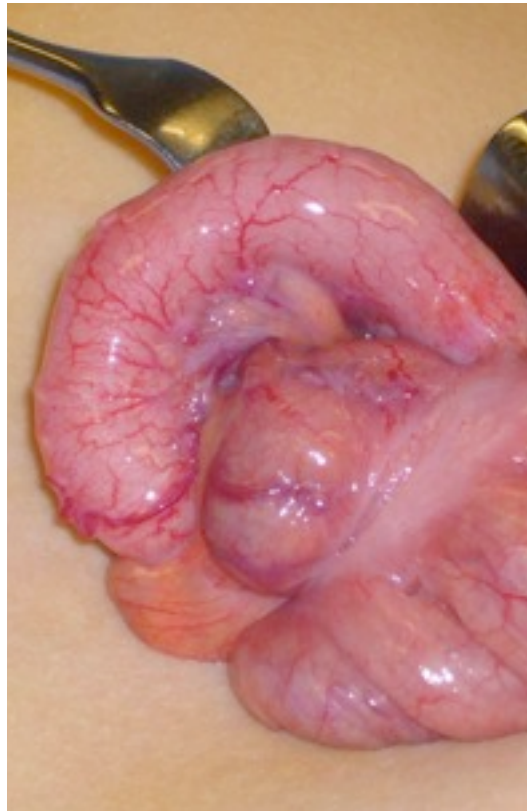
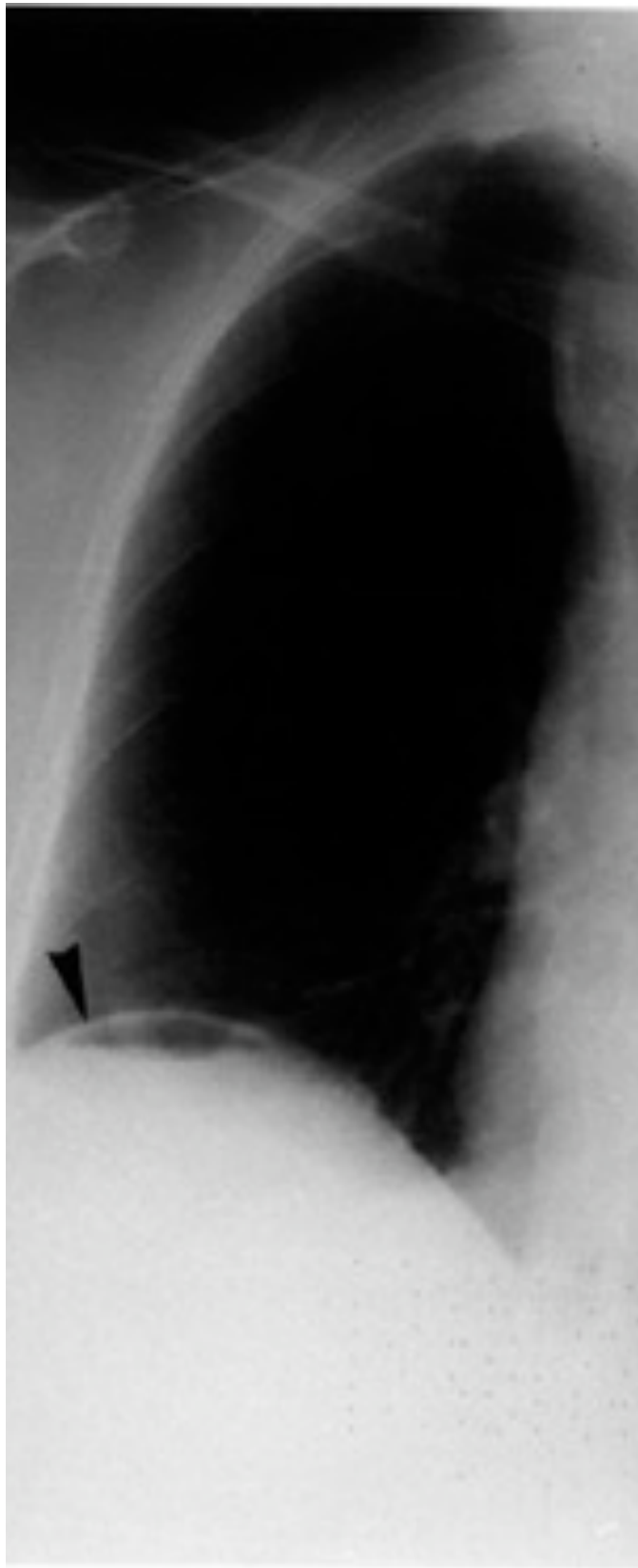
Consultant in Emergency Medicine

North Manchester General Hospital



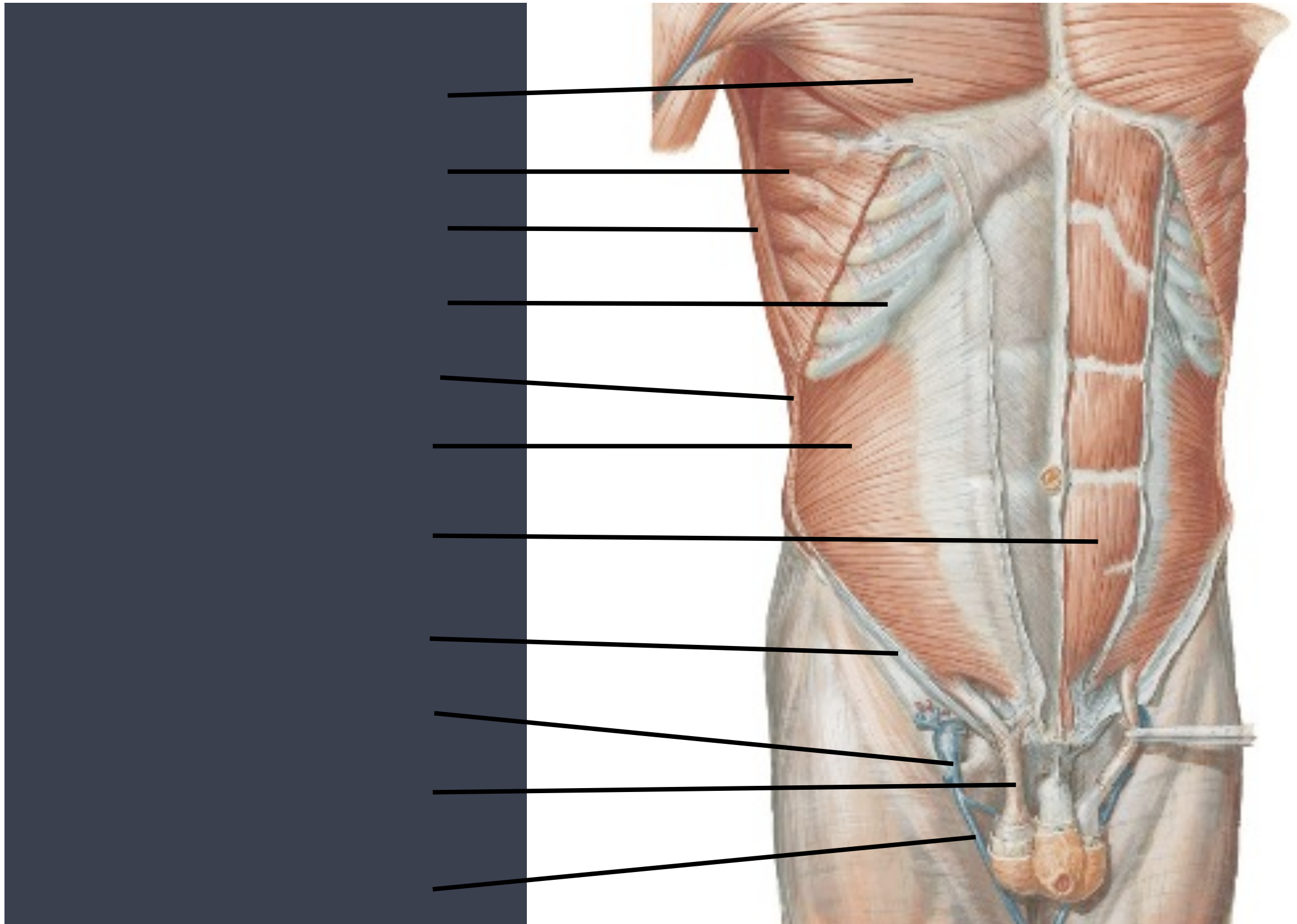
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- ▶ Anatomy
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- ▶ Some Specific Clinical Conditions:
 - ▶ Appendicitis
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 - ▶ PUD/Gastritis
 - ▶ Biliary Disease
 - ▶ Pancreatitis
 - ▶ Renal Disease
 - ▶ Inflammatory Bowel Disease

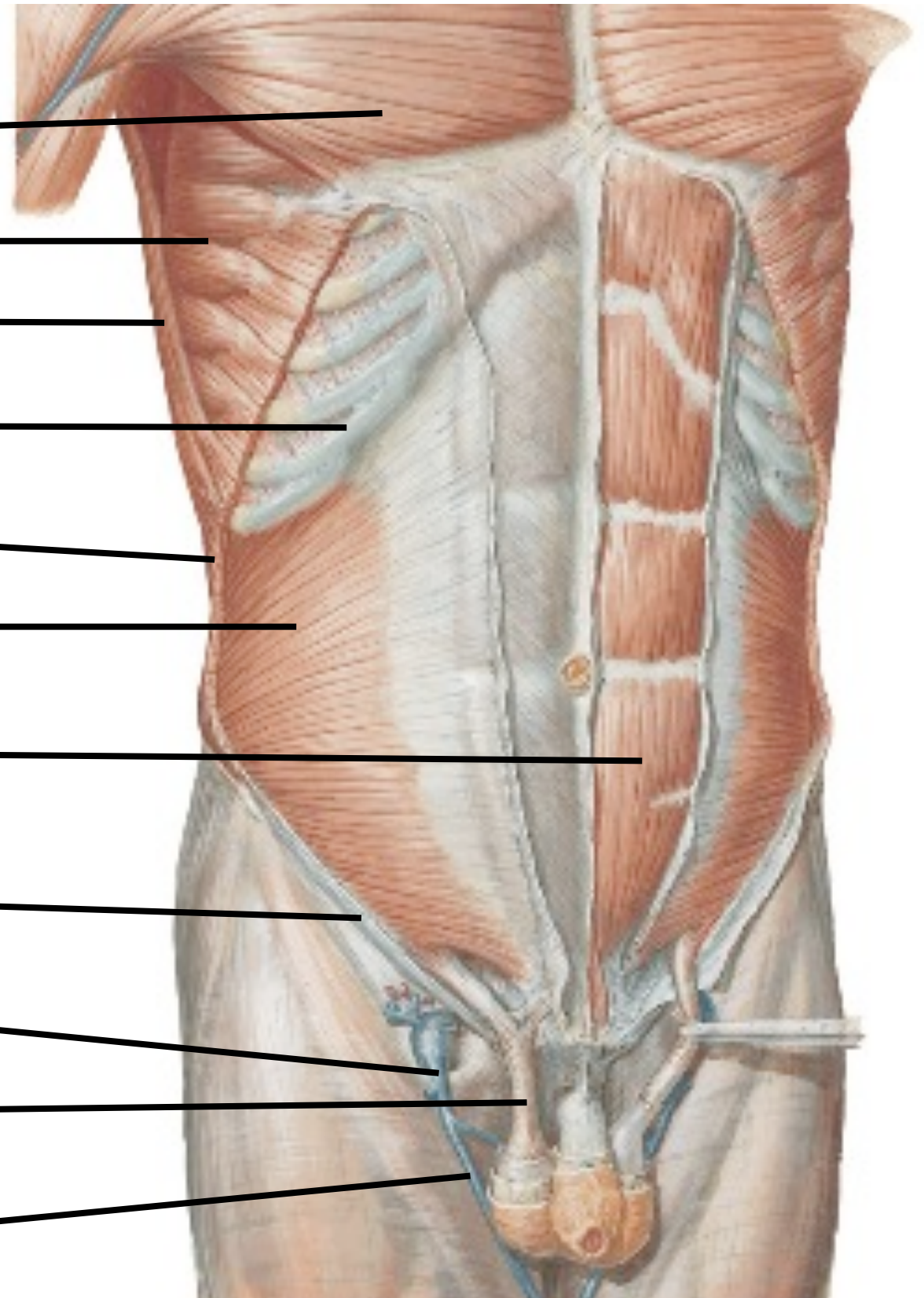


Background

- In last 12 months (Dec 07-08) at NMGH alone:
 - Abdo pain? cause: 1694
 - Biliary Colic: 187
 - Pancreatitis: 186
 - PUD: 108
 - Appendicitis?: 148
 - Obstruction?: 103
- Most diagnoses clinical

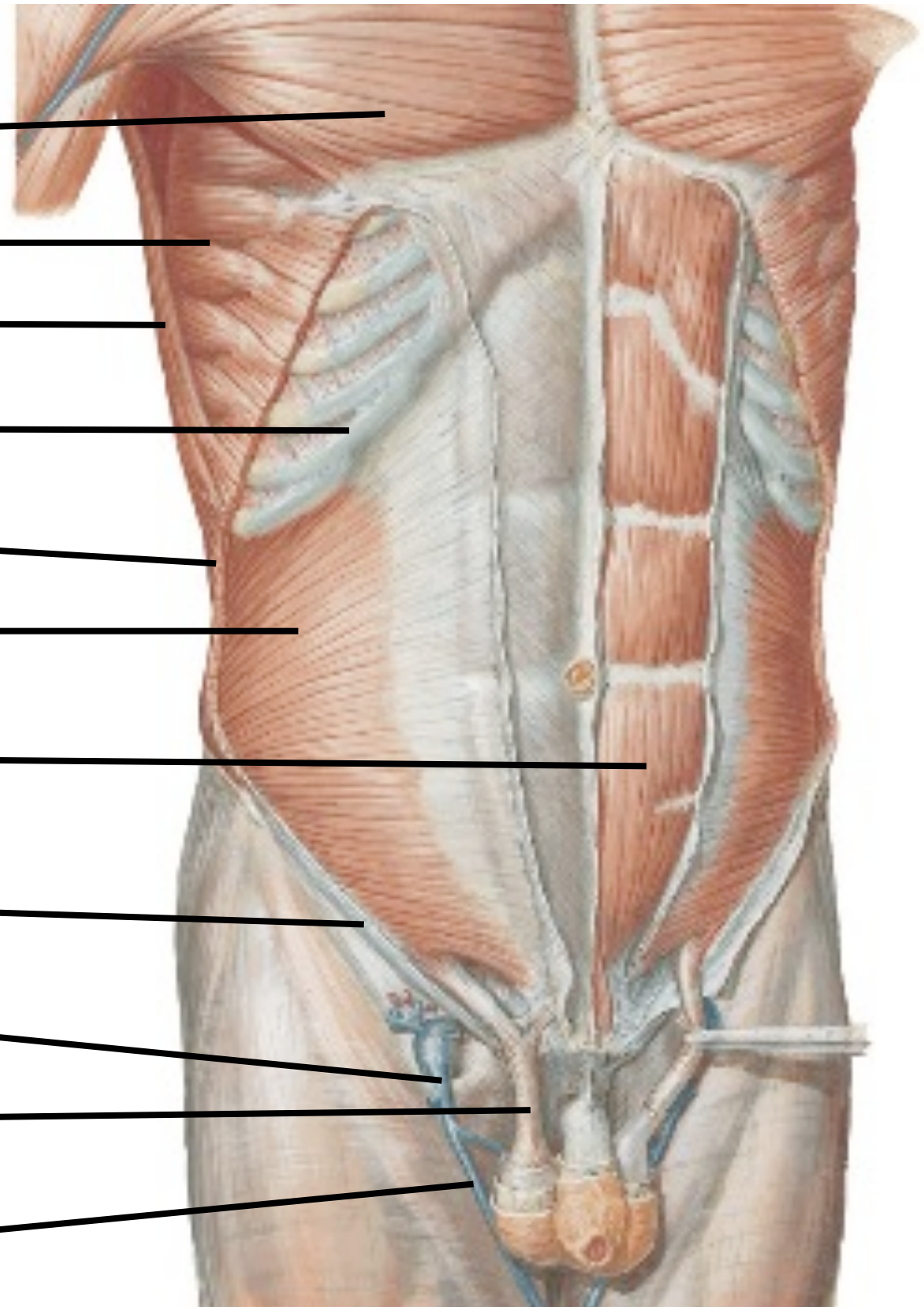


Pectoralis major m.



Pectoralis major m.

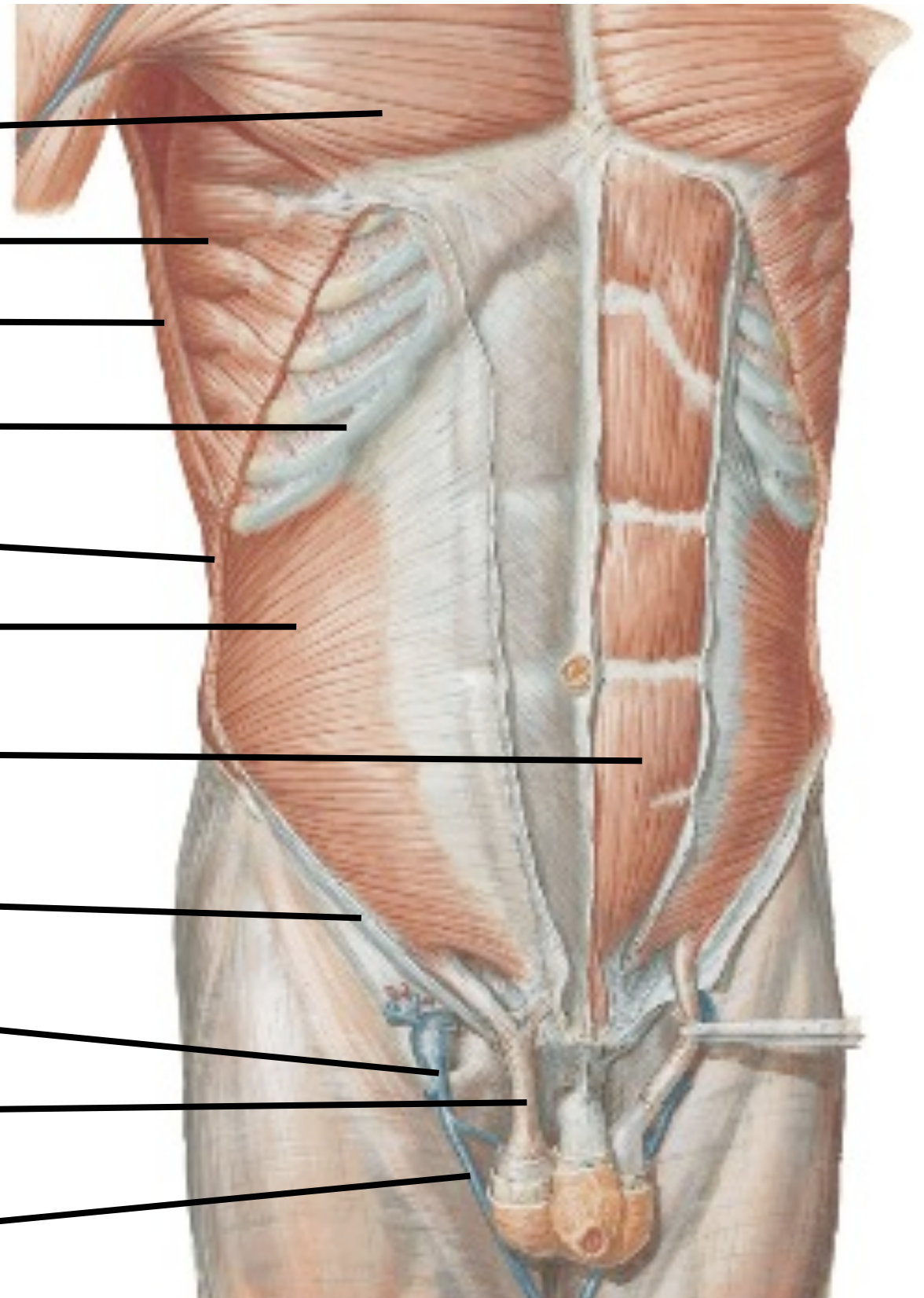
Serratus anterior m.



Pectoralis major m.

Serratus anterior m.

Latissimus dorsi m.

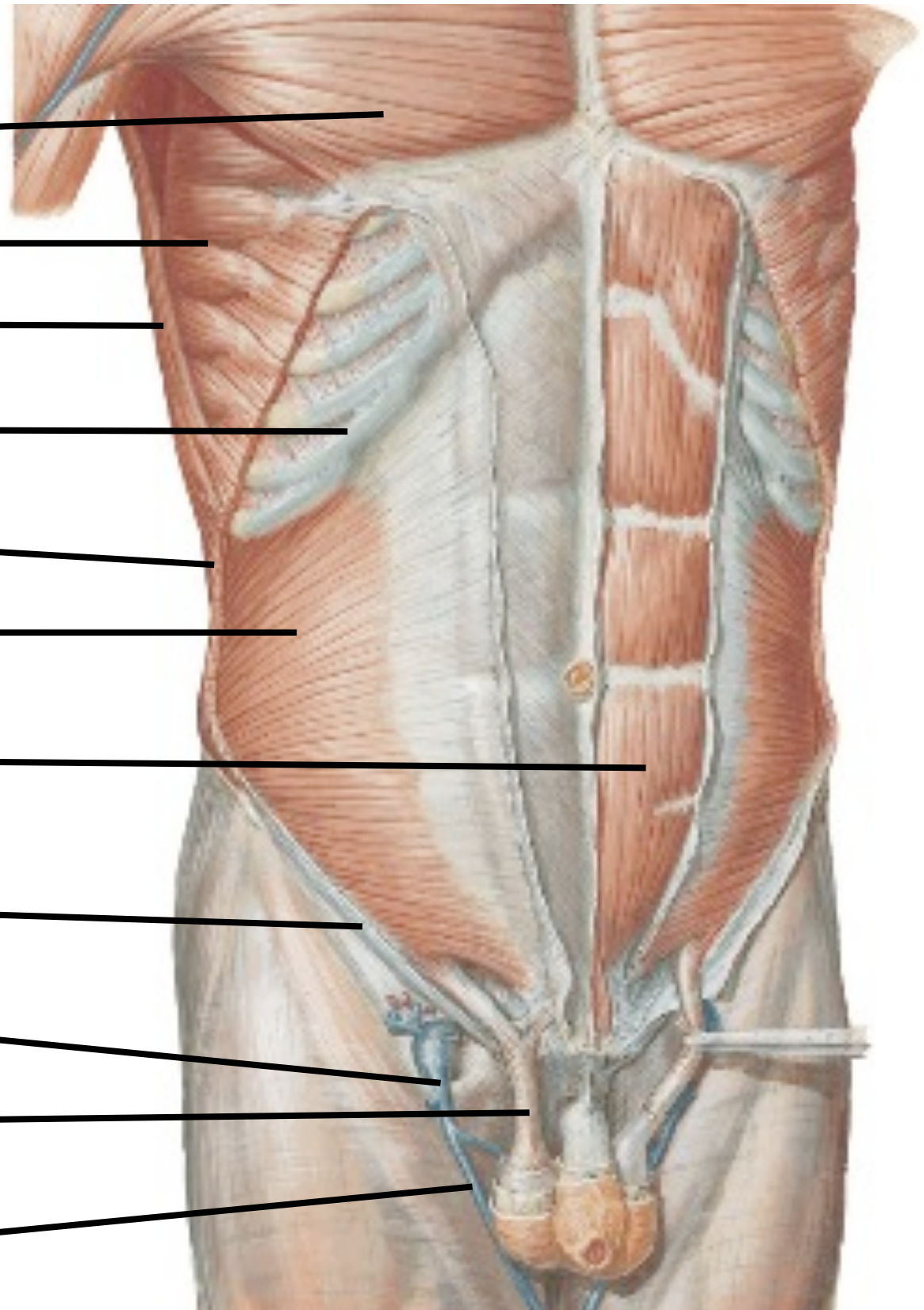


Pectoralis major m.

Serratus anterior m.

Latissimus dorsi m.

Costal cartilage



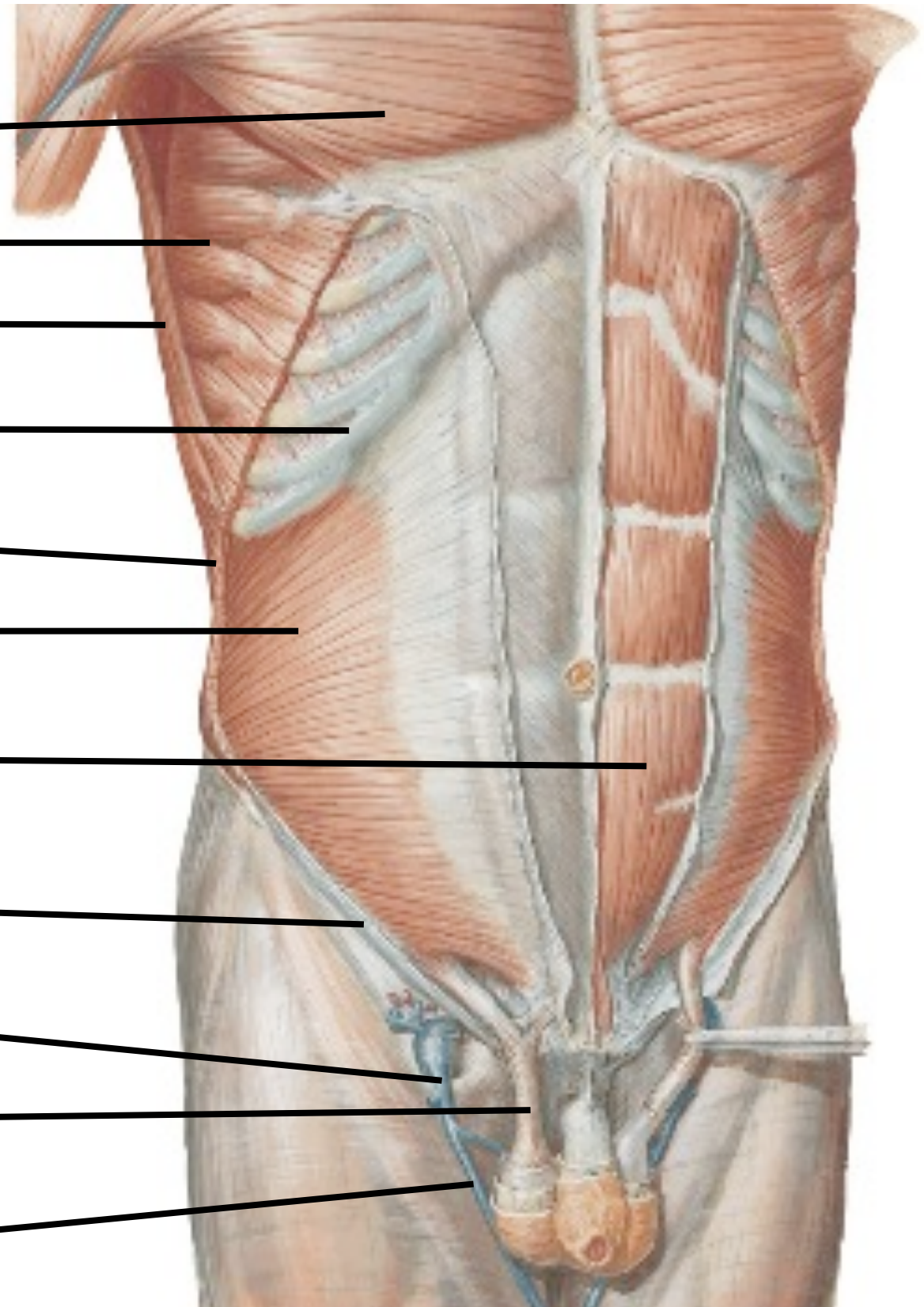
Pectoralis major m.

Serratus anterior m.

Latissimus dorsi m.

Costal cartilage

External oblique m. *cut*



Pectoralis major m.

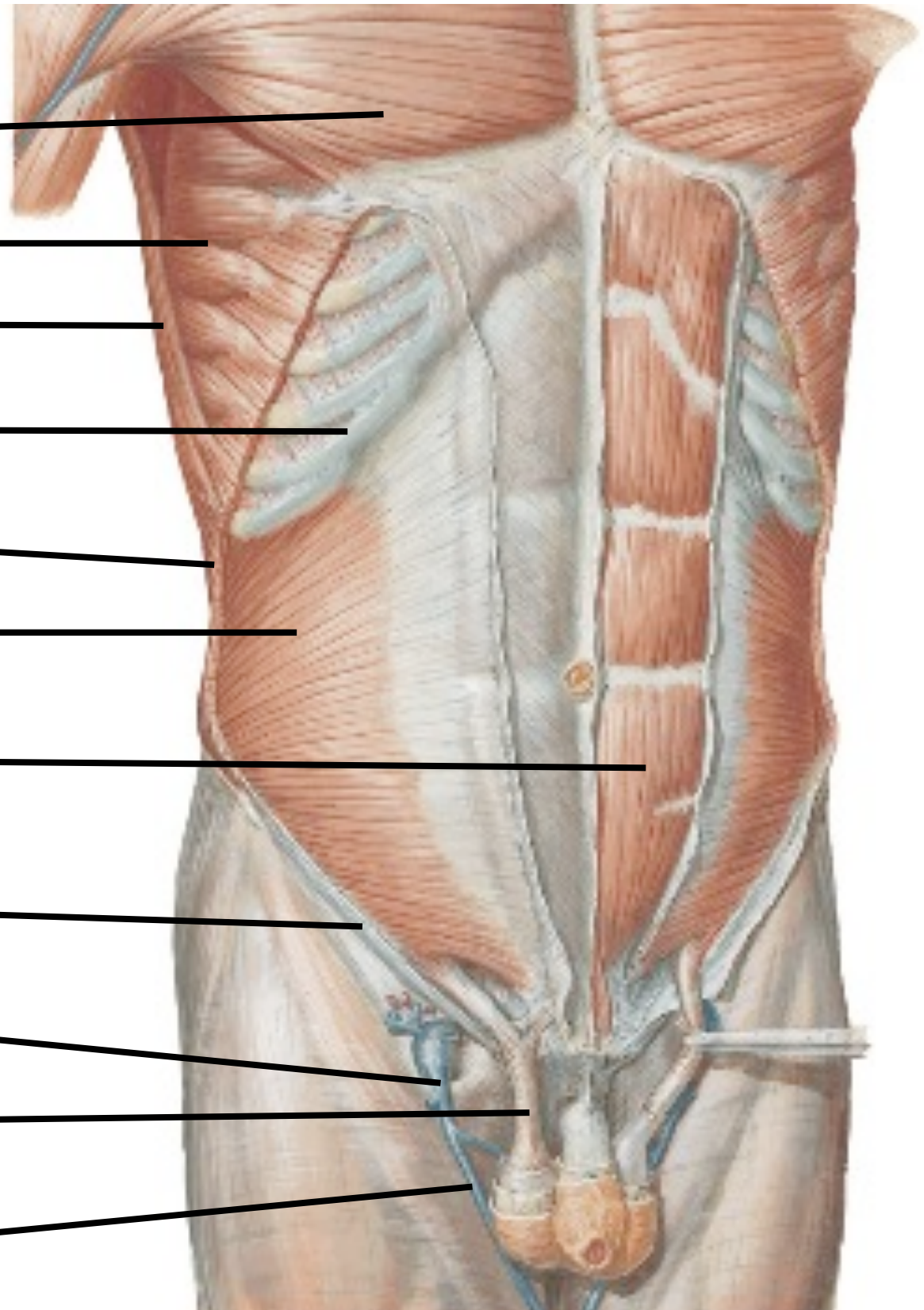
Serratus anterior m.

Latissimus dorsi m.

Costal cartilage

External oblique m. *cut*

Internal oblique m.



Pectoralis major m.

Serratus anterior m.

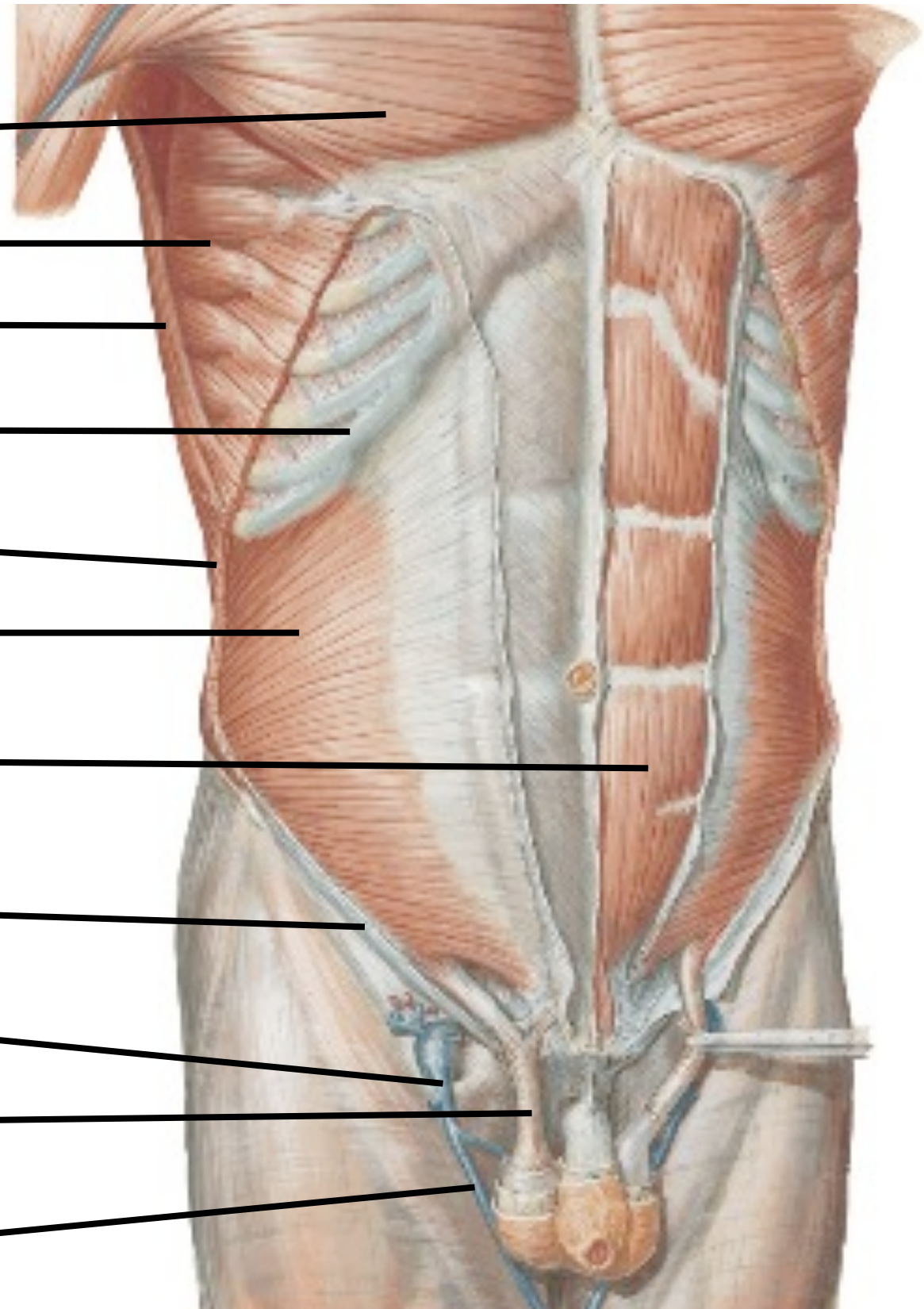
Latissimus dorsi m.

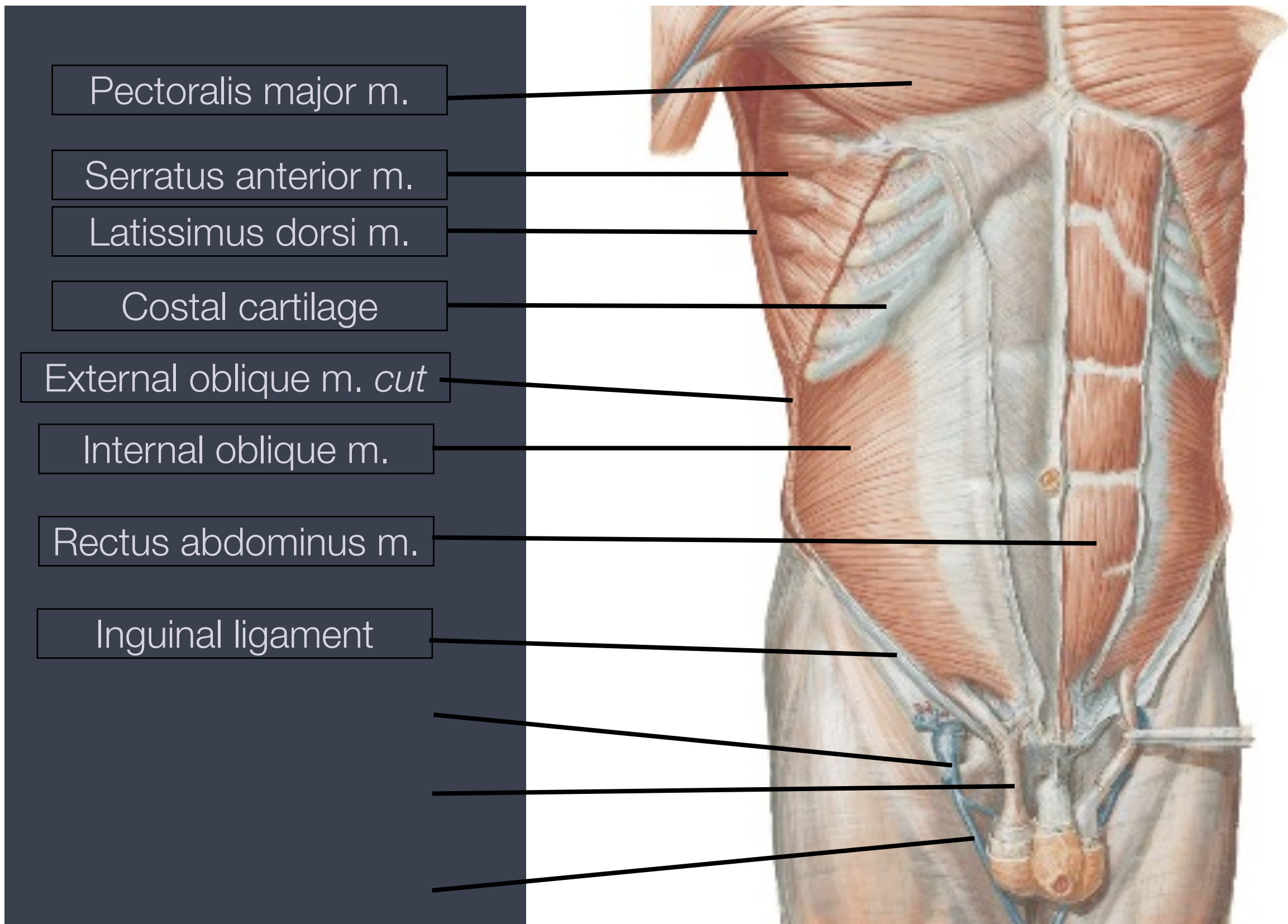
Costal cartilage

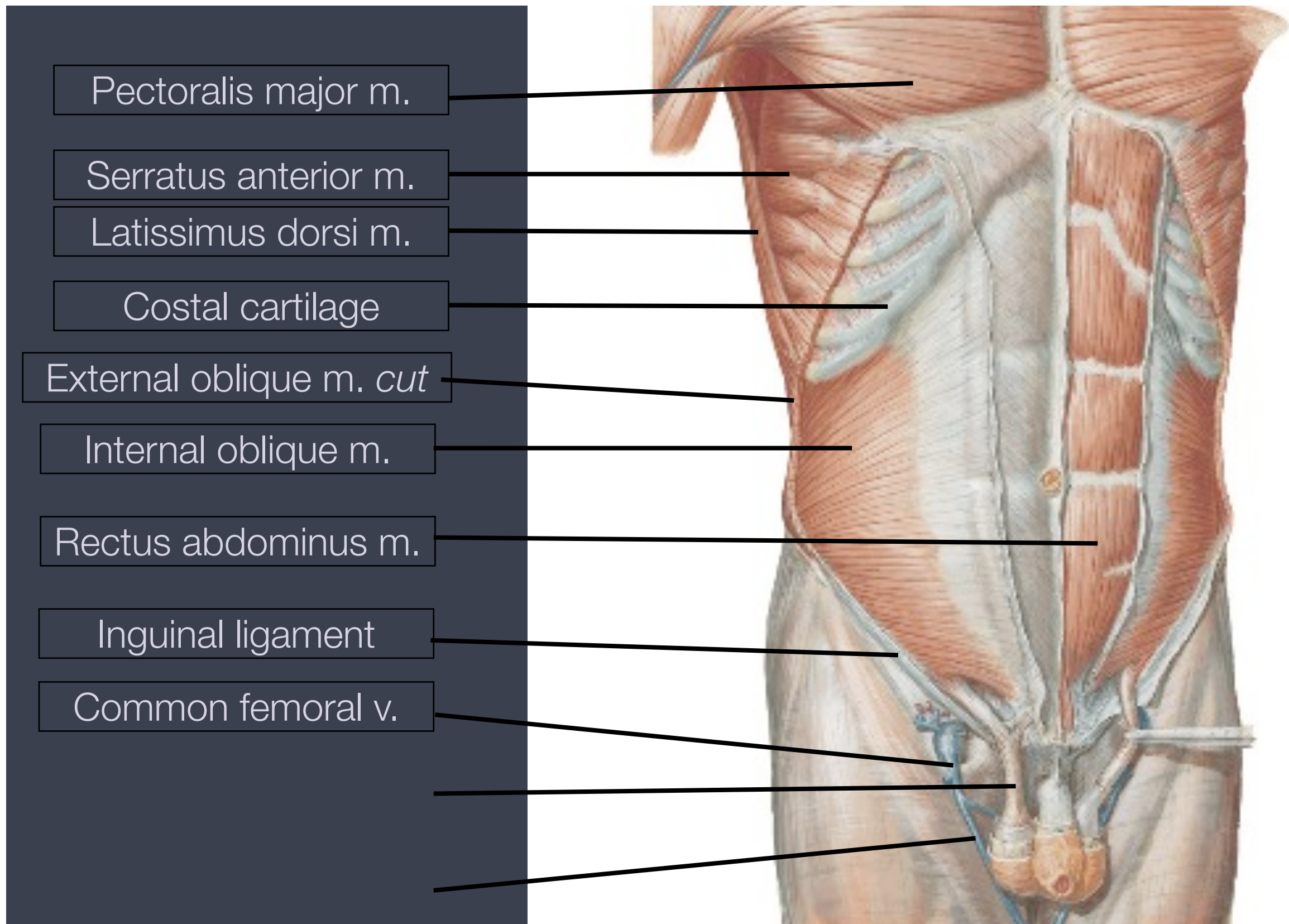
External oblique m. *cut*

Internal oblique m.

Rectus abdominus m.







Pectoralis major m.

Serratus anterior m.

Latissimus dorsi m.

Costal cartilage

External oblique m. *cut*

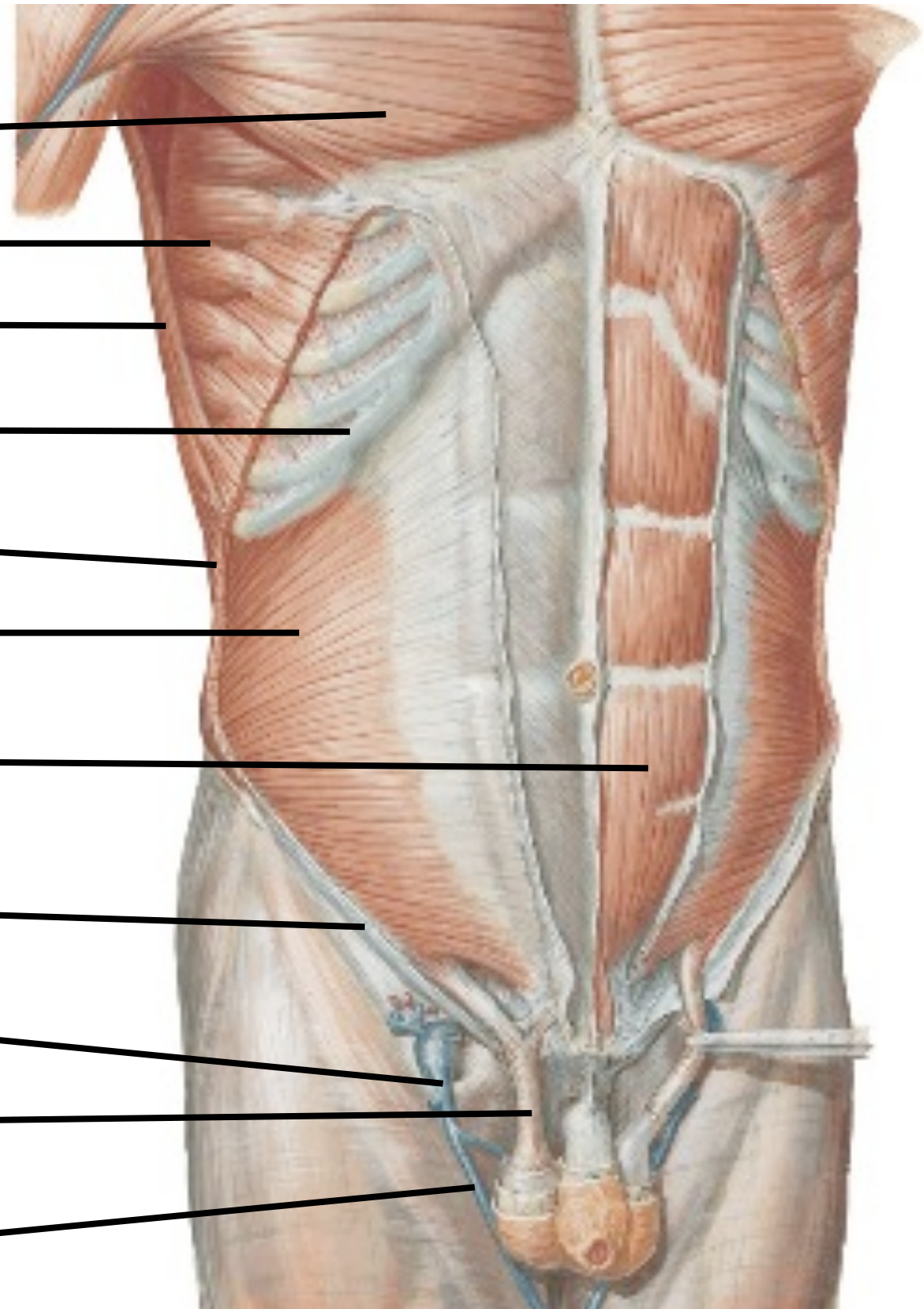
Internal oblique m.

Rectus abdominus m.

Inguinal ligament

Common femoral v.

Cremasteric m.



Pectoralis major m.

Serratus anterior m.

Latissimus dorsi m.

Costal cartilage

External oblique m. *cut*

Internal oblique m.

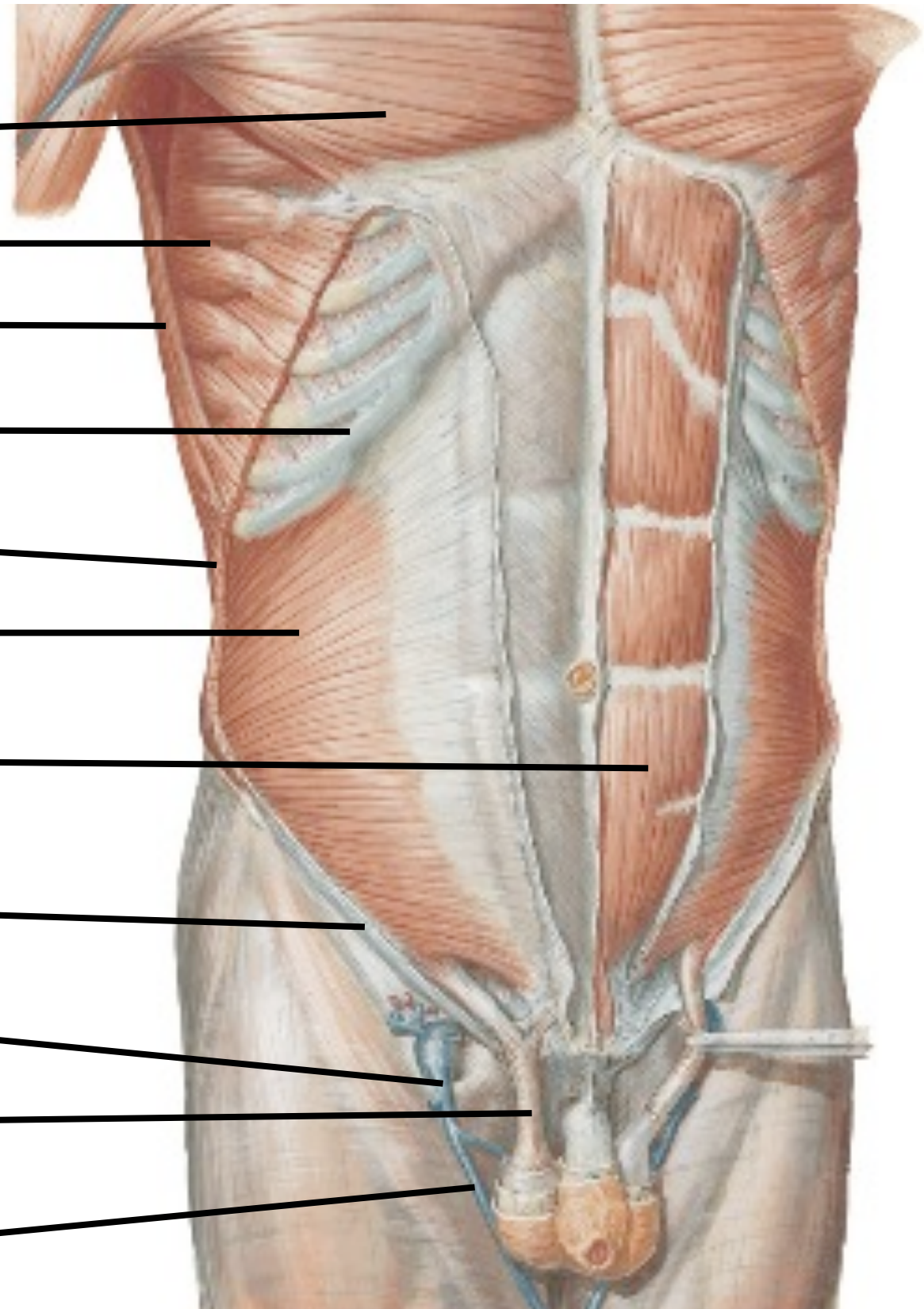
Rectus abdominus m.

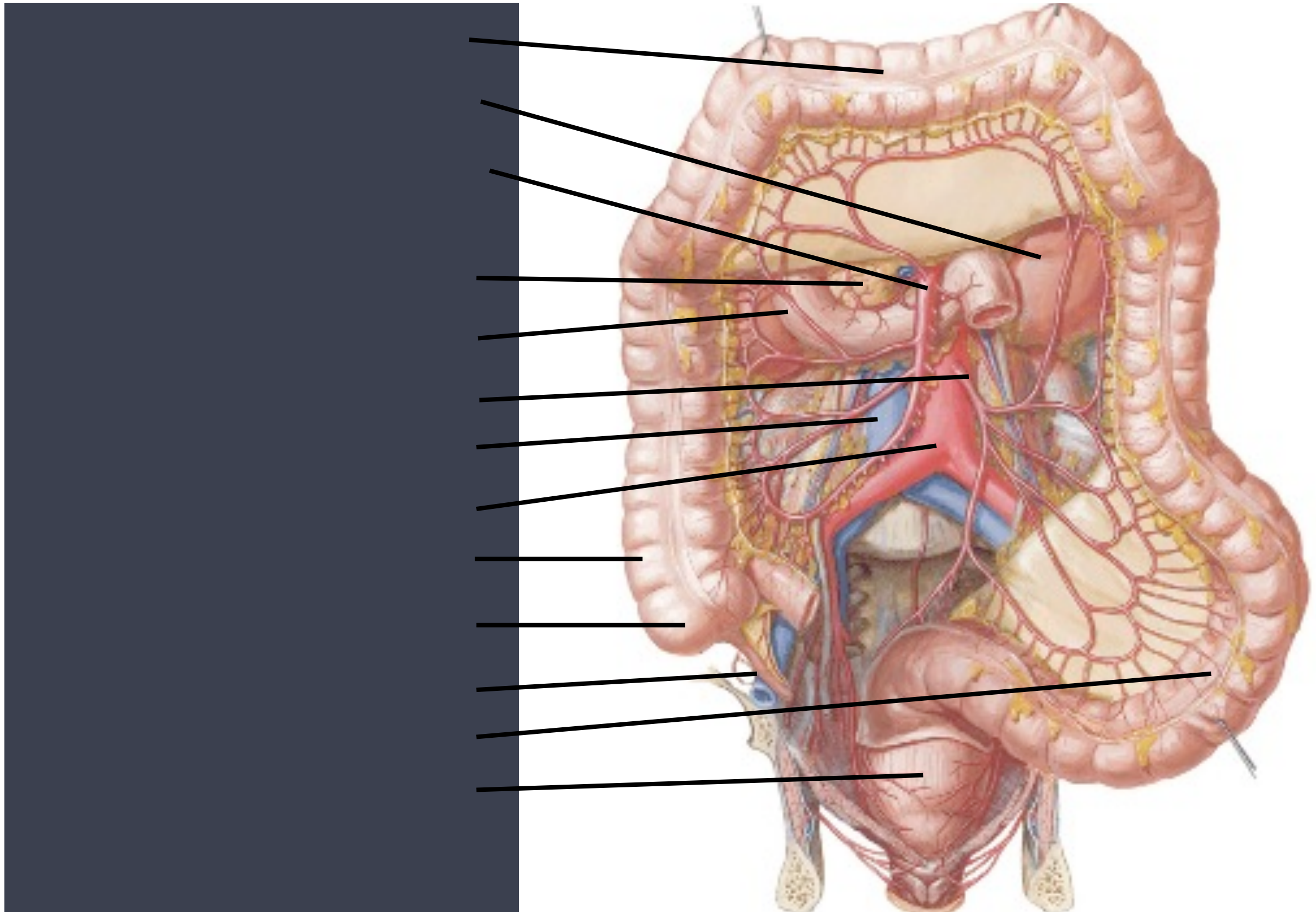
Inguinal ligament

Common femoral v.

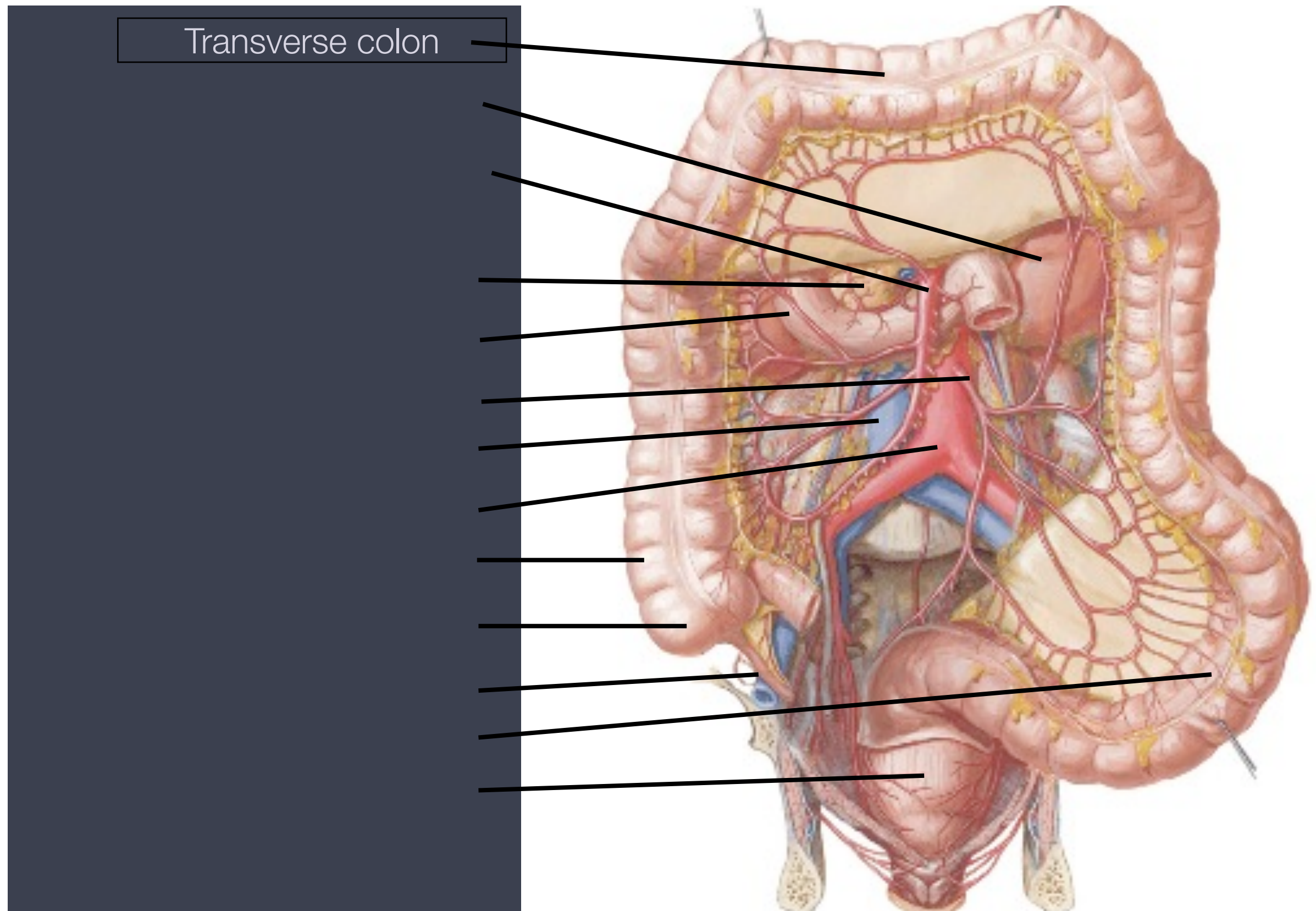
Cremasteric m.

Great saphenous v.



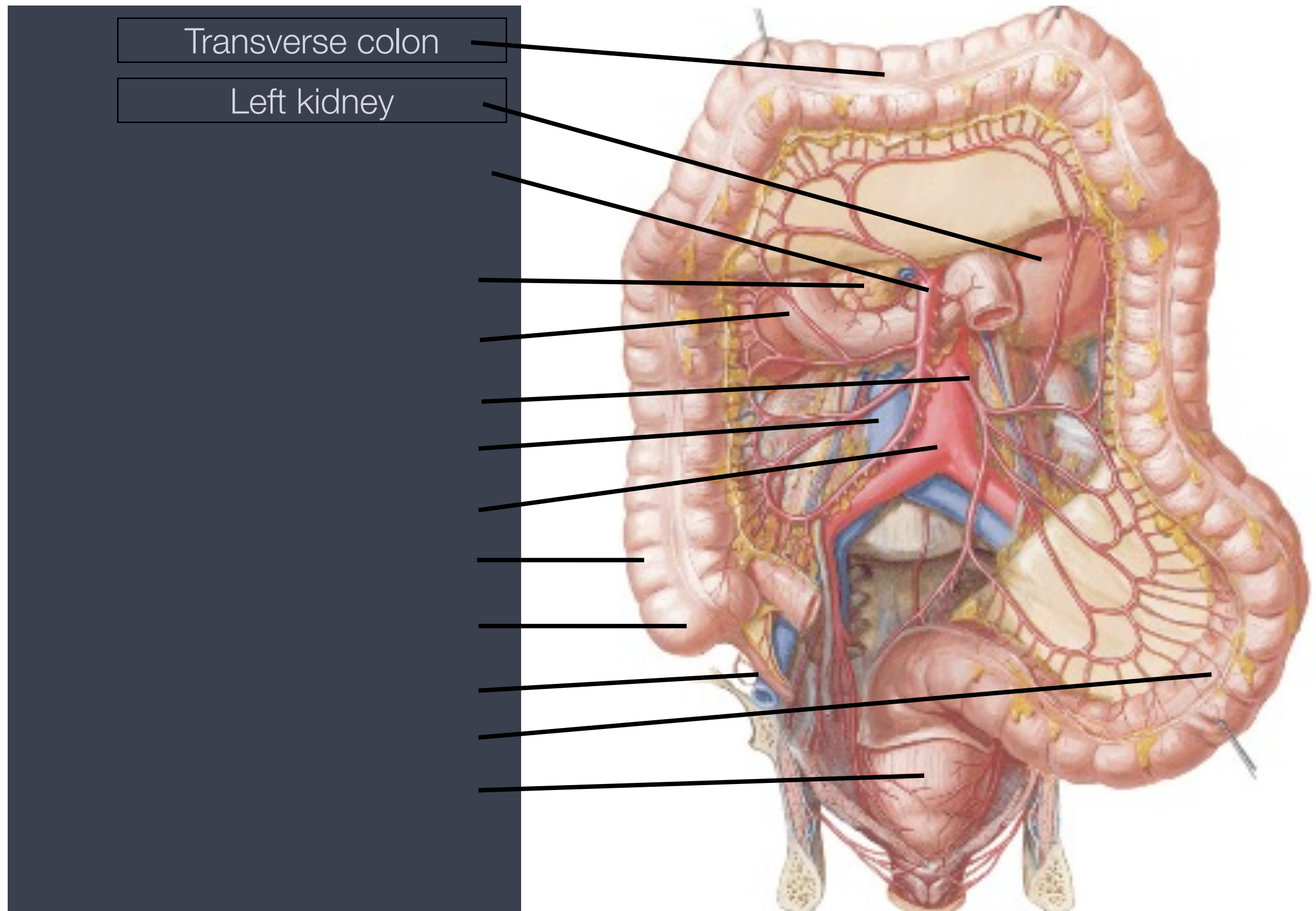


Transverse colon



Transverse colon

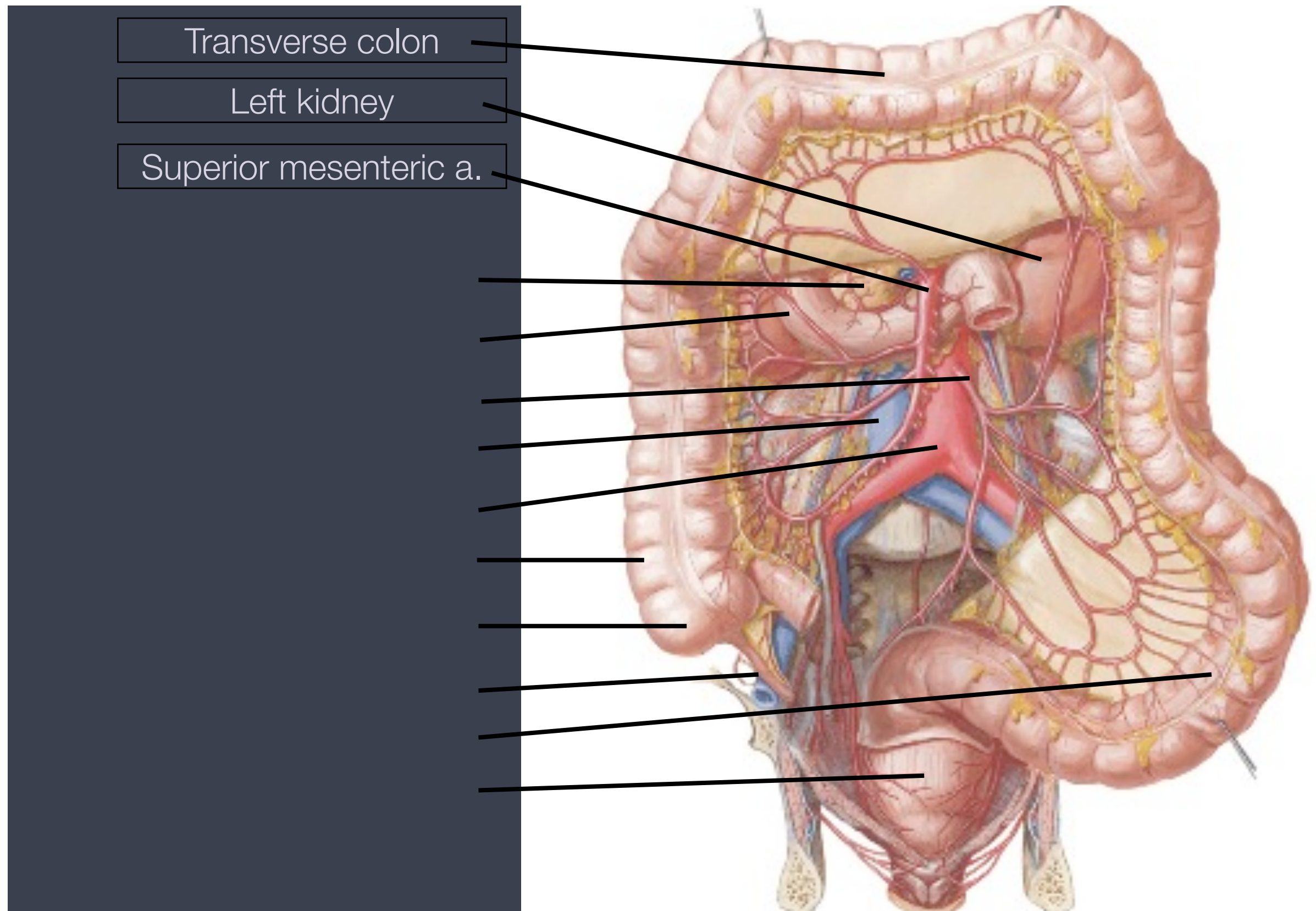
Left kidney



Transverse colon

Left kidney

Superior mesenteric a.

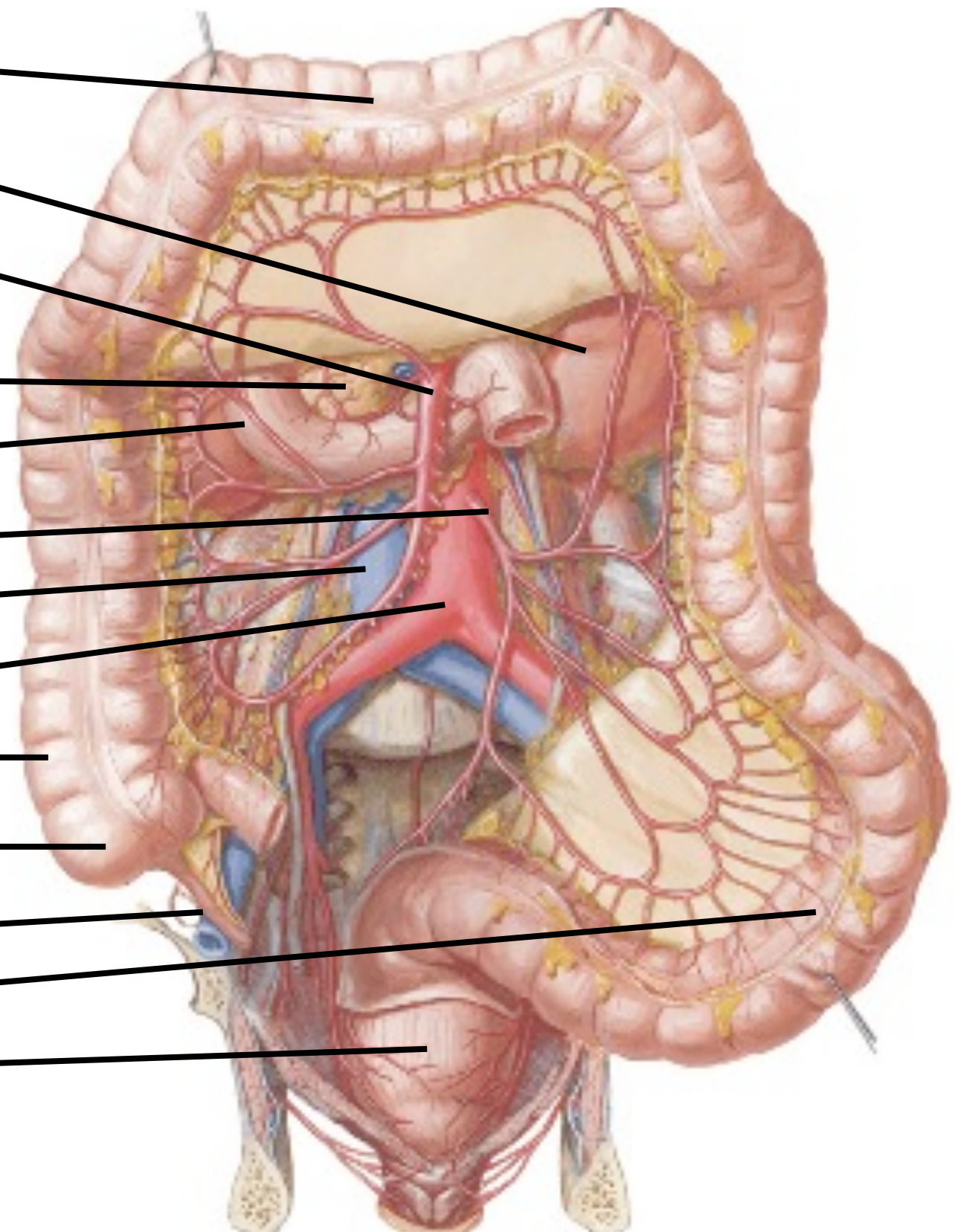


Transverse colon

Left kidney

Superior mesenteric a.

Pancreas



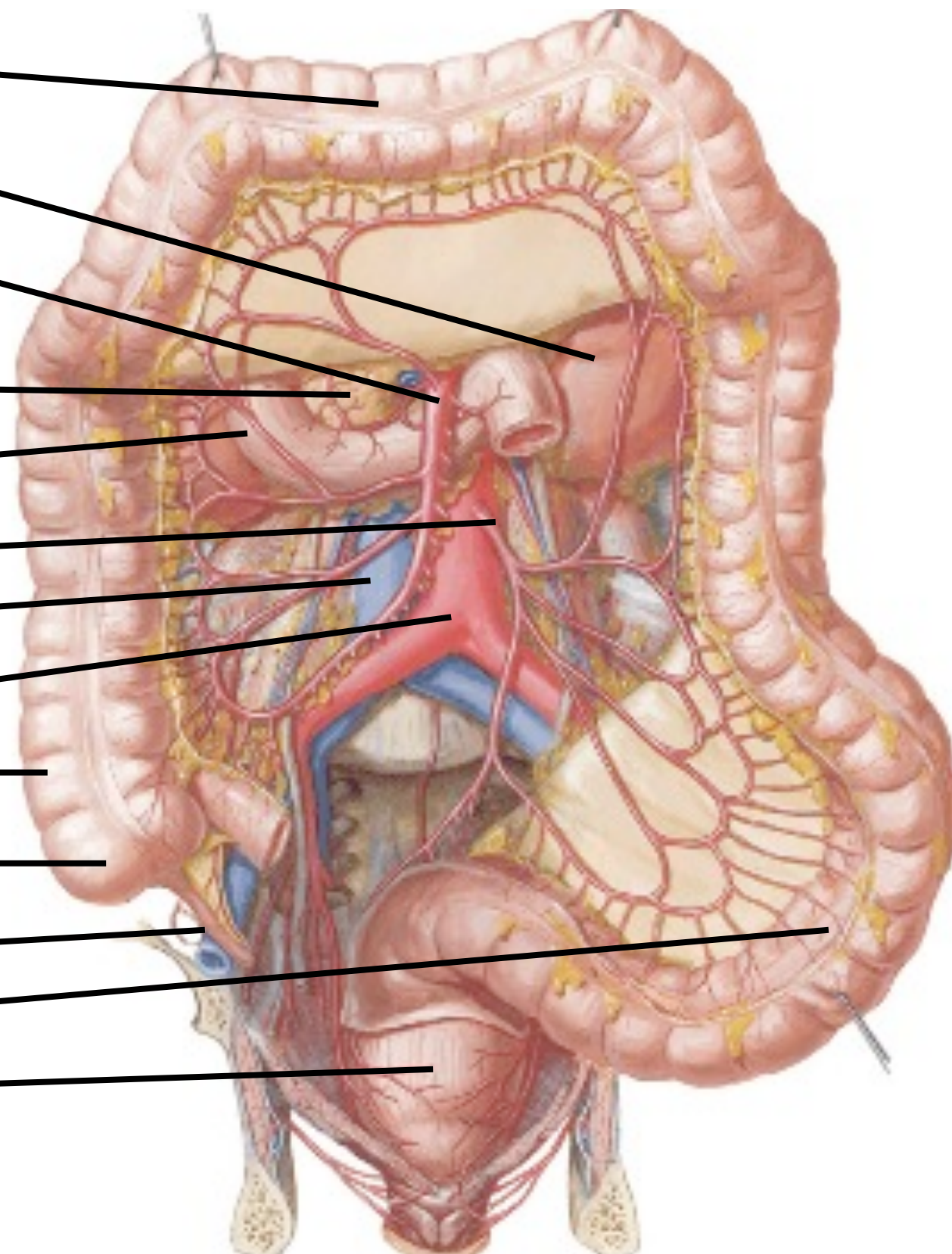
Transverse colon

Left kidney

Superior mesenteric a.

Pancreas

Duodenum



Transverse colon

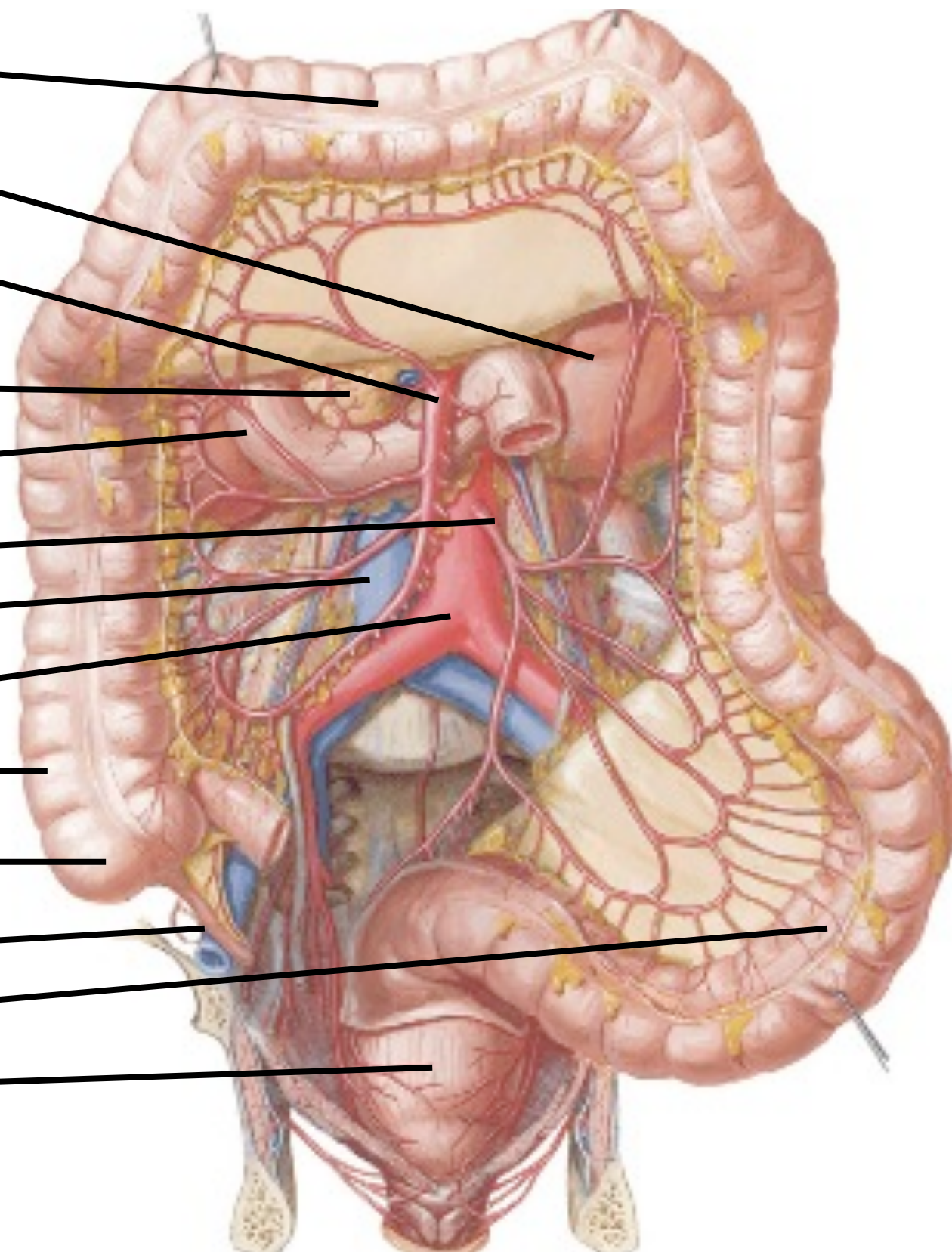
Left kidney

Superior mesenteric a.

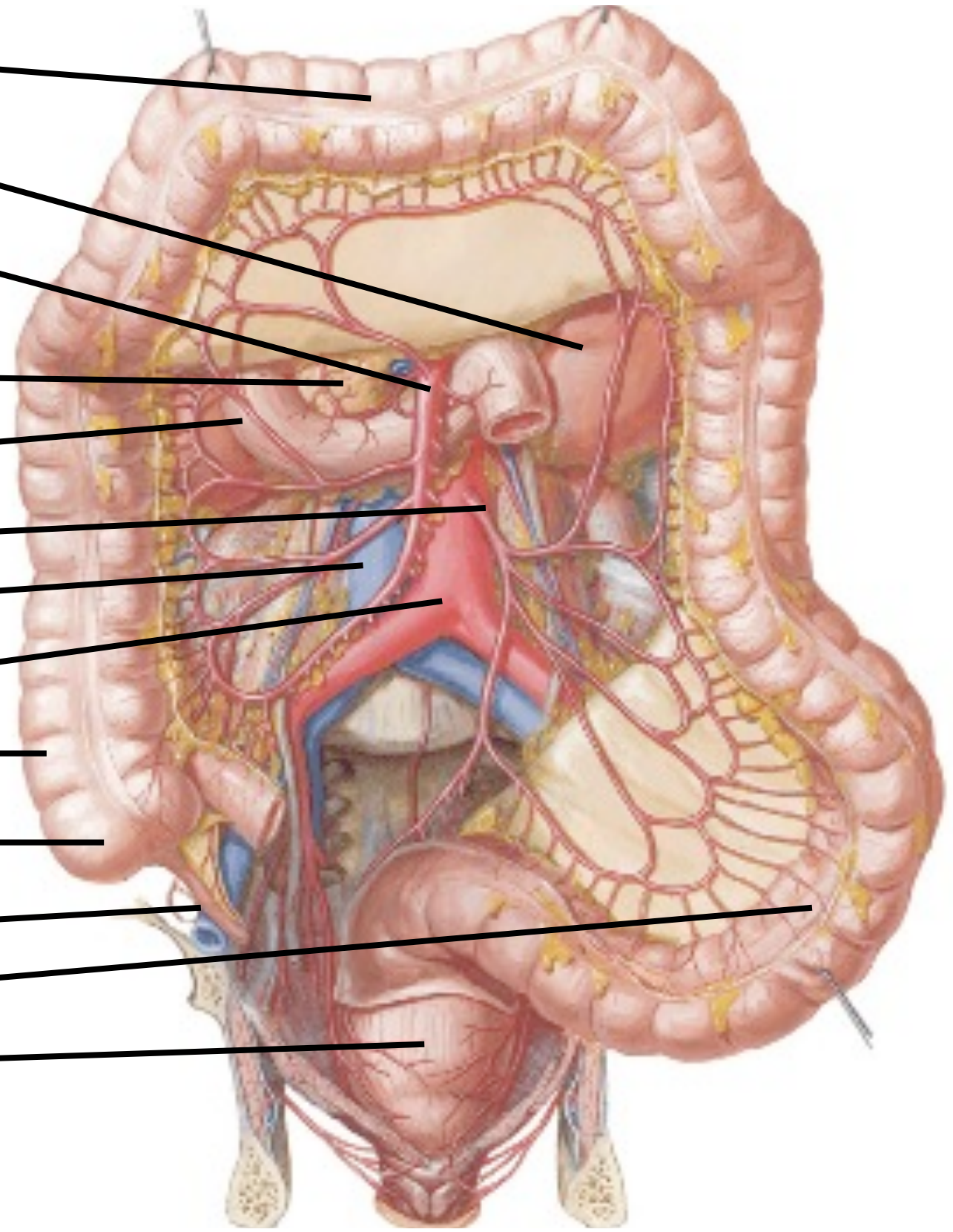
Pancreas

Duodenum

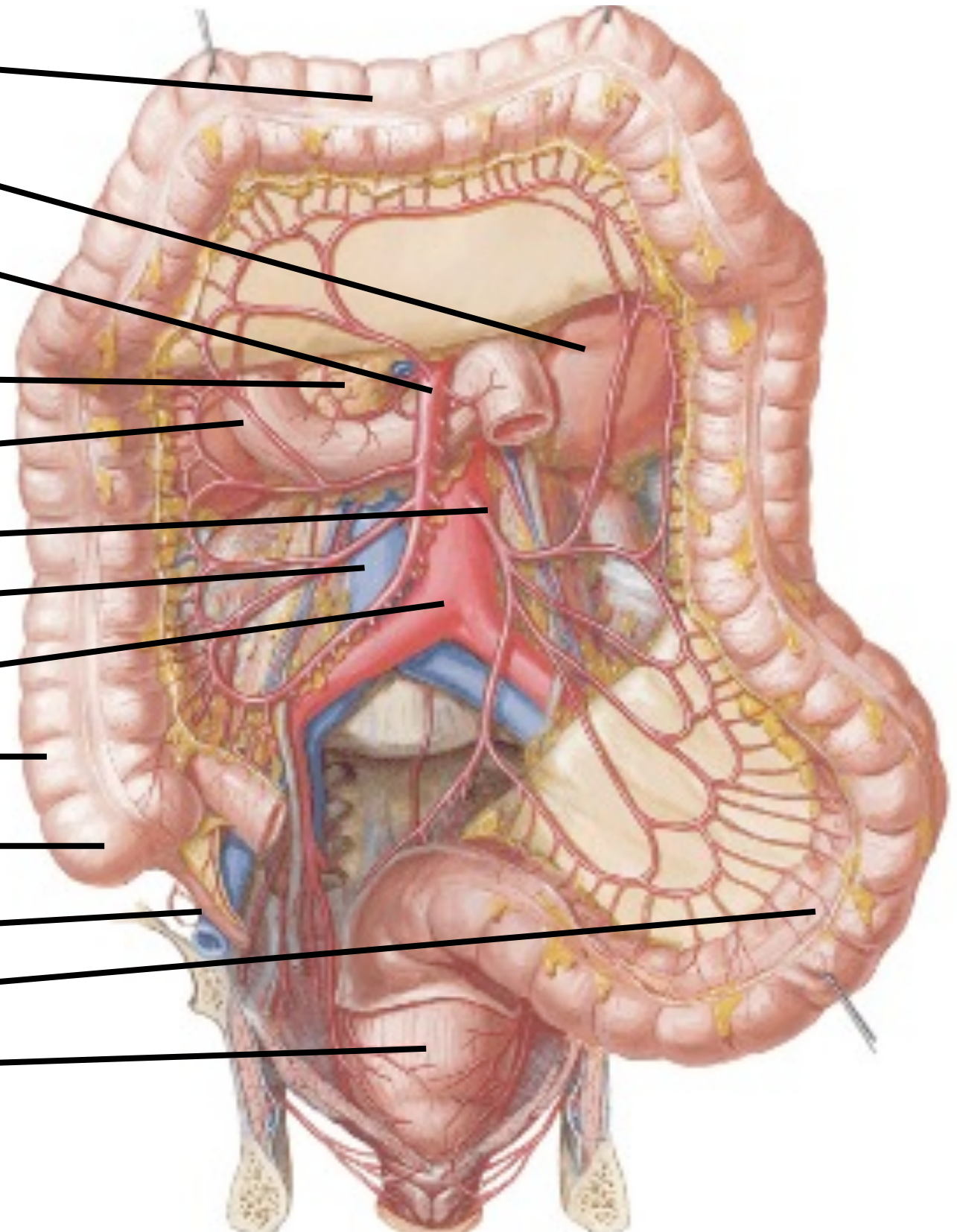
Inferior mesenteric a.



- Transverse colon
- Left kidney
- Superior mesenteric a.
- Pancreas
- Duodenum
- Inferior mesenteric a.
- IVC



- Transverse colon
- Left kidney
- Superior mesenteric a.
- Pancreas
- Duodenum
- Inferior mesenteric a.
- IVC
- Aorta bifurcation



Transverse colon

Left kidney

Superior mesenteric a.

Pancreas

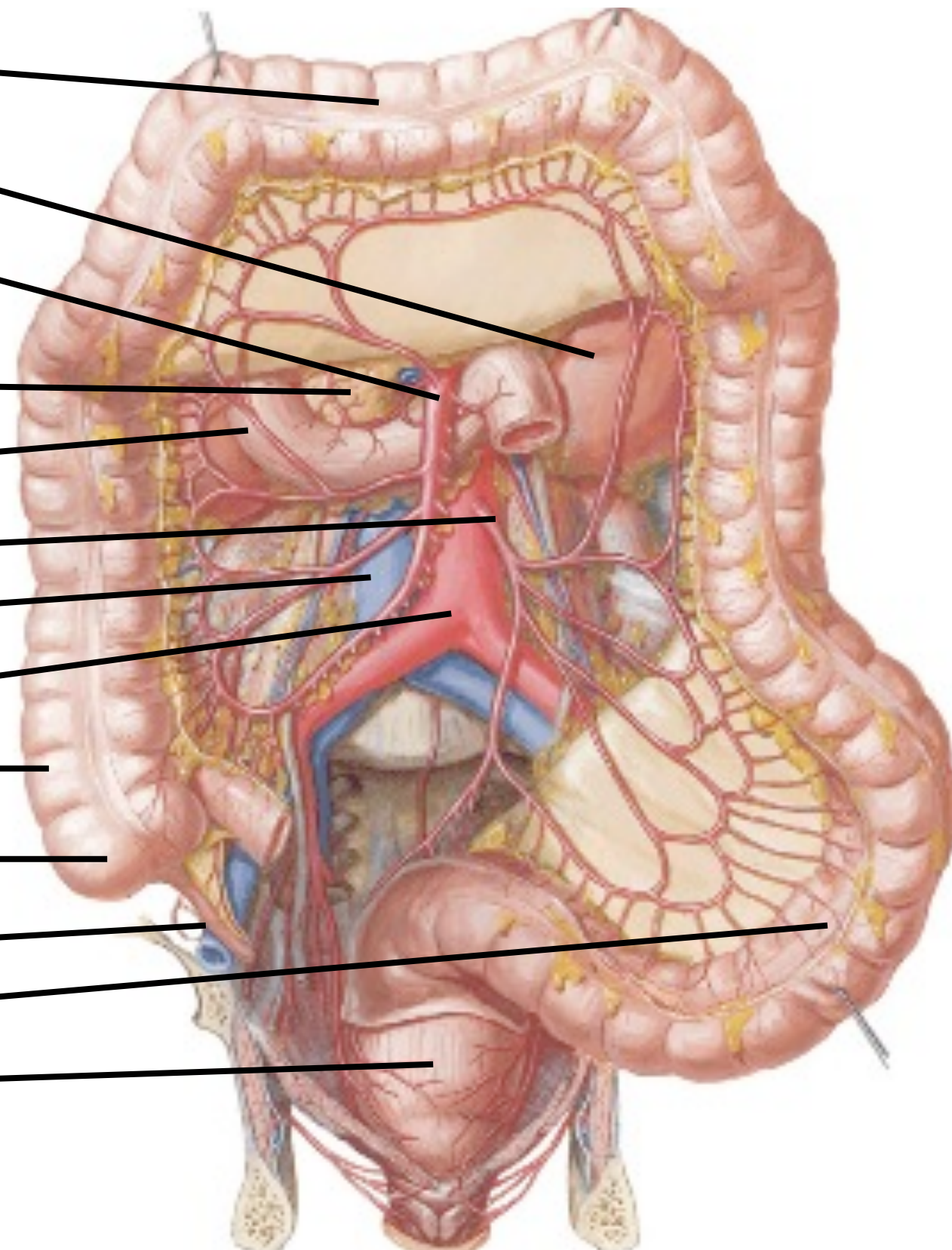
Duodenum

Inferior mesenteric a.

IVC

Aorta bifurcation

Ascending colon



Transverse colon

Left kidney

Superior mesenteric a.

Pancreas

Duodenum

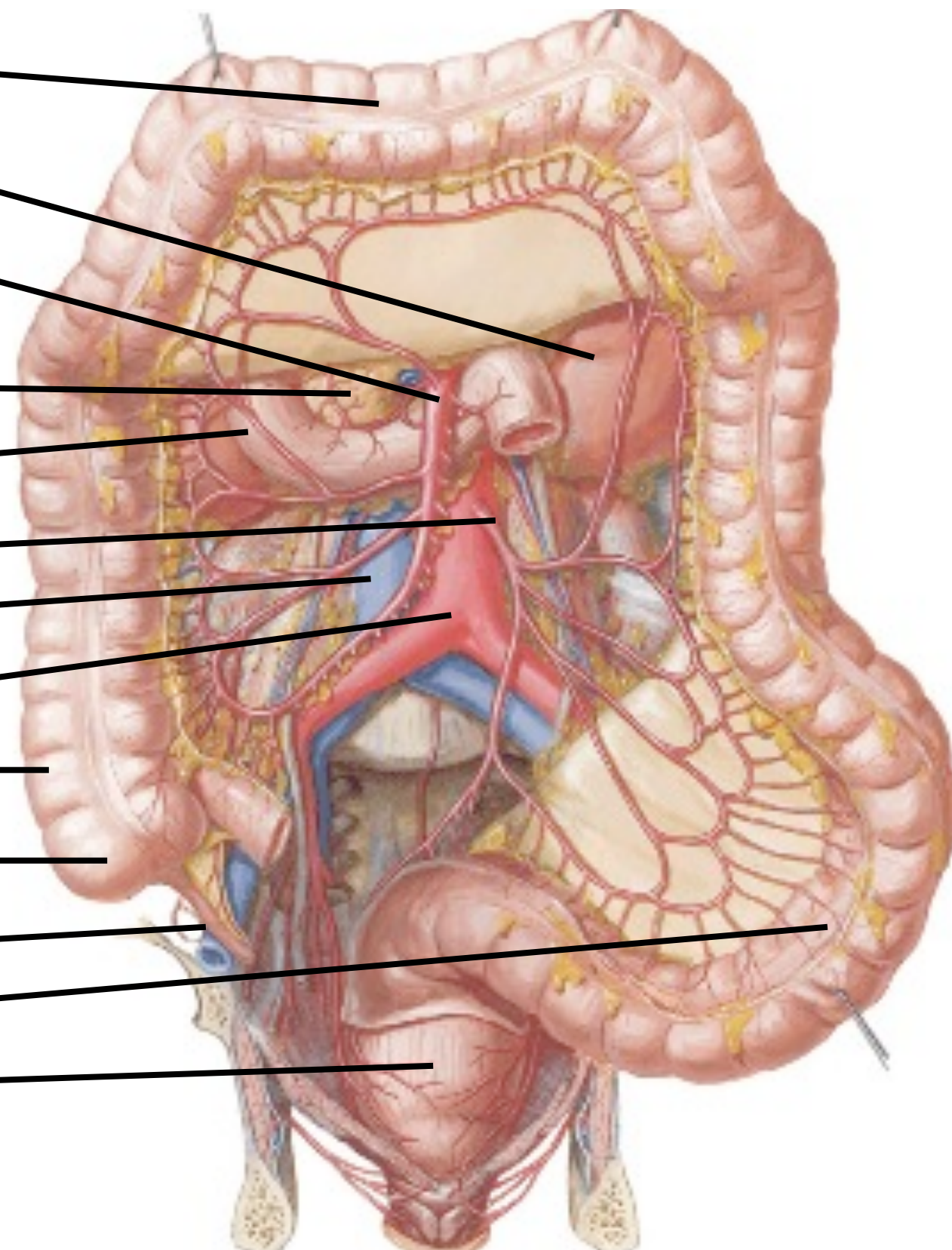
Inferior mesenteric a.

IVC

Aorta bifurcation

Ascending colon

Caecum



Transverse colon

Left kidney

Superior mesenteric a.

Pancreas

Duodenum

Inferior mesenteric a.

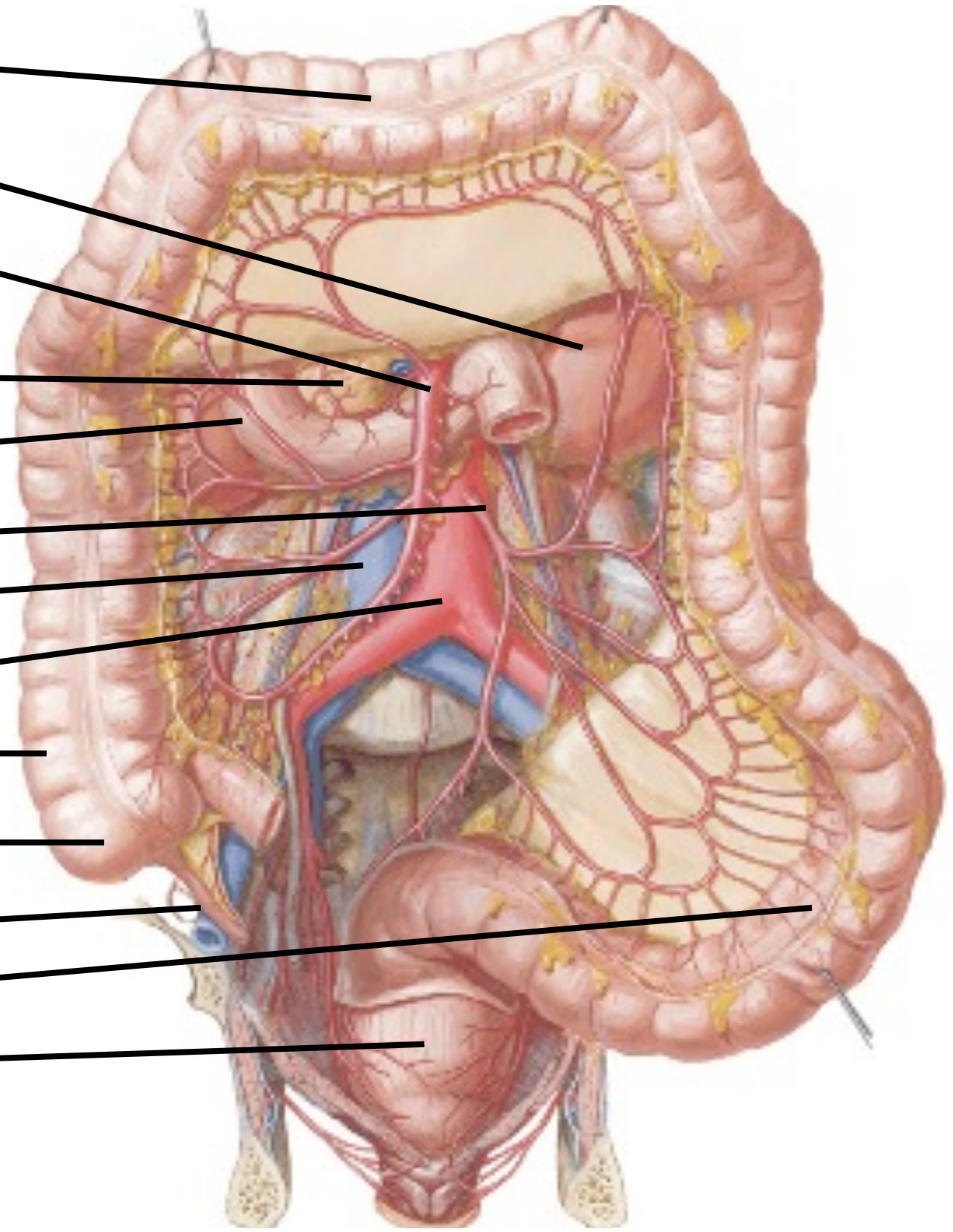
IVC

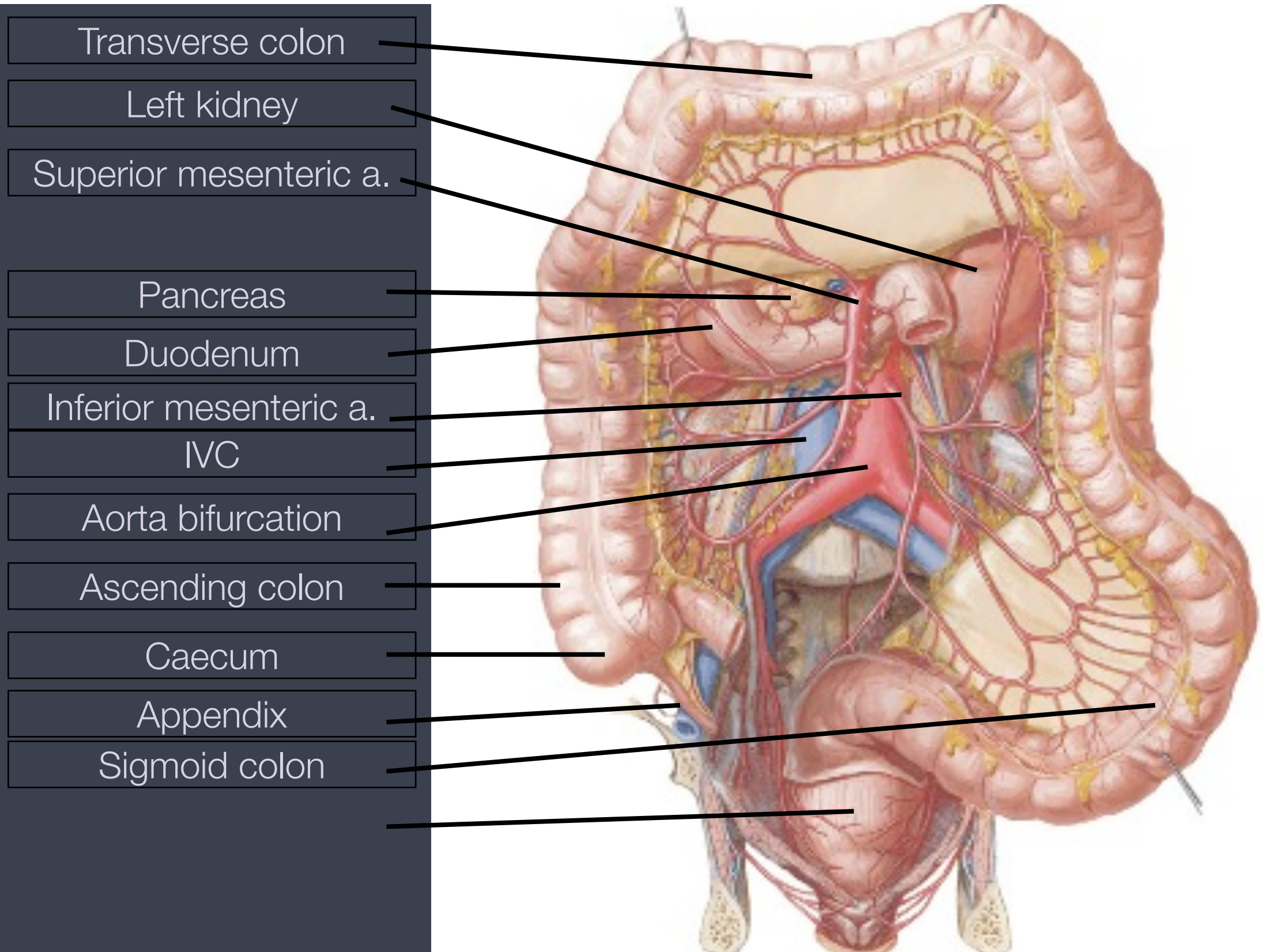
Aorta bifurcation

Ascending colon

Caecum

Appendix





Transverse colon

Left kidney

Superior mesenteric a.

Pancreas

Duodenum

Inferior mesenteric a.

IVC

Aorta bifurcation

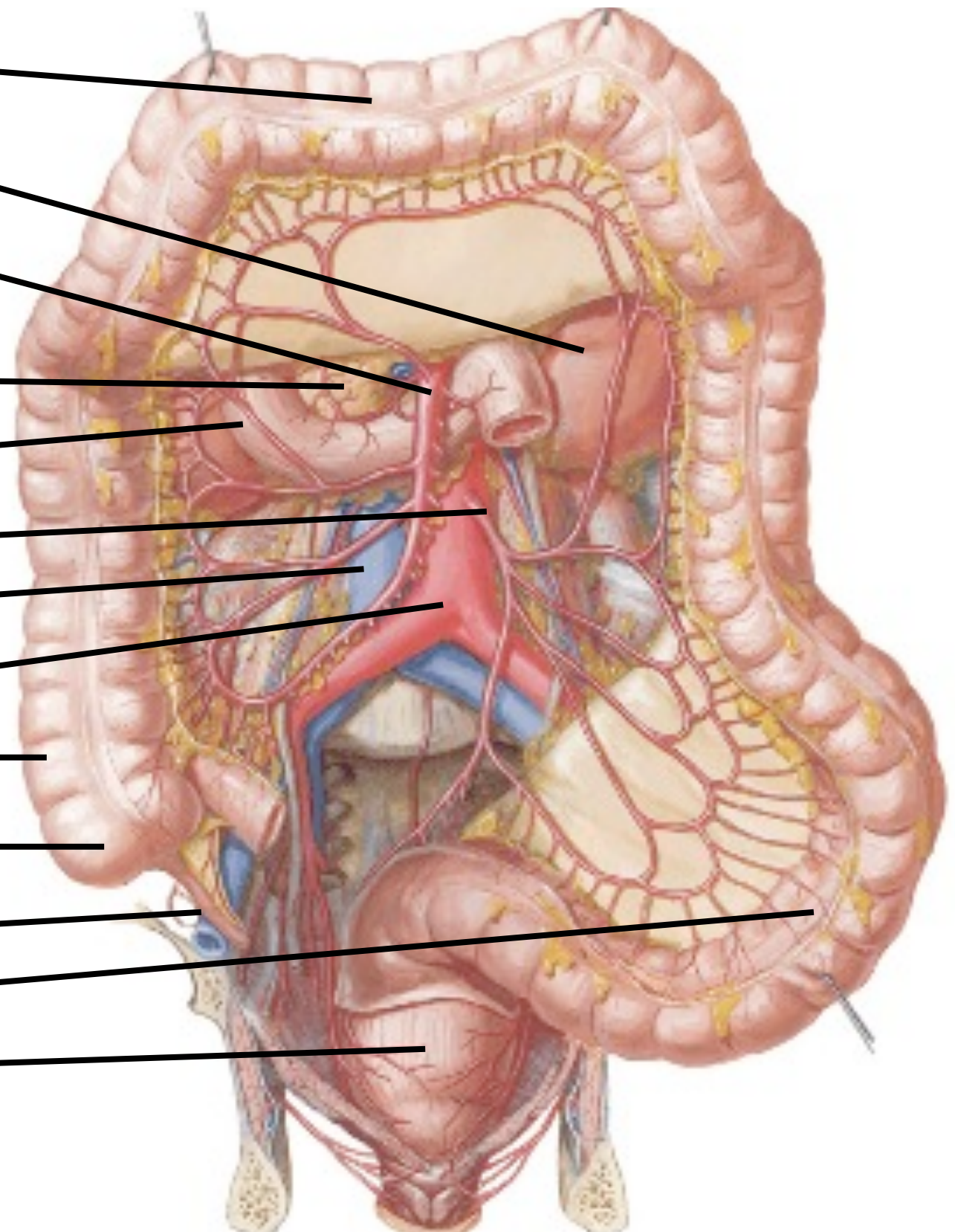
Ascending colon

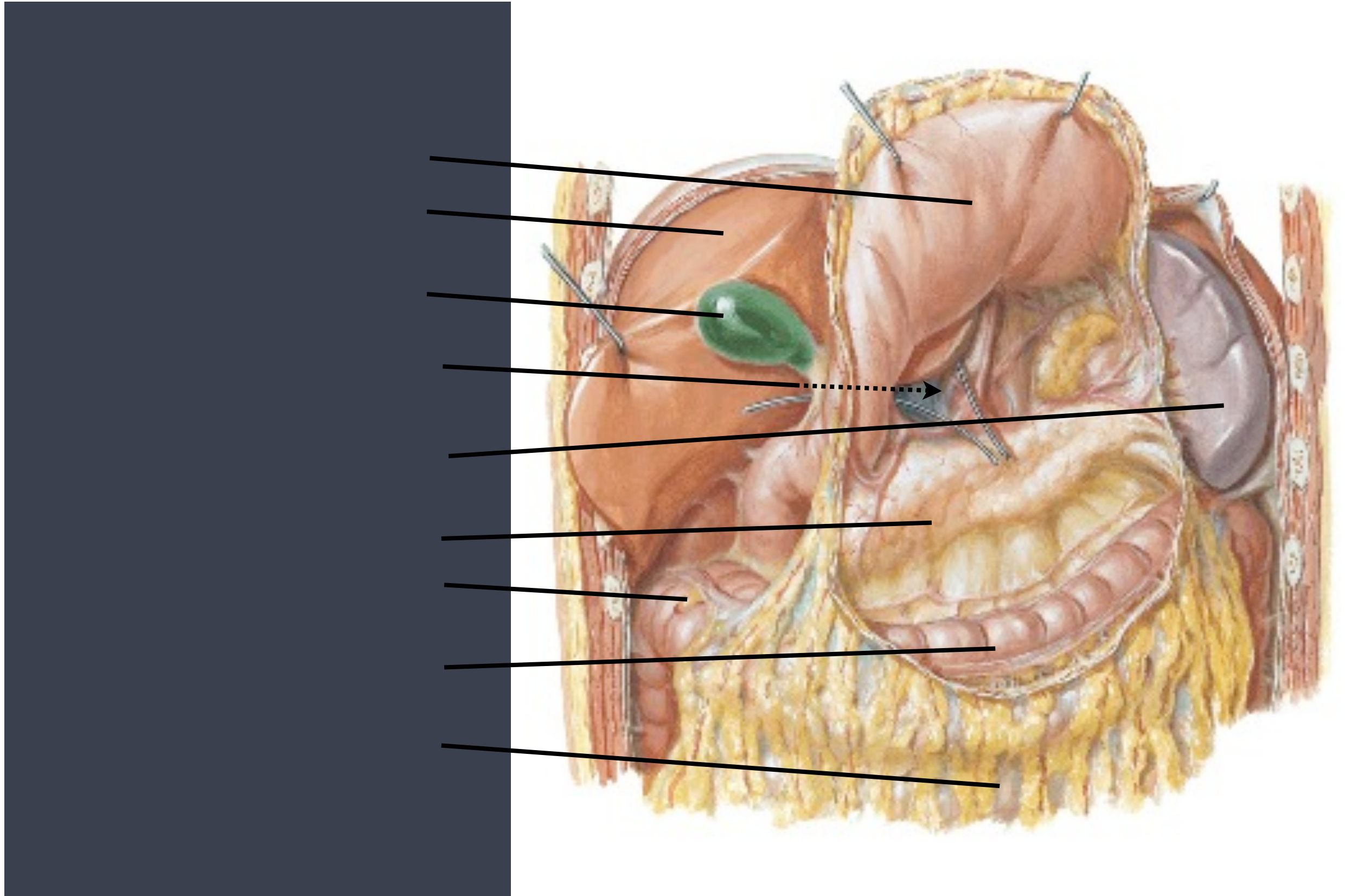
Caecum

Appendix

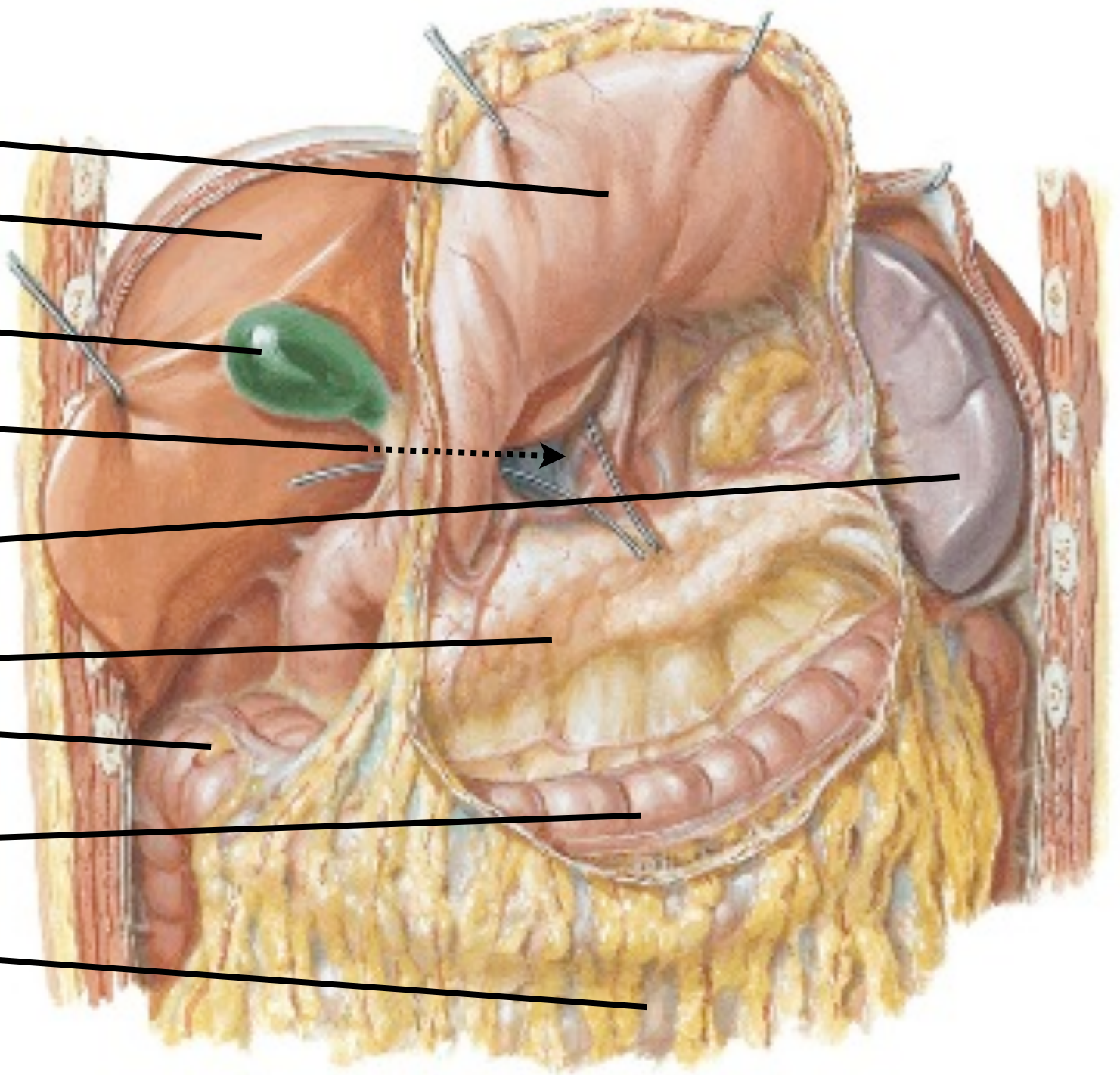
Sigmoid colon

Rectum



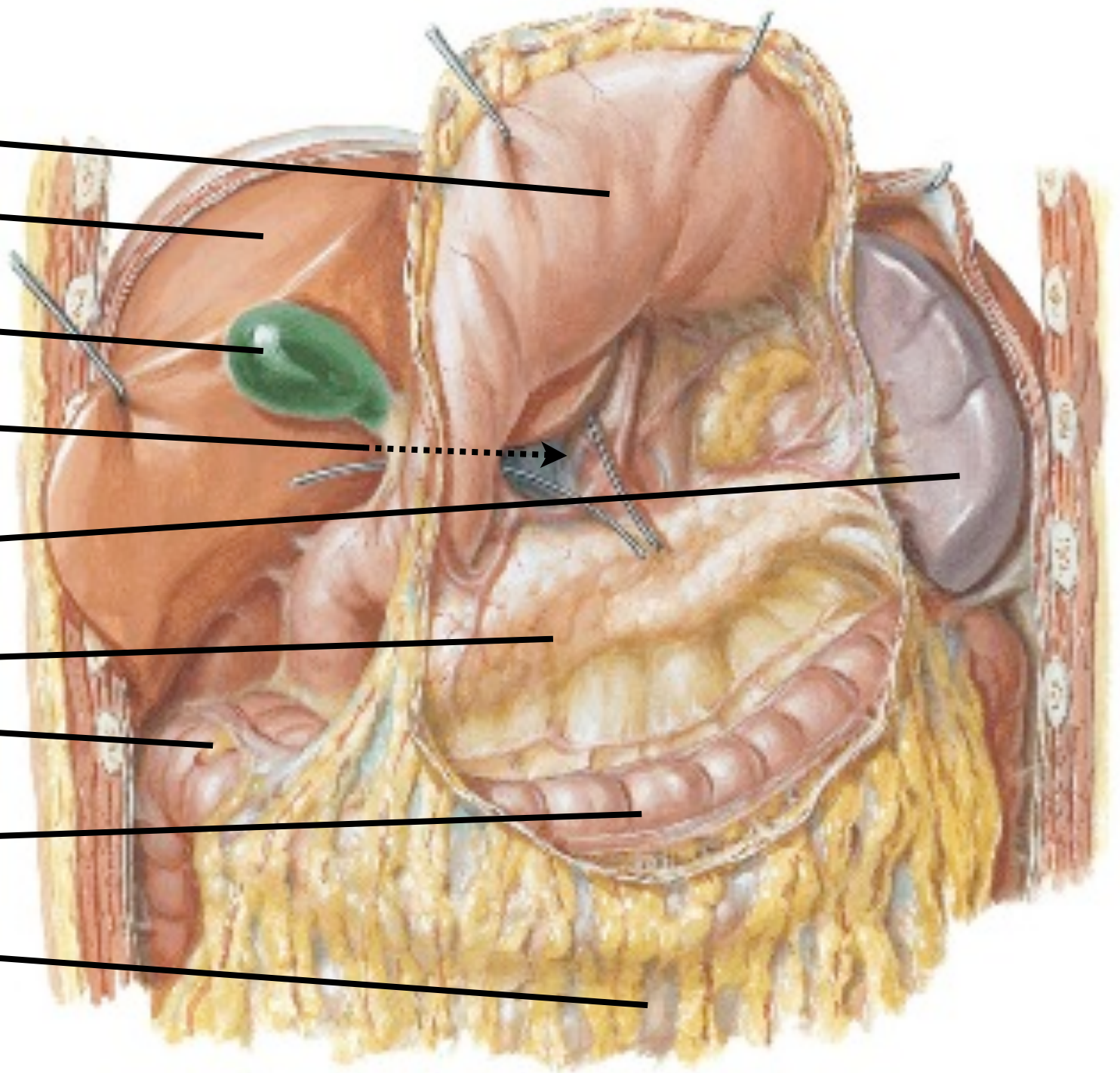


Stomach



Stomach

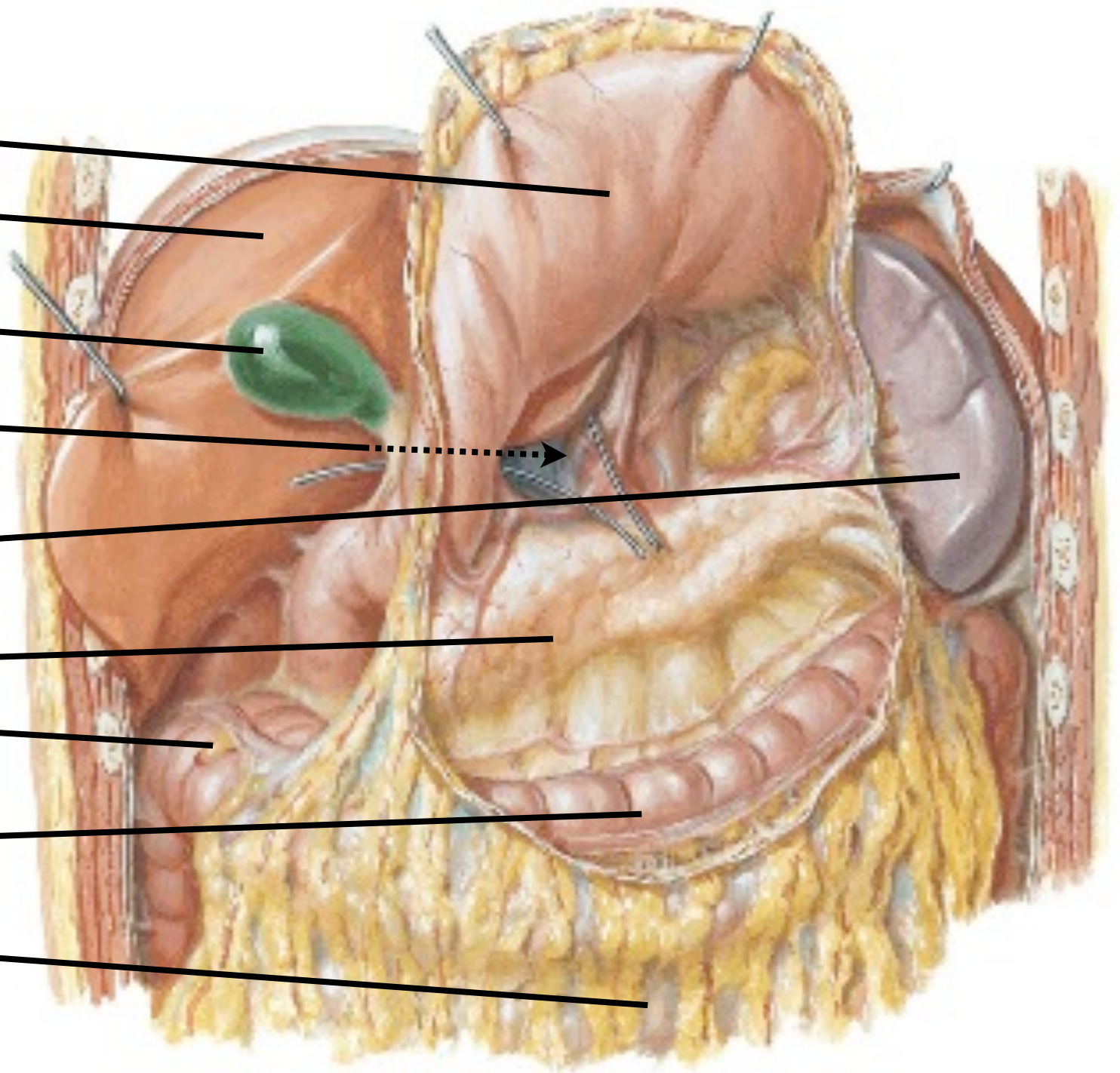
Liver



Stomach

Liver

Gallbladder

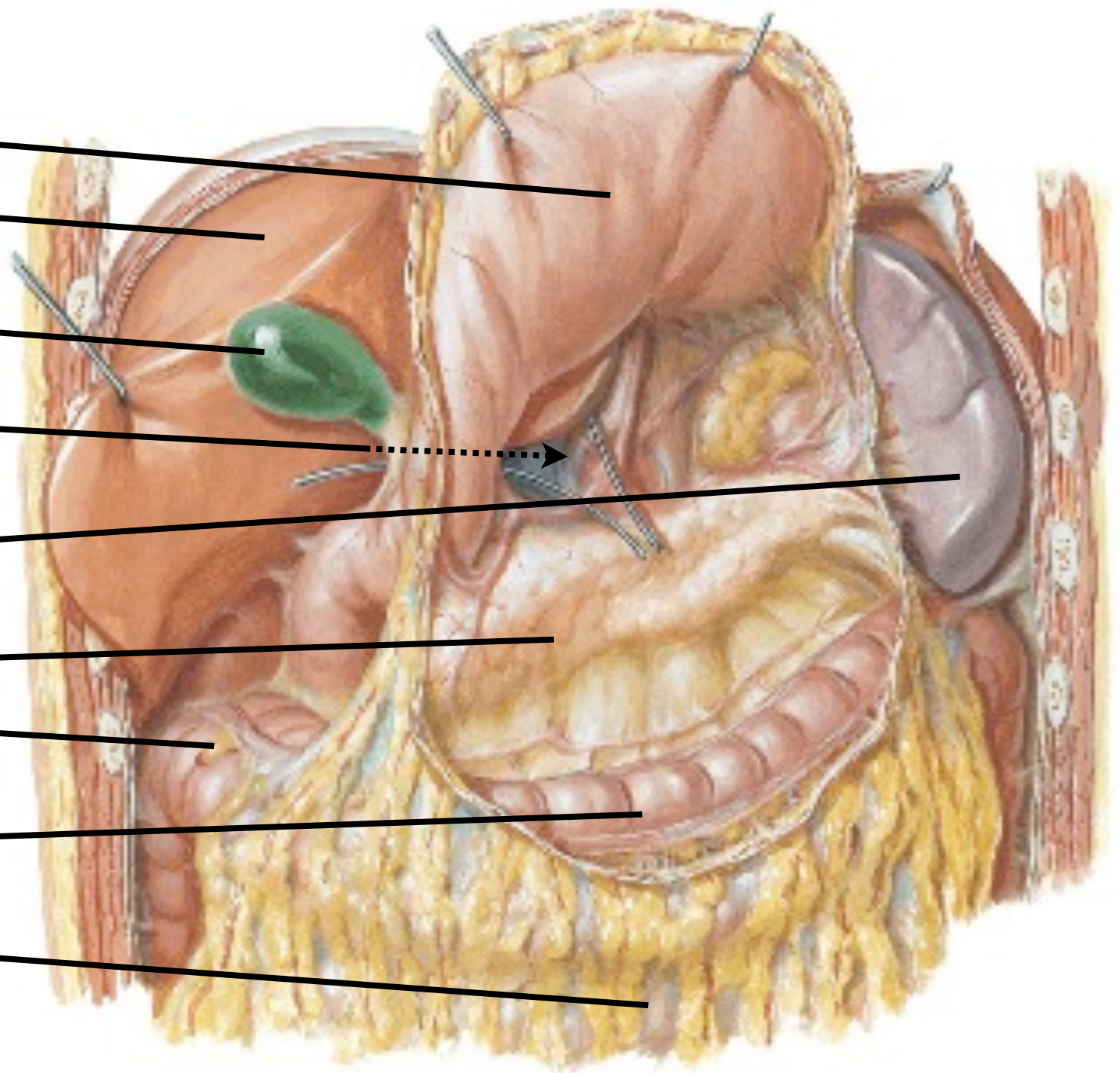


Stomach

Liver

Gallbladder

Epiploic foramen of Winslow
leading to lesser sac



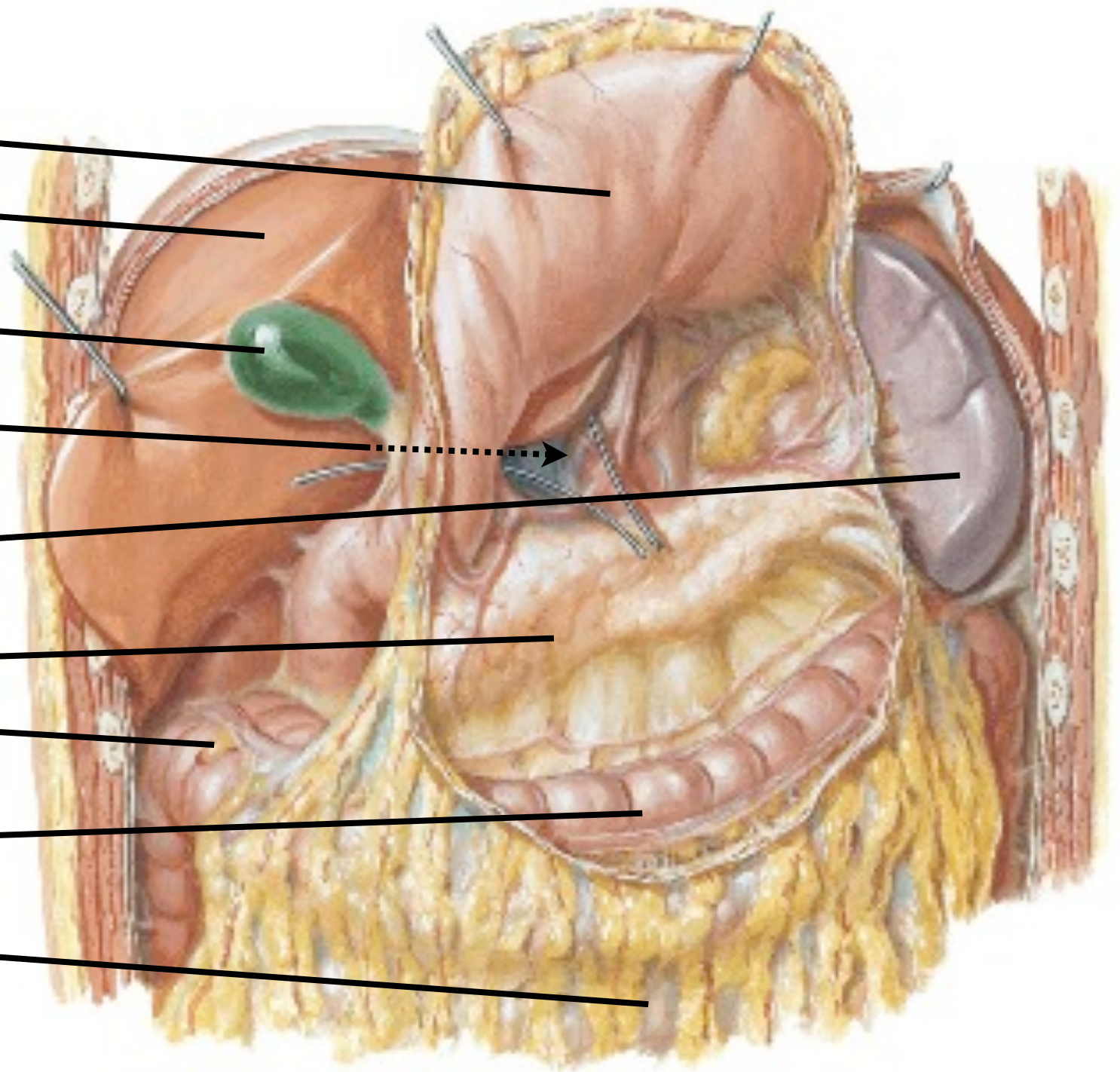
Stomach

Liver

Gallbladder

Epiploic foramen of Winslow
leading to lesser sac

Spleen



Stomach

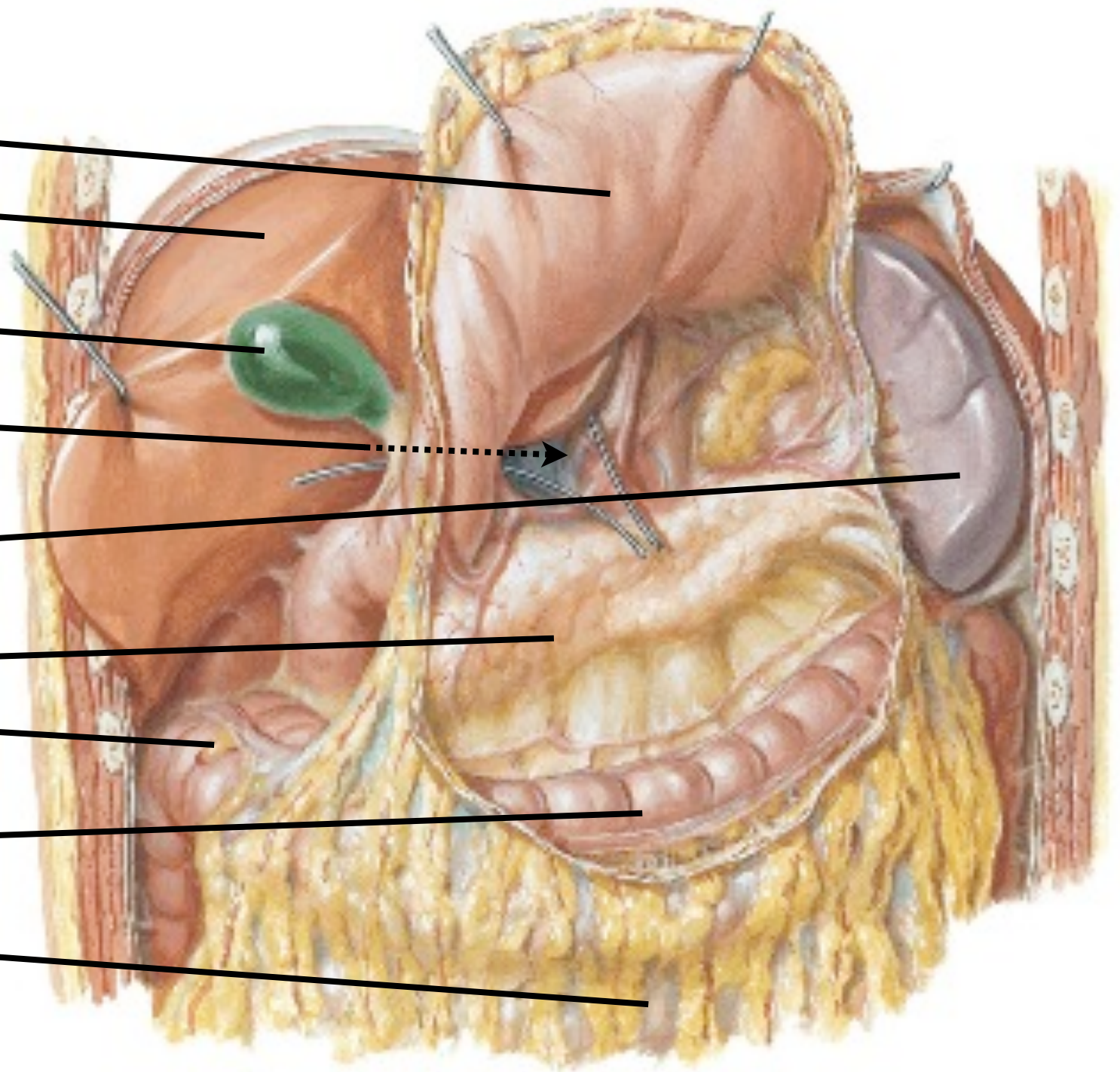
Liver

Gallbladder

Epiploic foramen of Winslow
leading to lesser sac

Spleen

Pancreas



Stomach

Liver

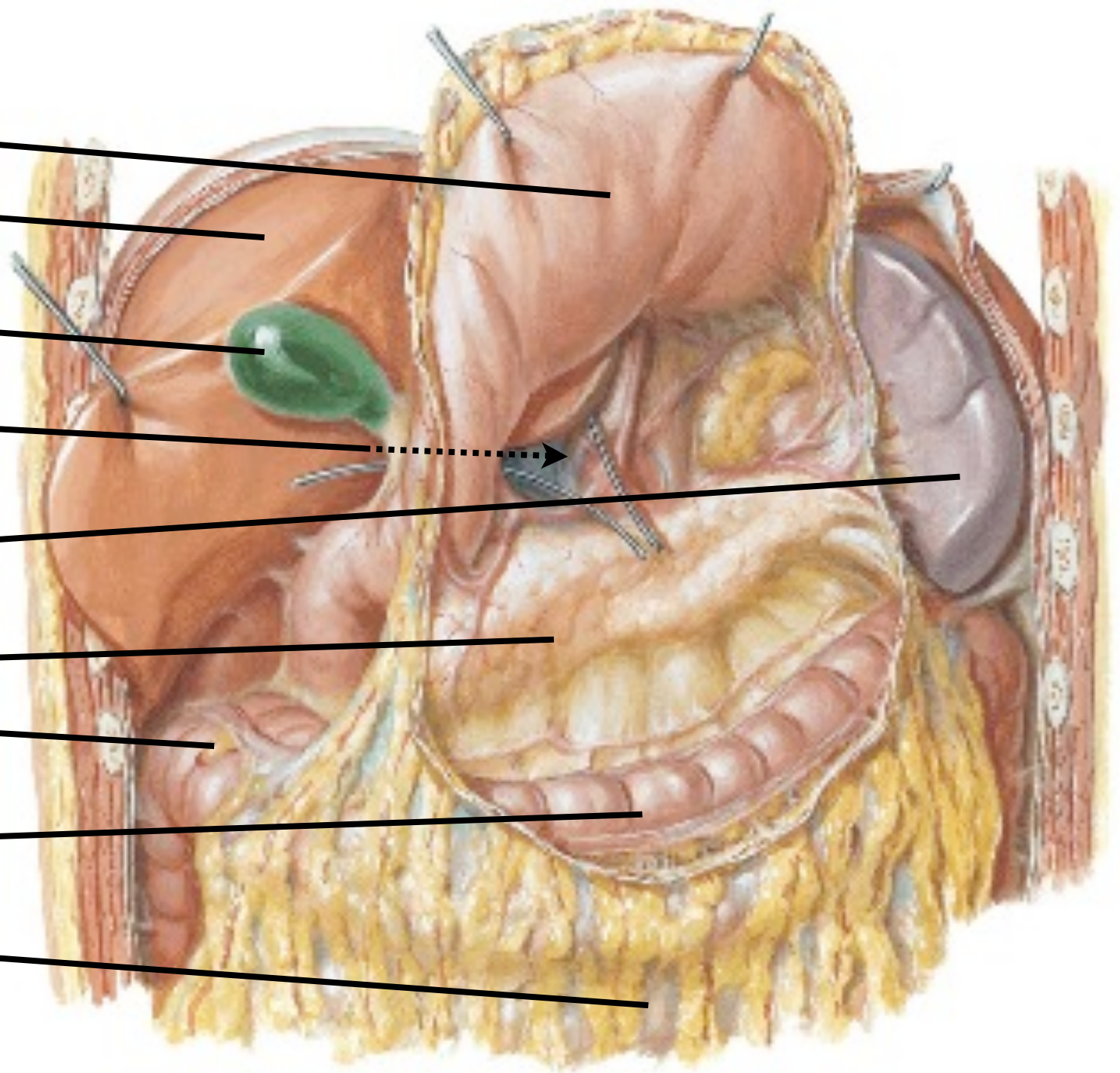
Gallbladder

Epiploic foramen of Winslow
leading to lesser sac

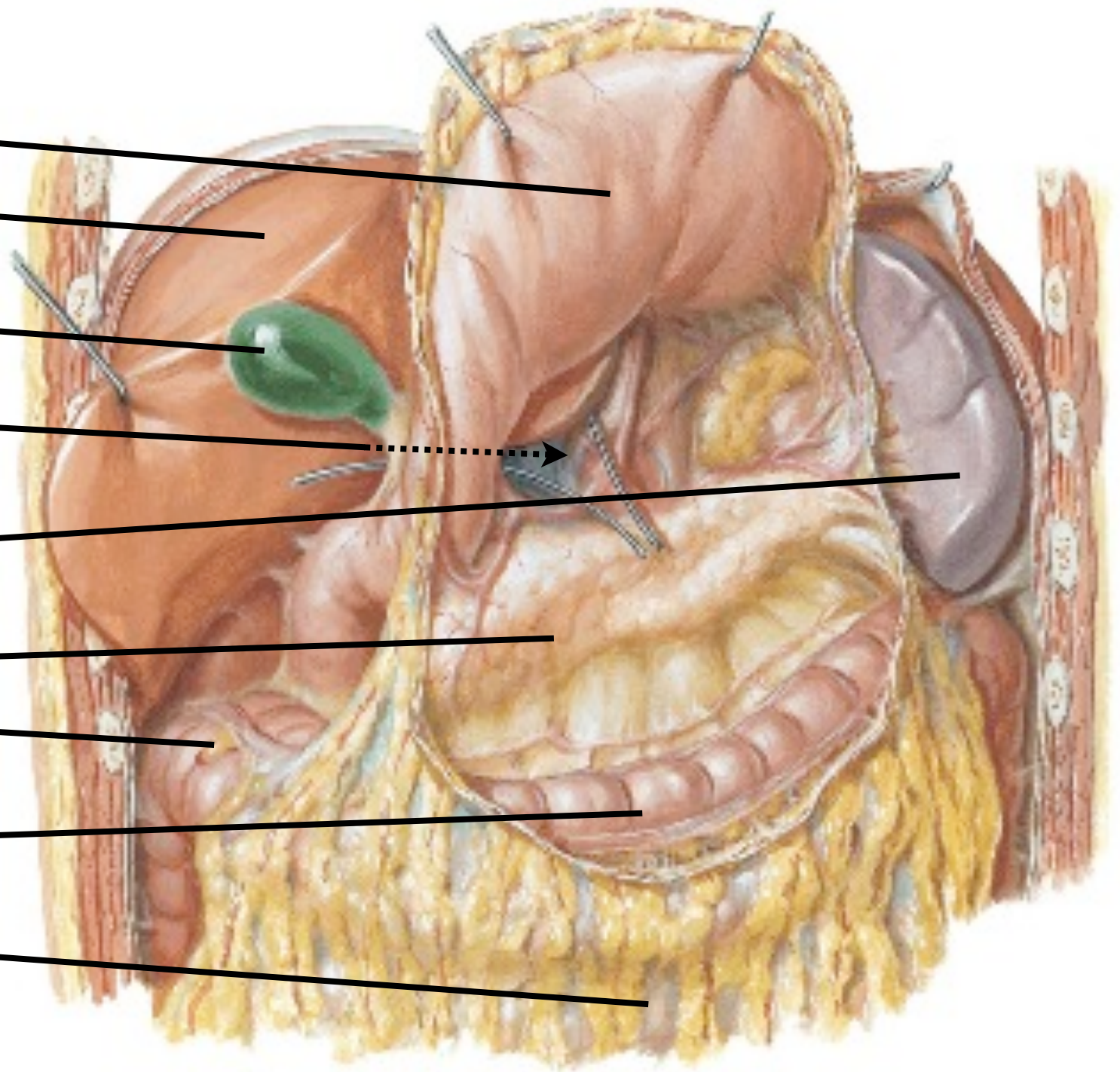
Spleen

Pancreas

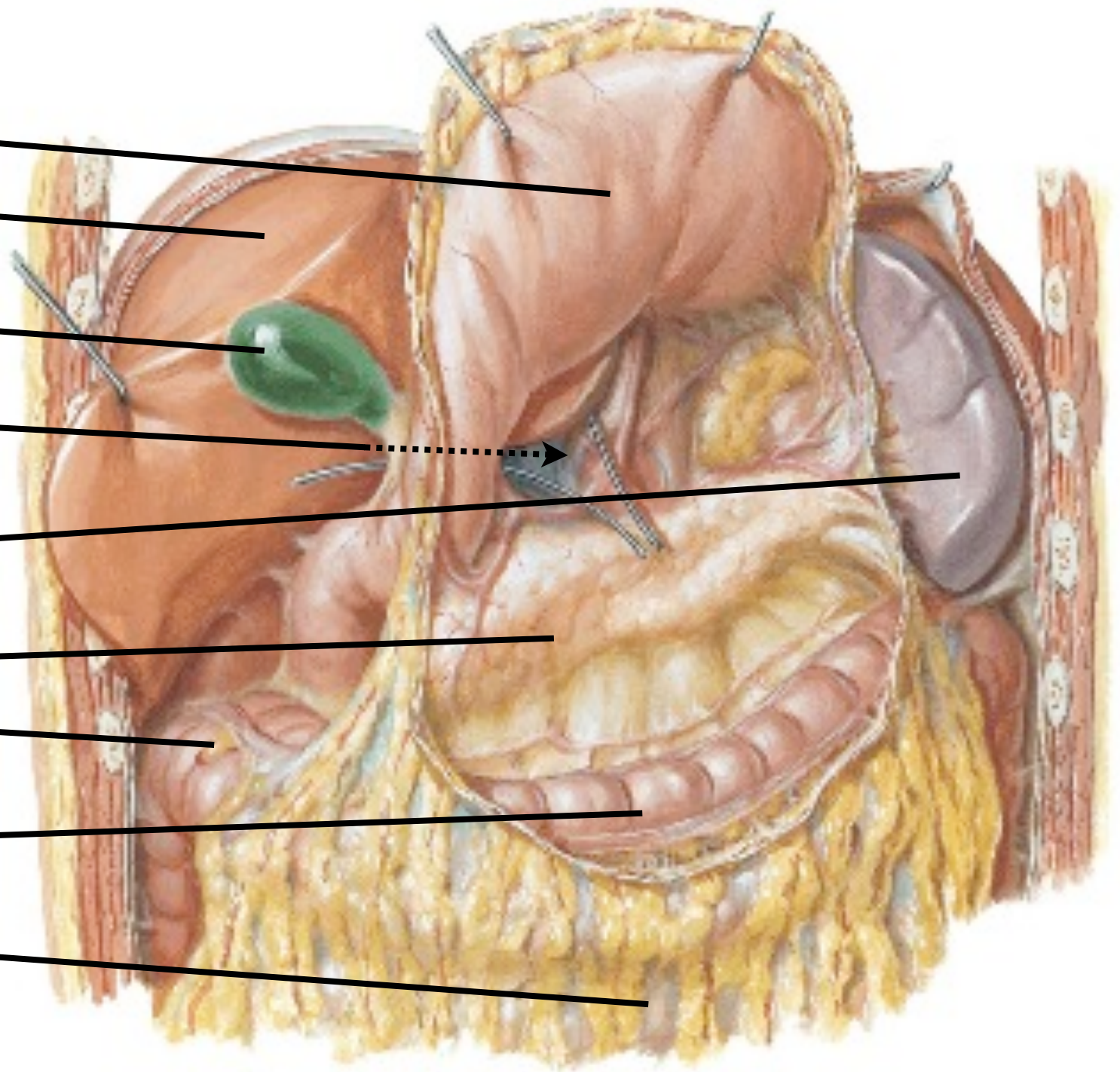
Hepatic flexure

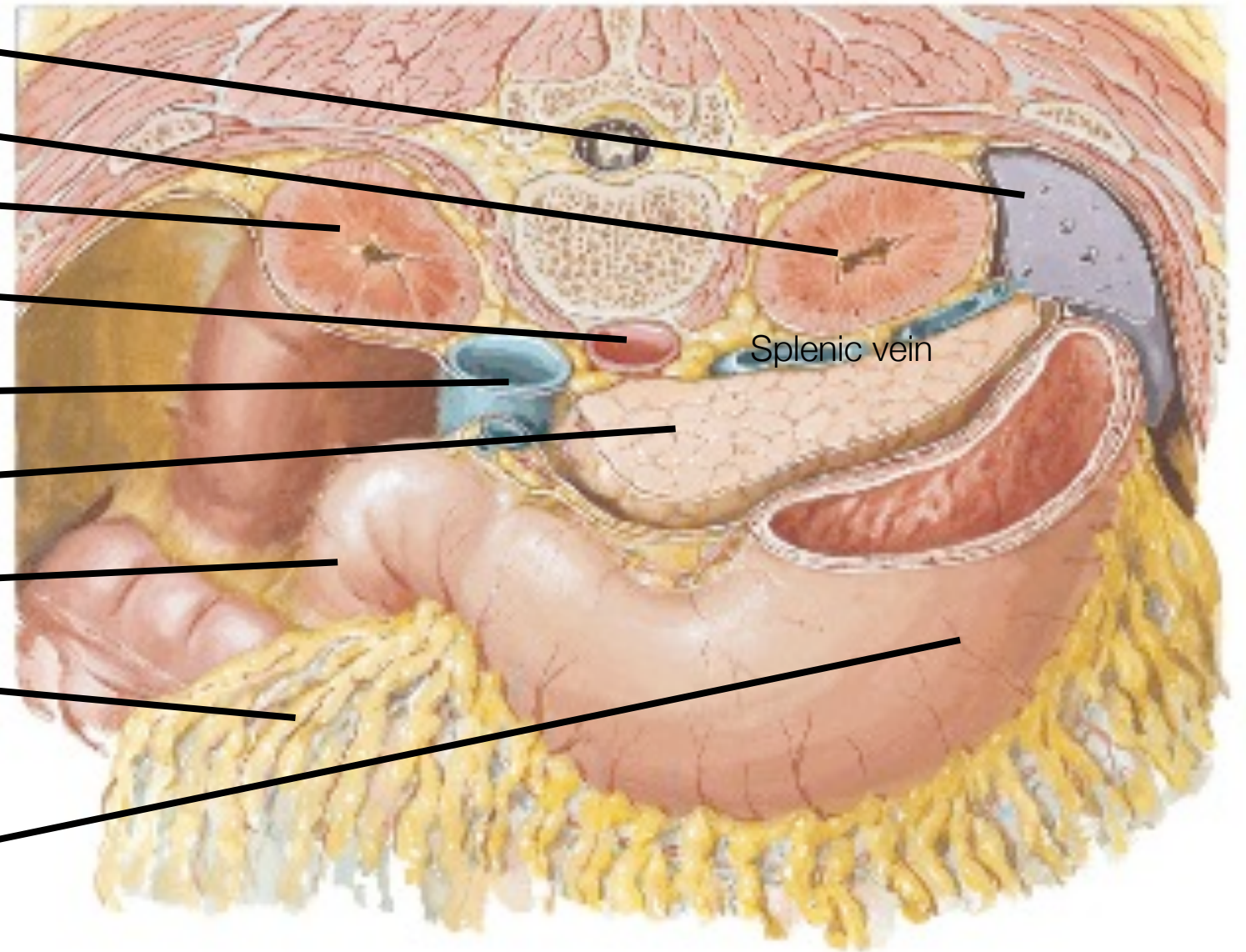


- Stomach
- Liver
- Gallbladder
- Epiploic foramen of Winslow leading to lesser sac
- Spleen
- Pancreas
- Hepatic flexure
- Transverse colon

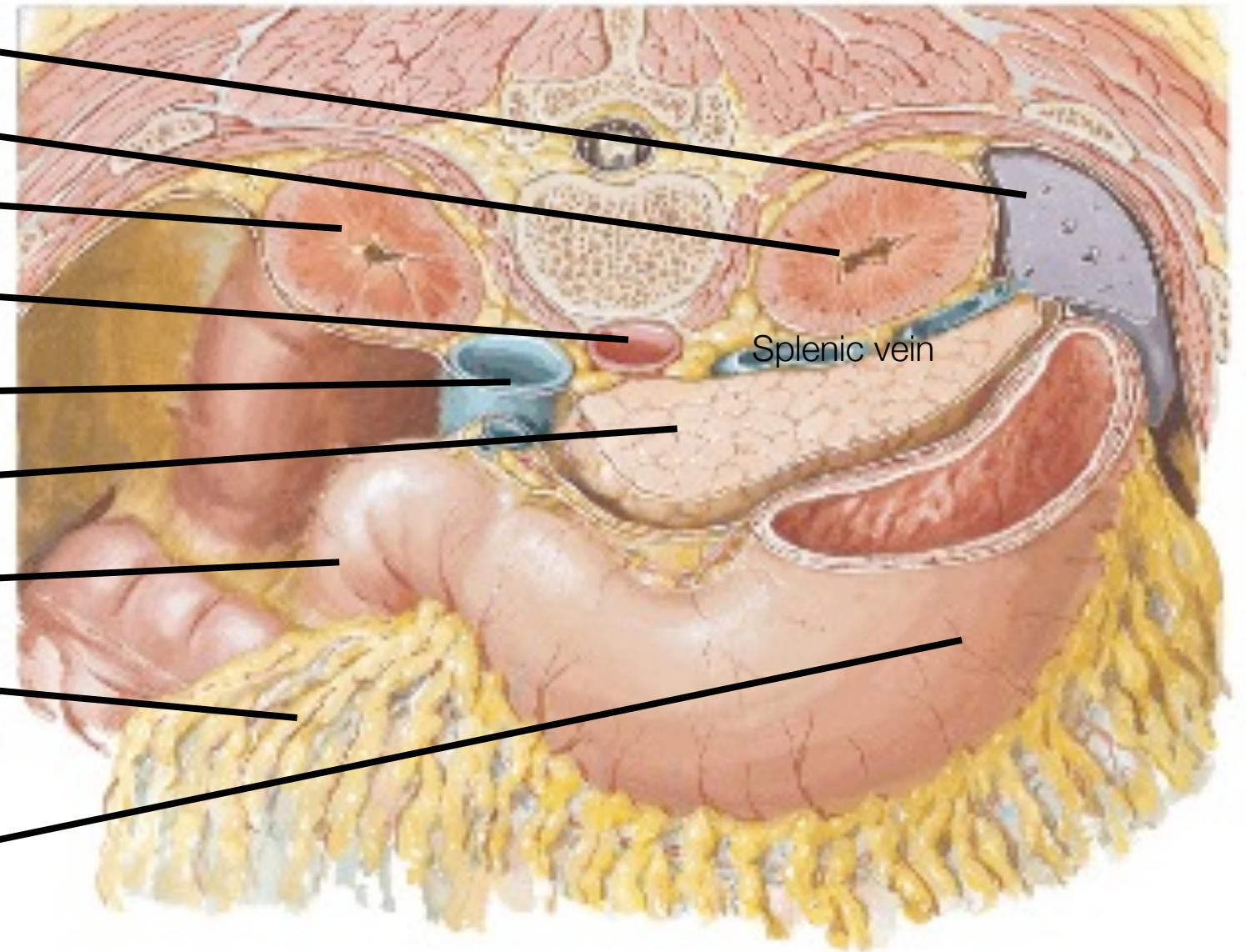


- Stomach
- Liver
- Gallbladder
- Epiploic foramen of Winslow leading to lesser sac
- Spleen
- Pancreas
- Hepatic flexure
- Transverse colon
- Greater omentum



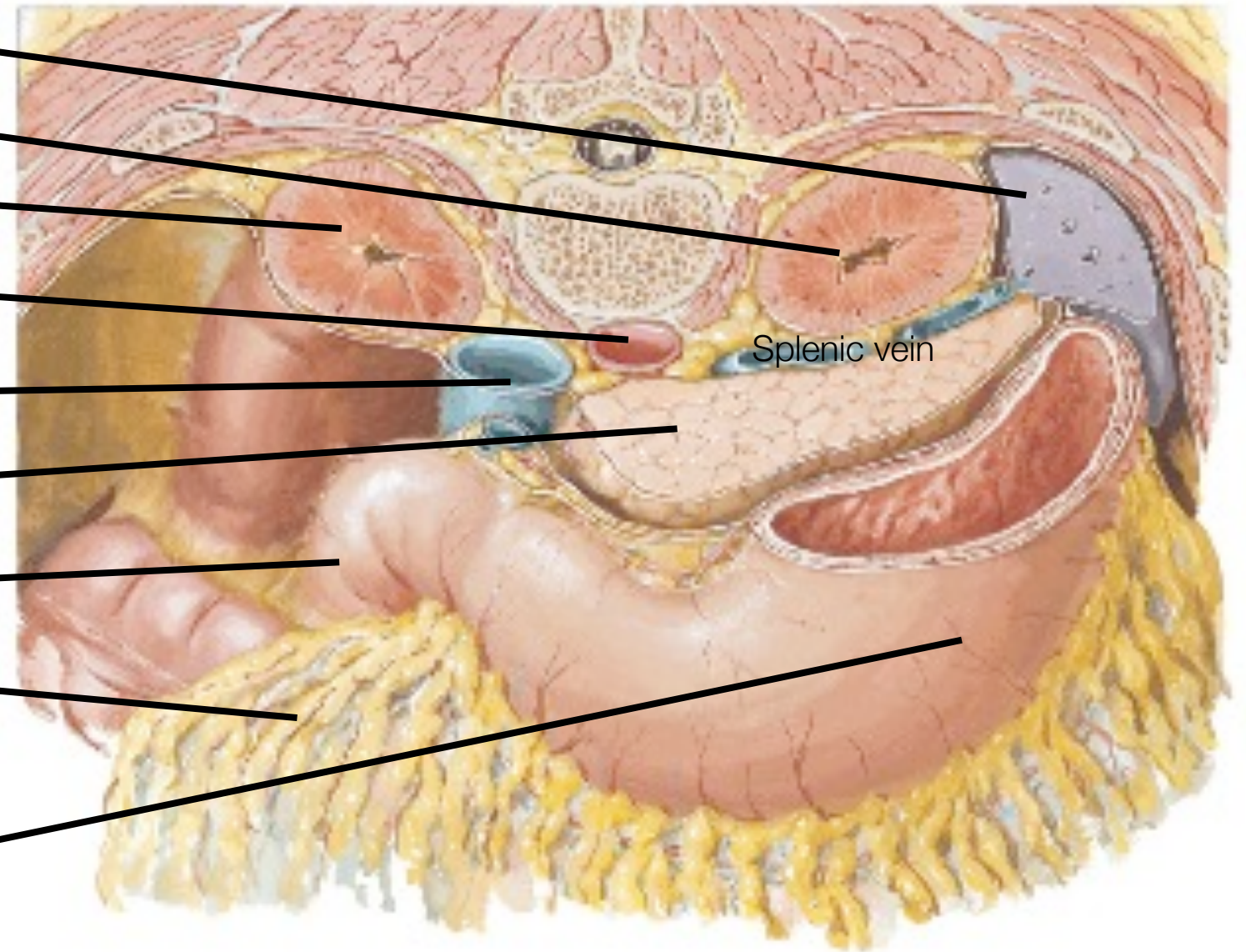


Spleen



Spleen

Left kidney

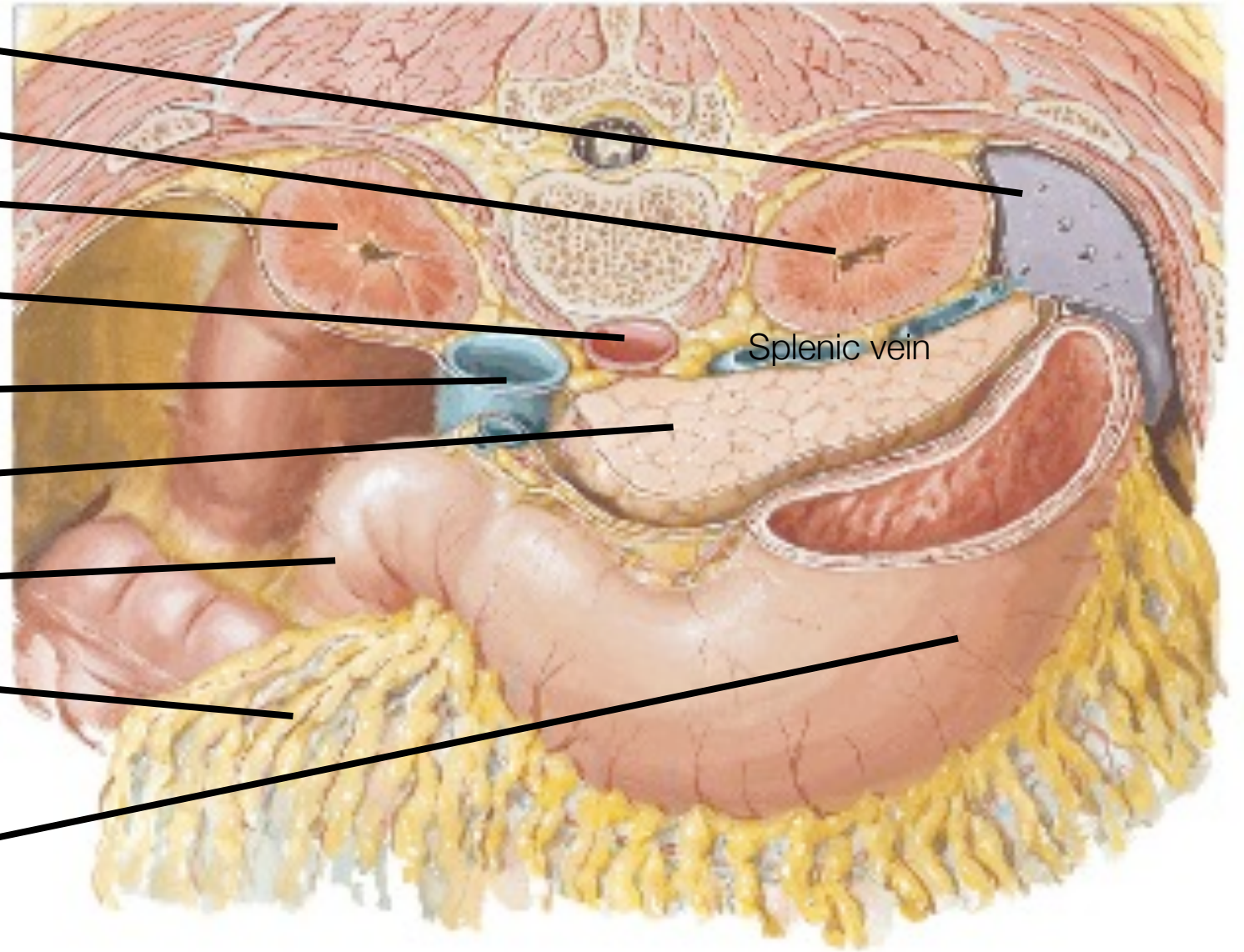


Spleen

Left kidney

Right kidney

Splenic vein



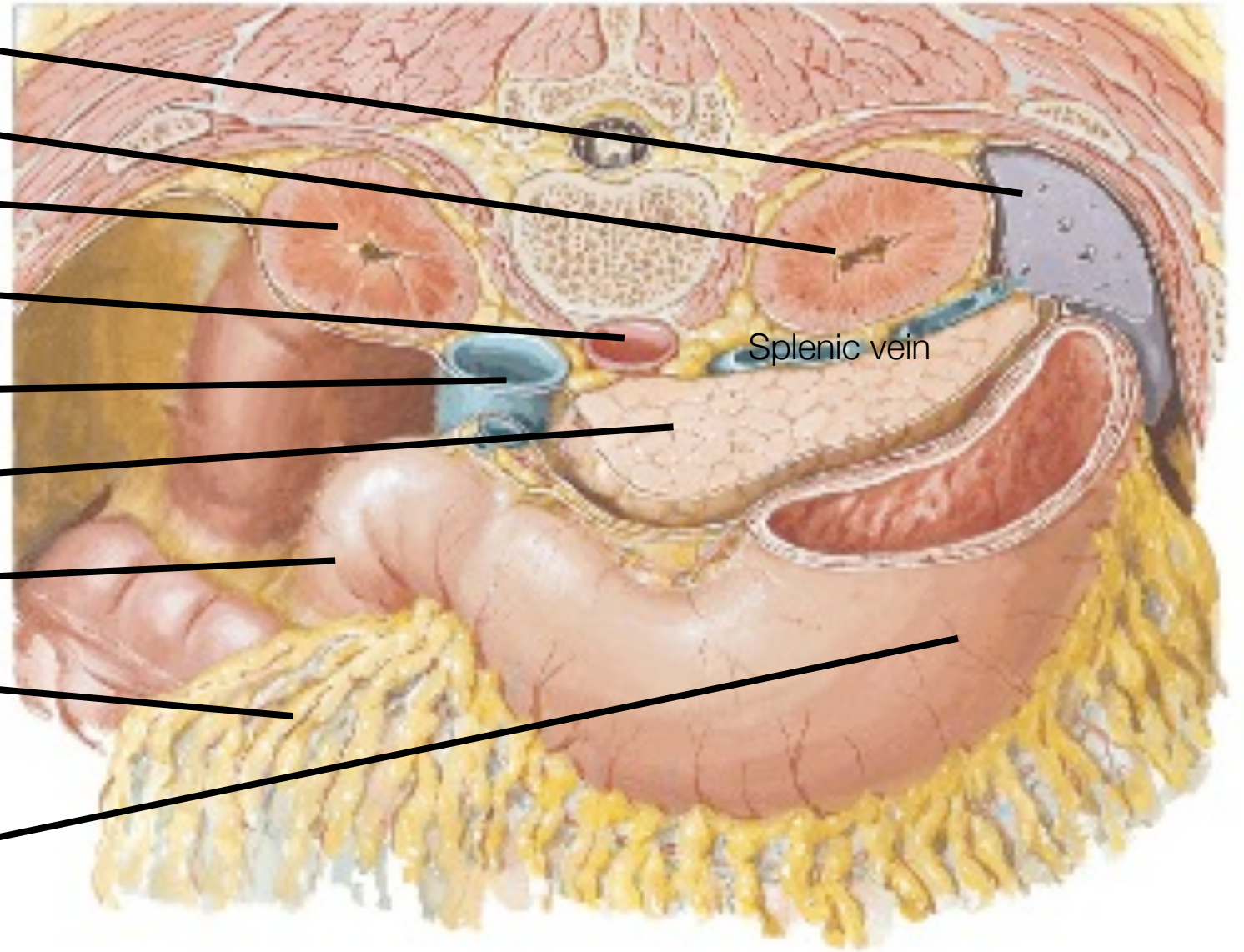
Spleen

Left kidney

Right kidney

Aorta

Splenic vein



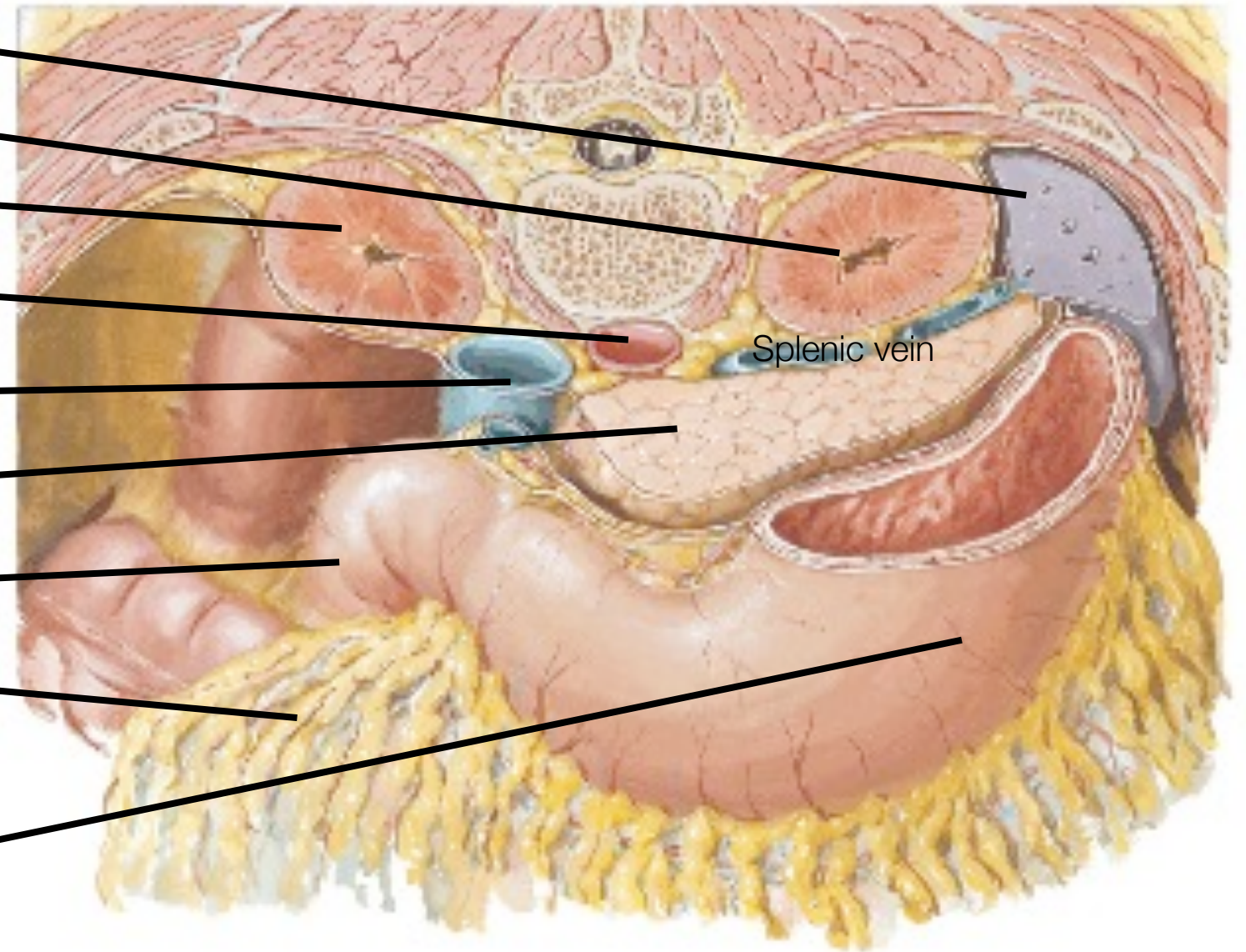
Spleen

Left kidney

Right kidney

Aorta

Inferior vena cava



Spleen

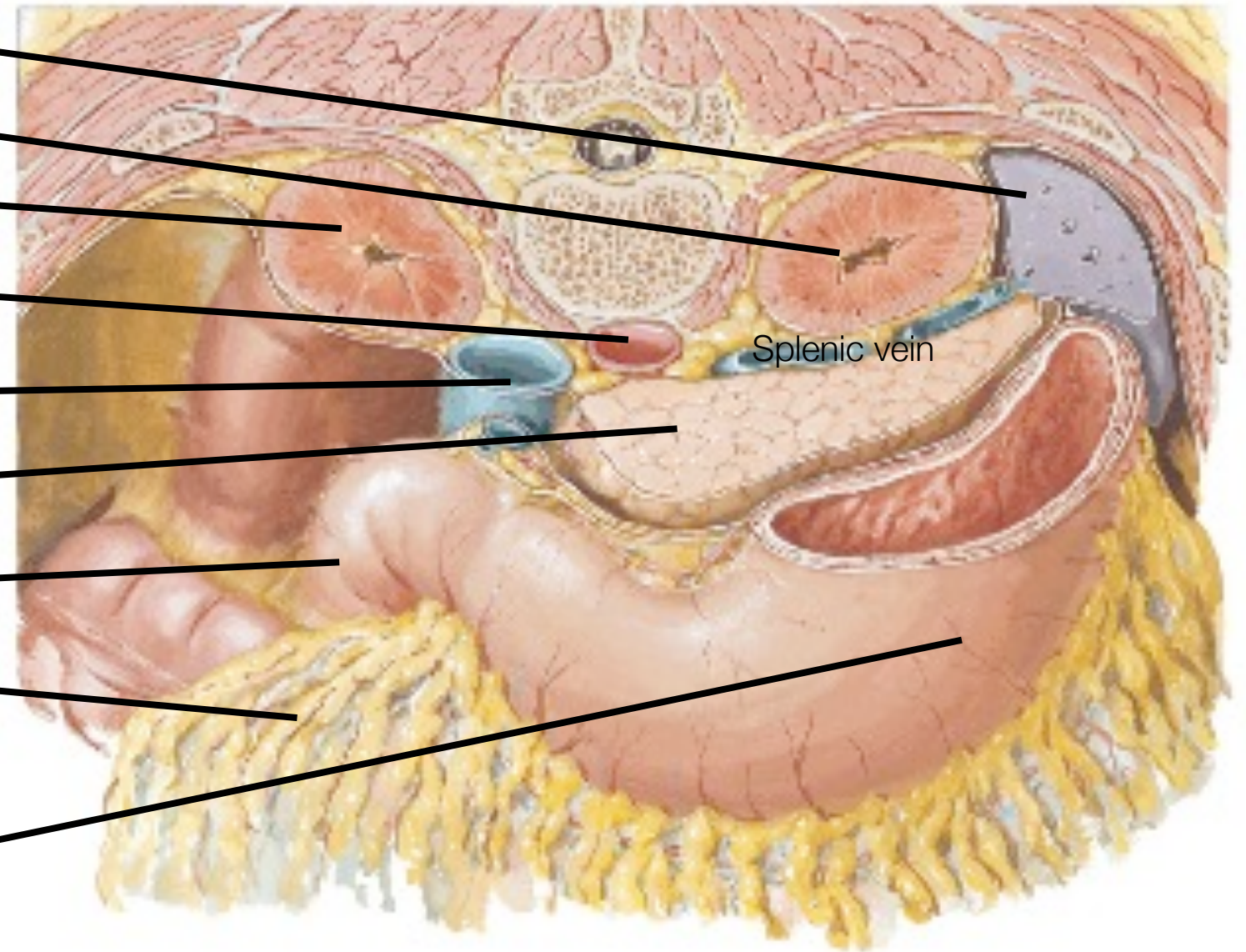
Left kidney

Right kidney

Aorta

Inferior vena cava

Pancreas



Spleen

Left kidney

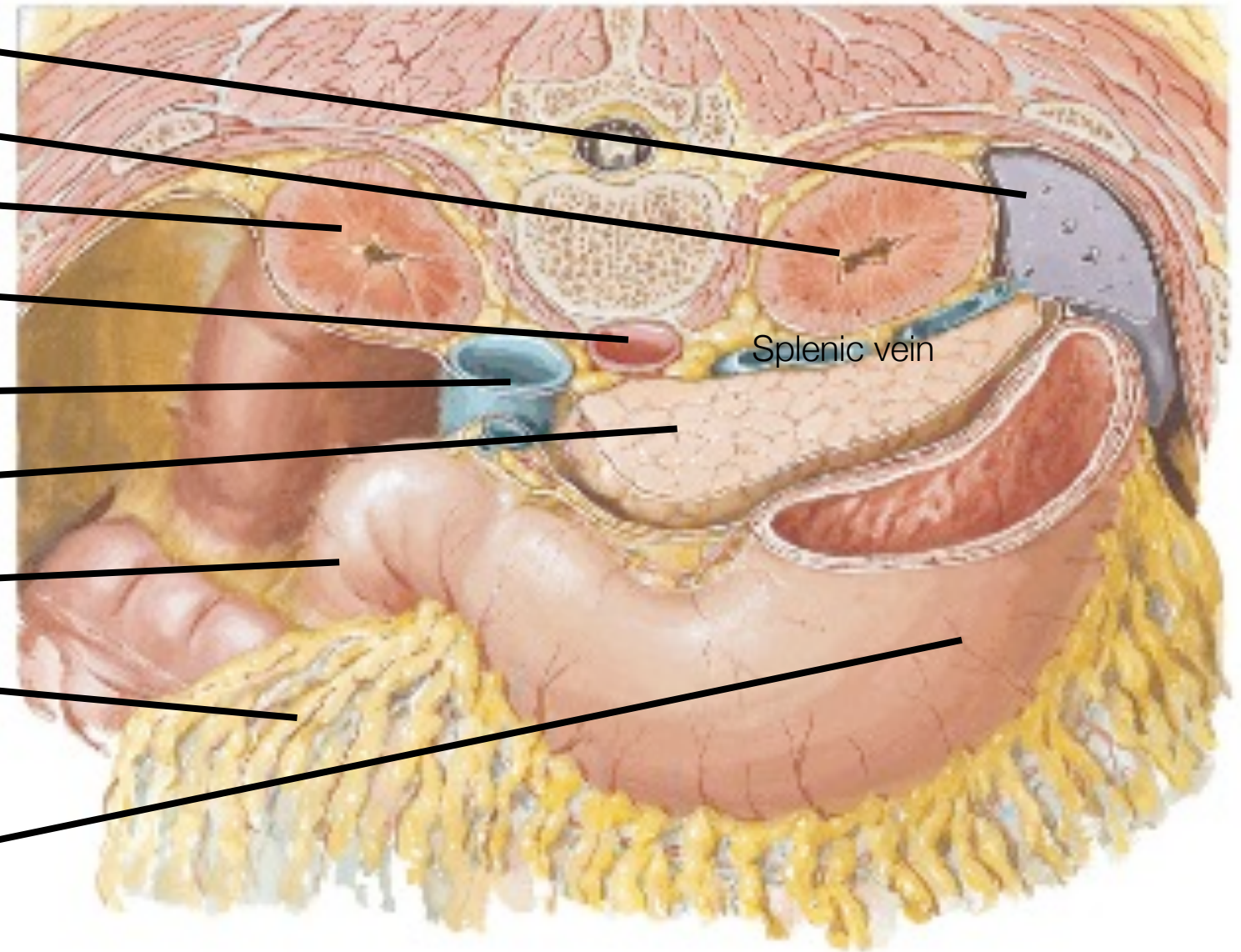
Right kidney

Aorta

Inferior vena cava

Pancreas

Duodenum



Spleen

Left kidney

Right kidney

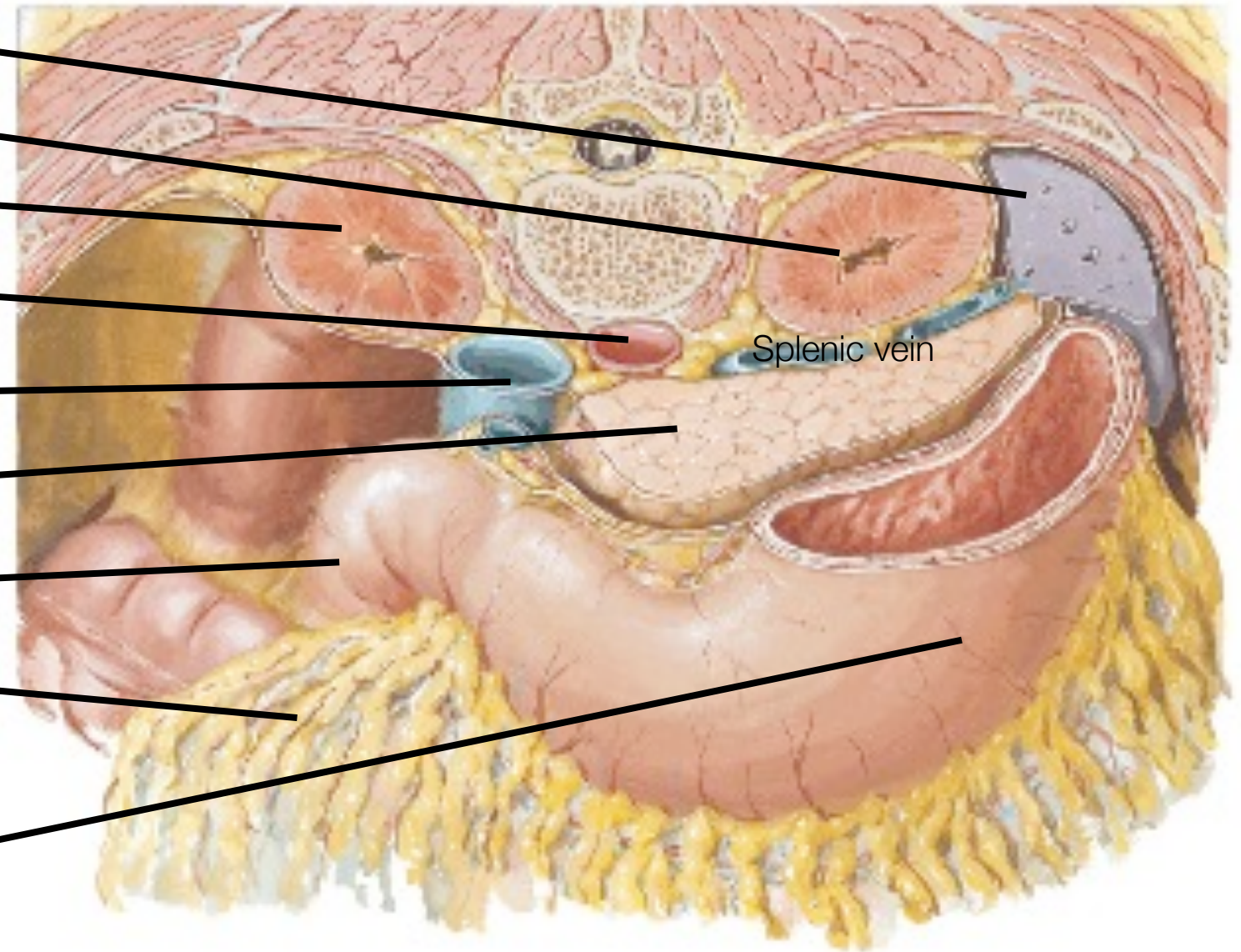
Aorta

Inferior vena cava

Pancreas

Duodenum

Greater omentum



Spleen

Left kidney

Right kidney

Aorta

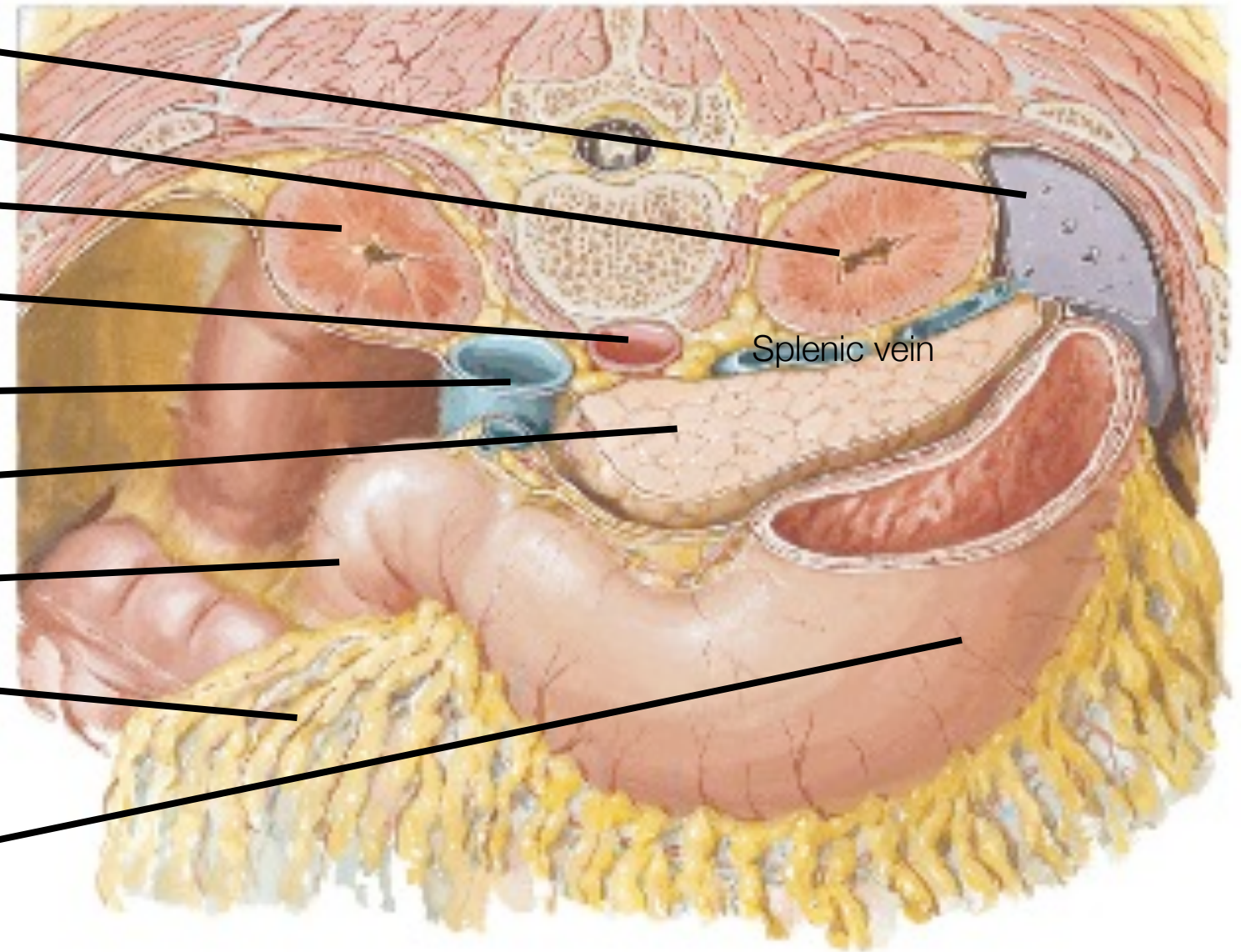
Inferior vena cava

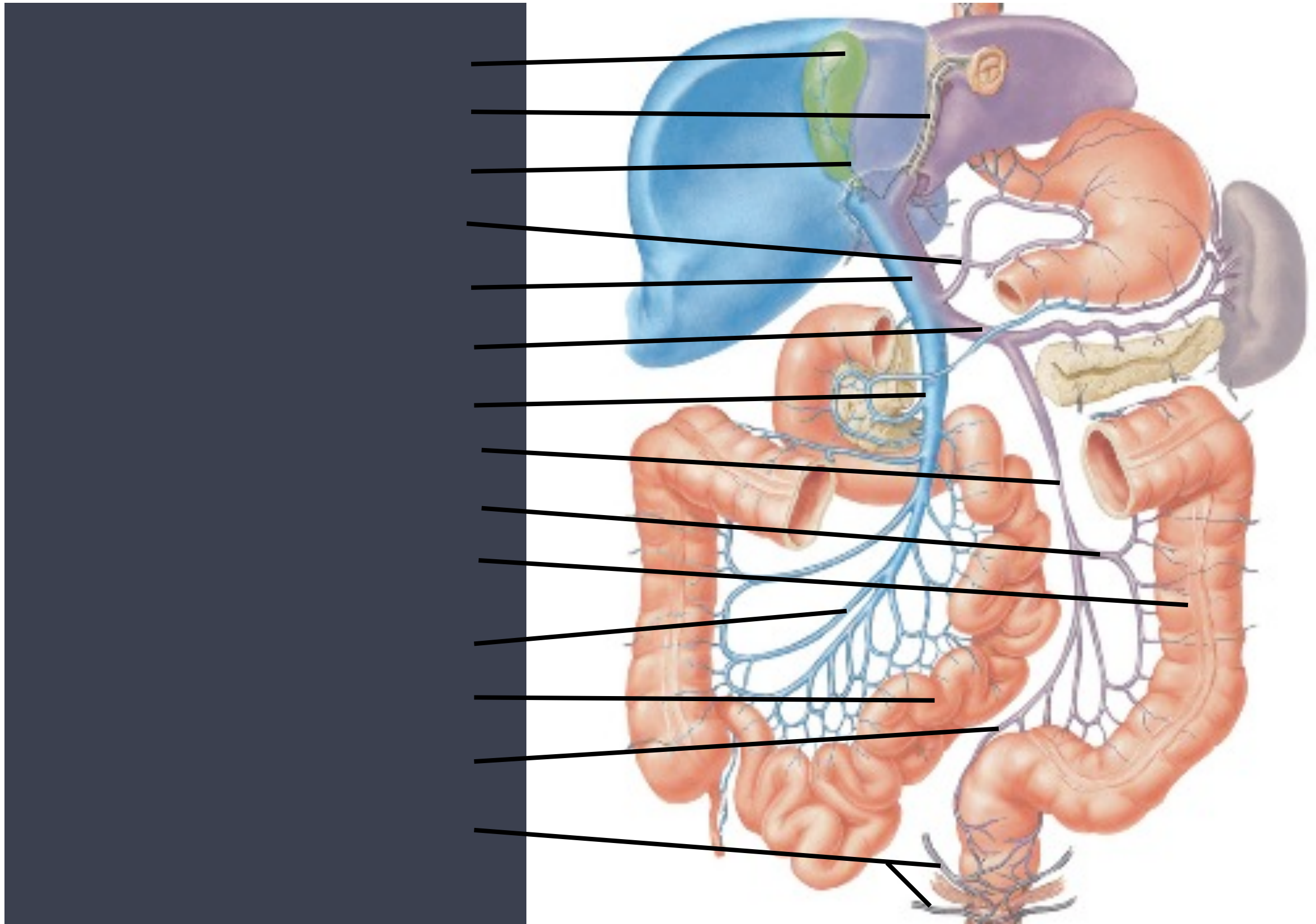
Pancreas

Duodenum

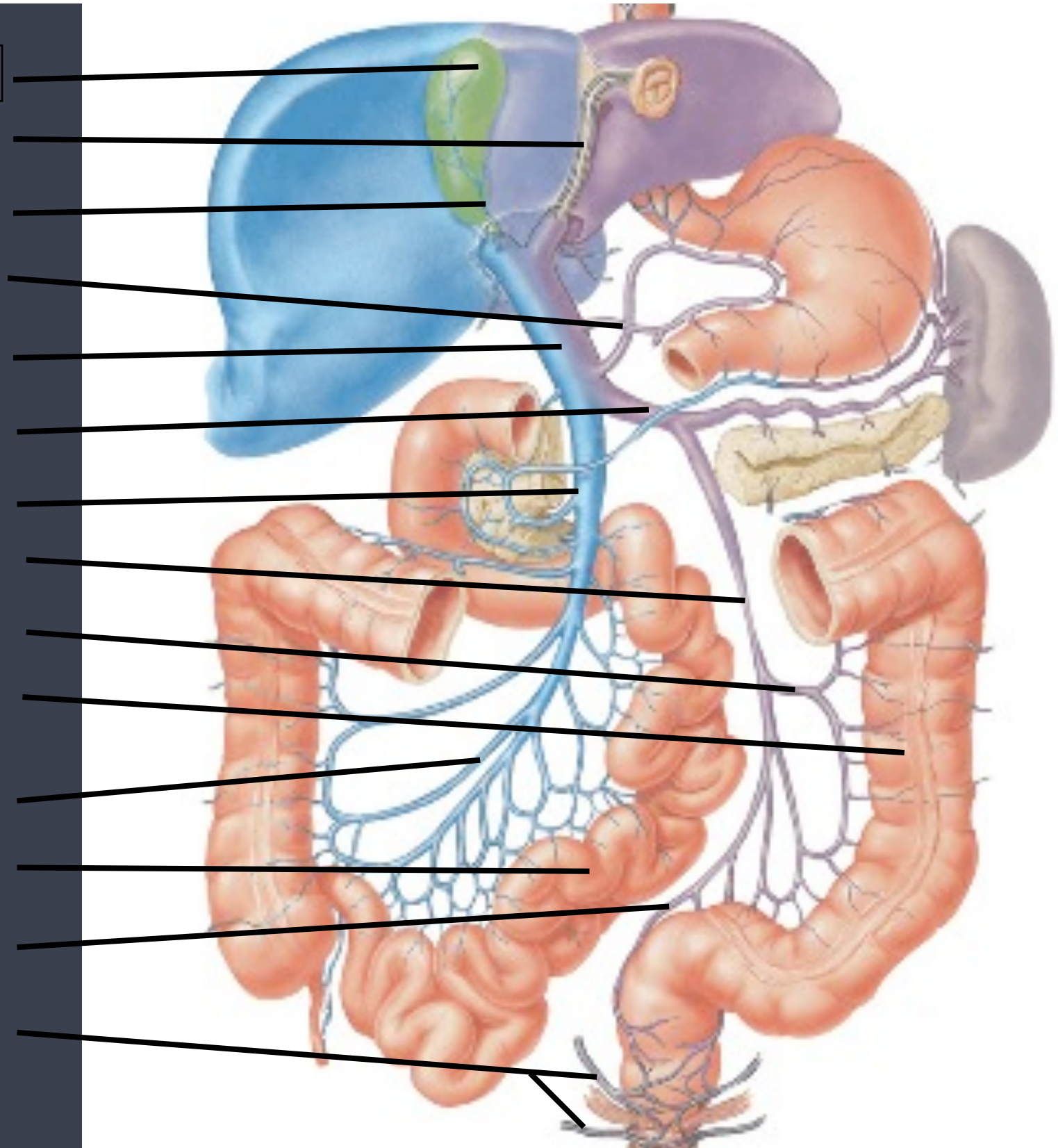
Greater omentum

Stomach



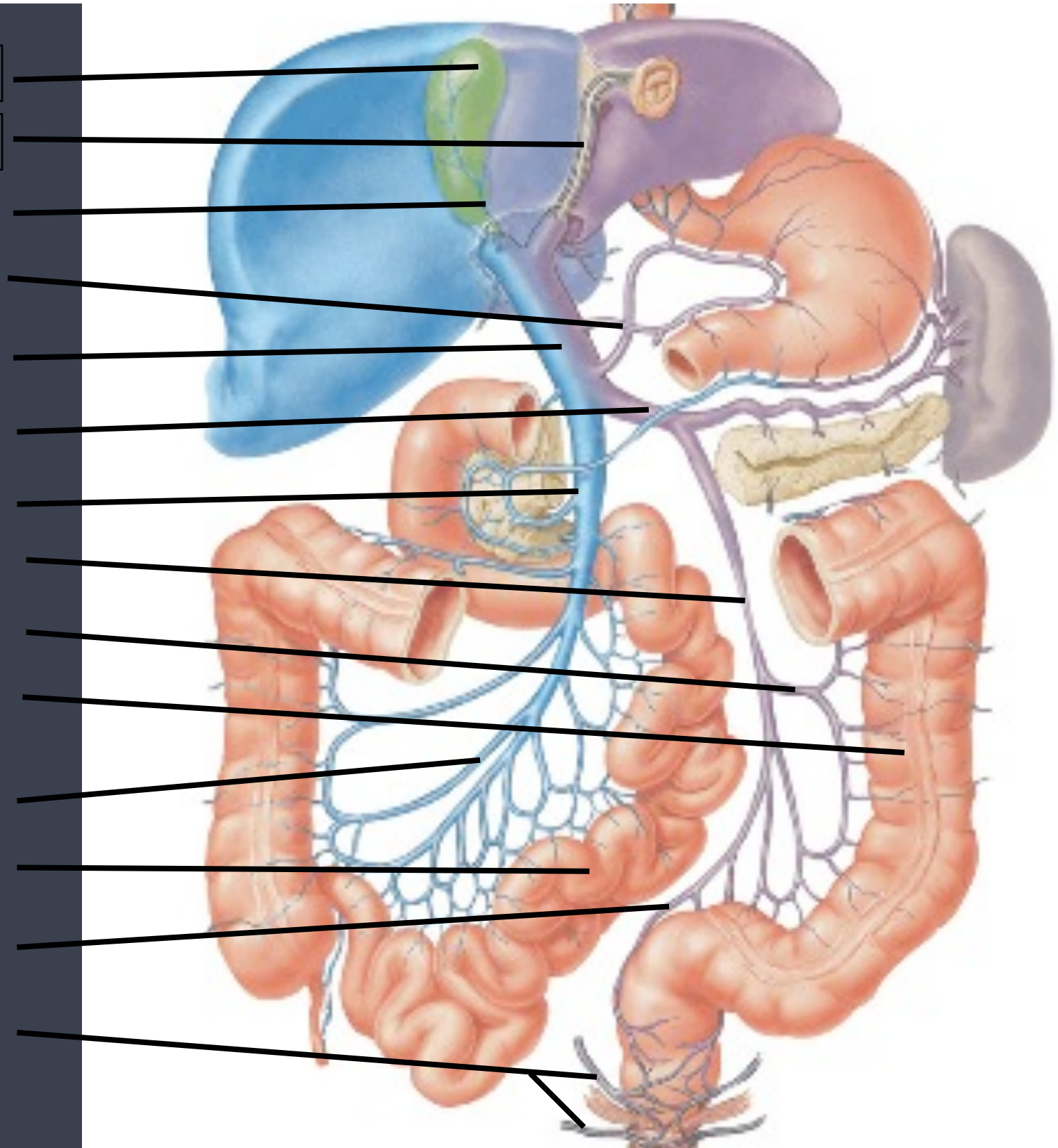


Gallbladder



Gallbladder

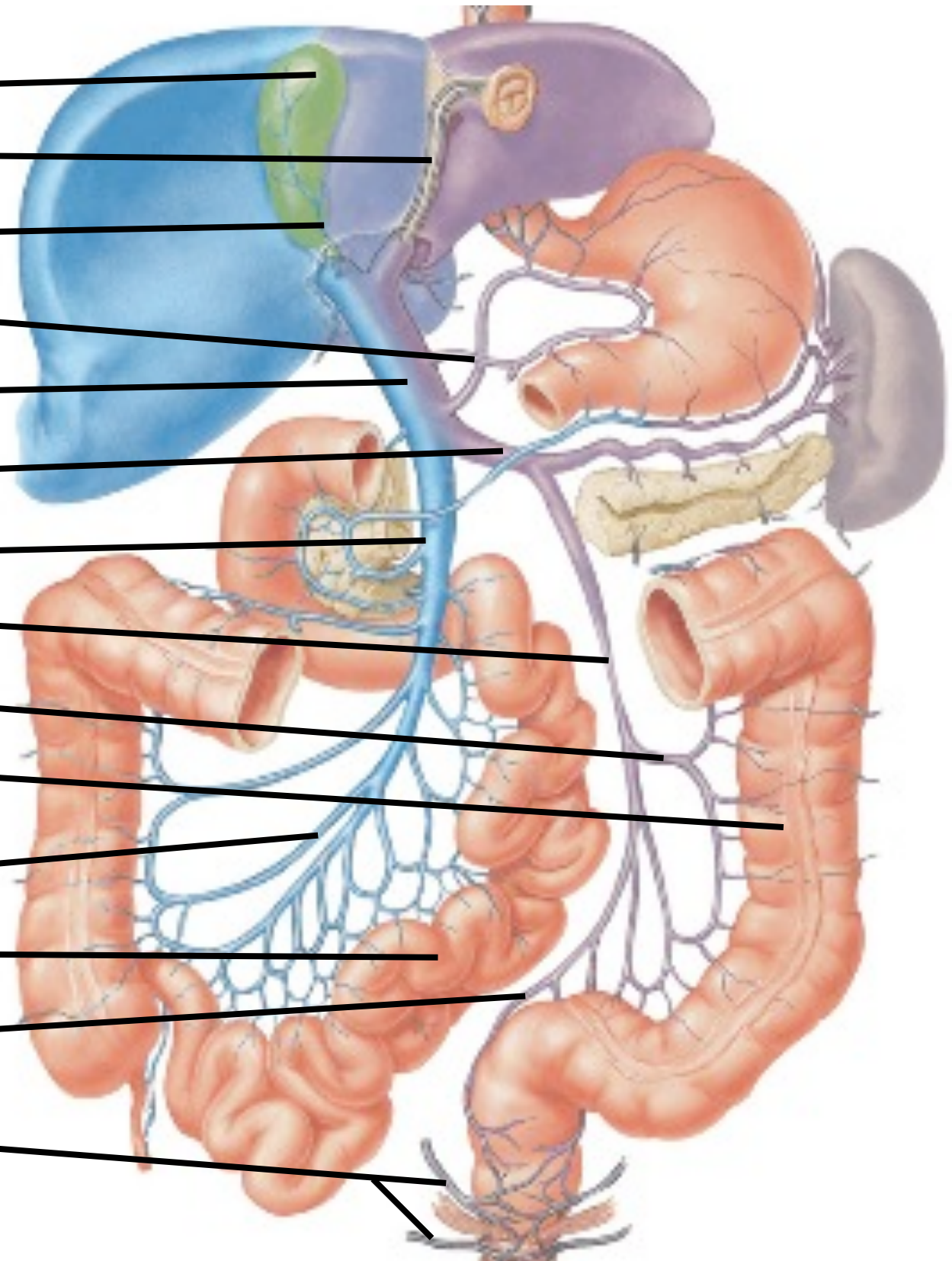
Paraumbilical v



Gallbladder

Paraumbilical v

Cystic v

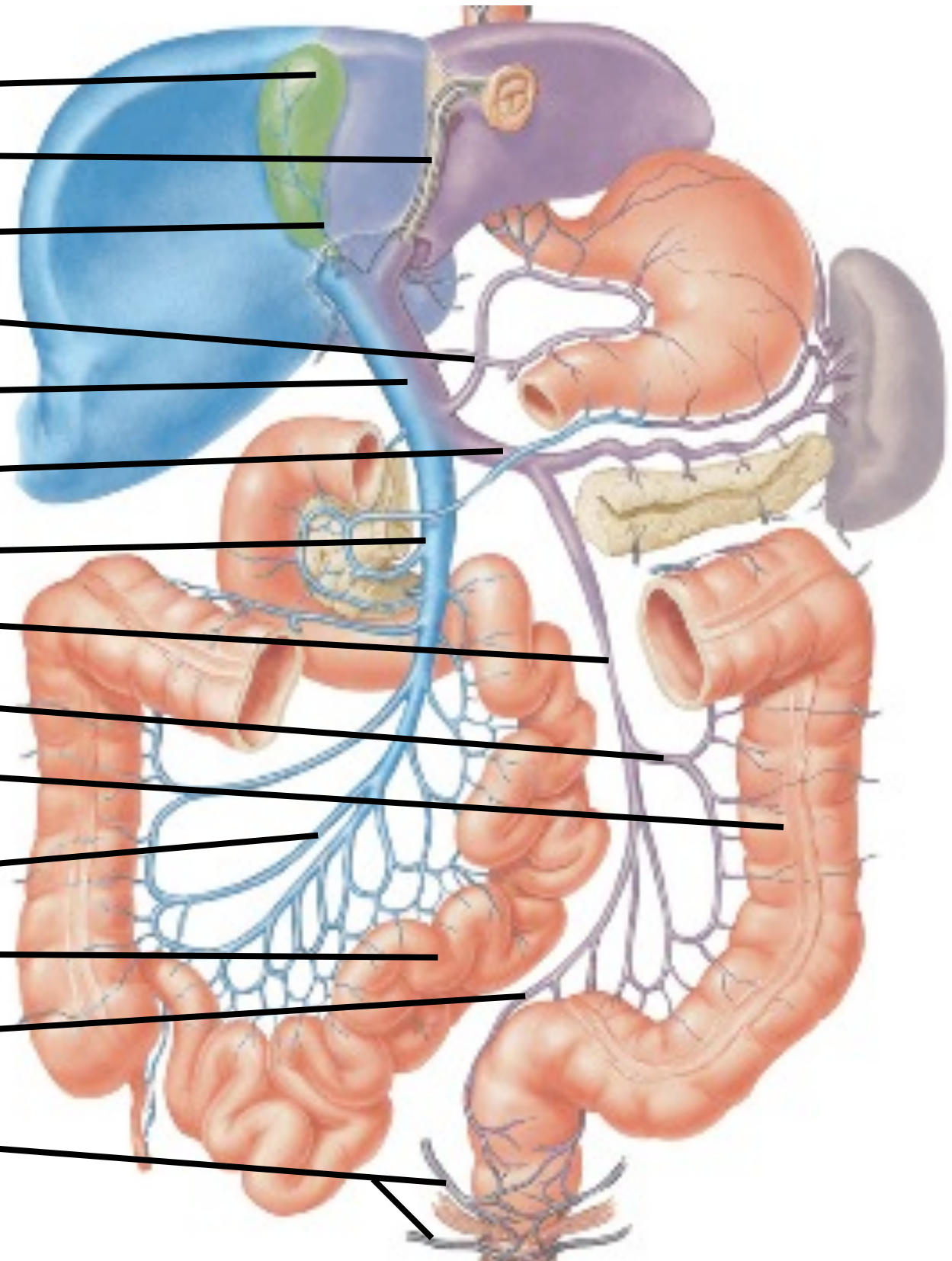


Gallbladder

Paraumbilical v

Cystic v

Right & Left gastric v



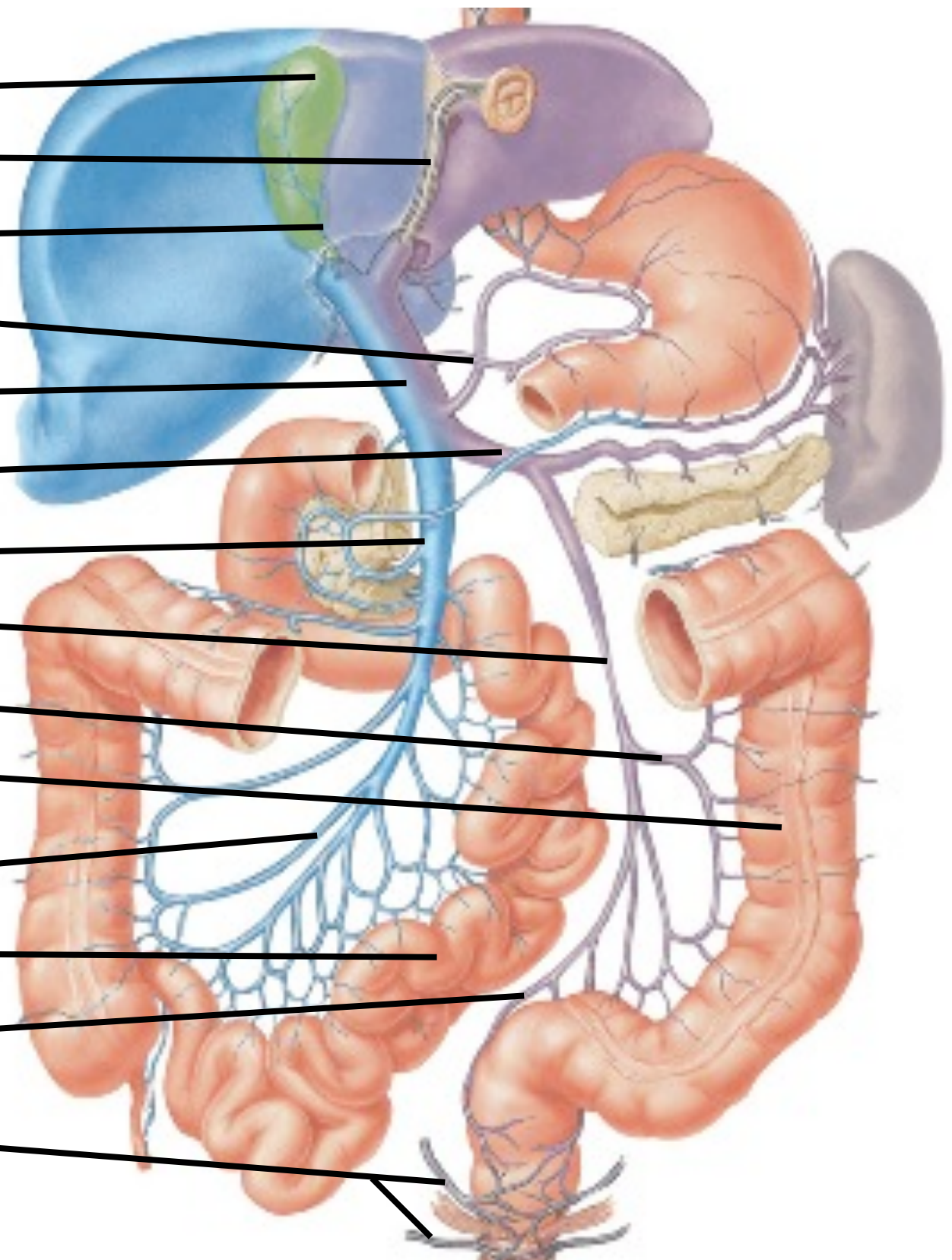
Gallbladder

Paraumbilical v

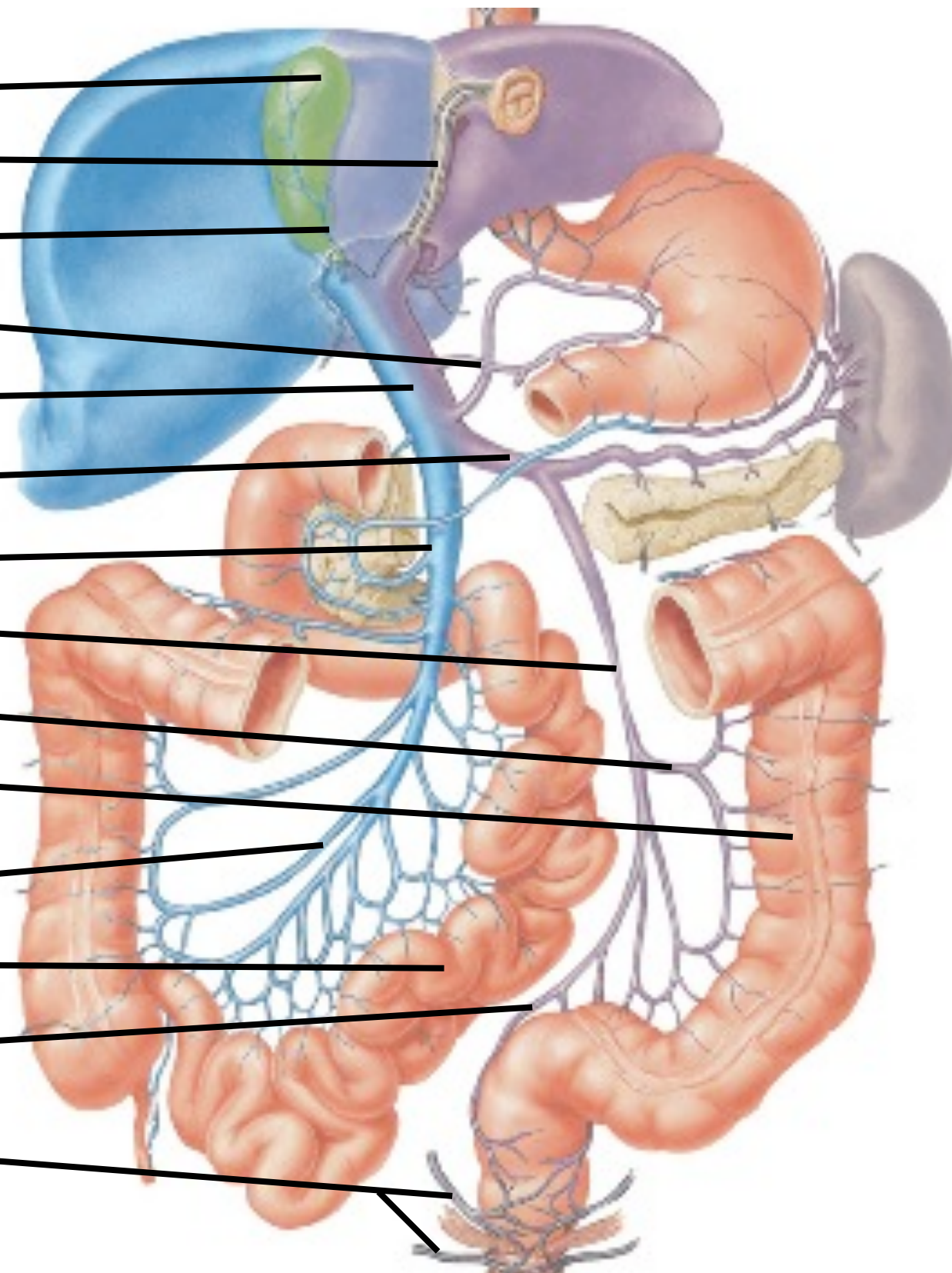
Cystic v

Right & Left gastric v

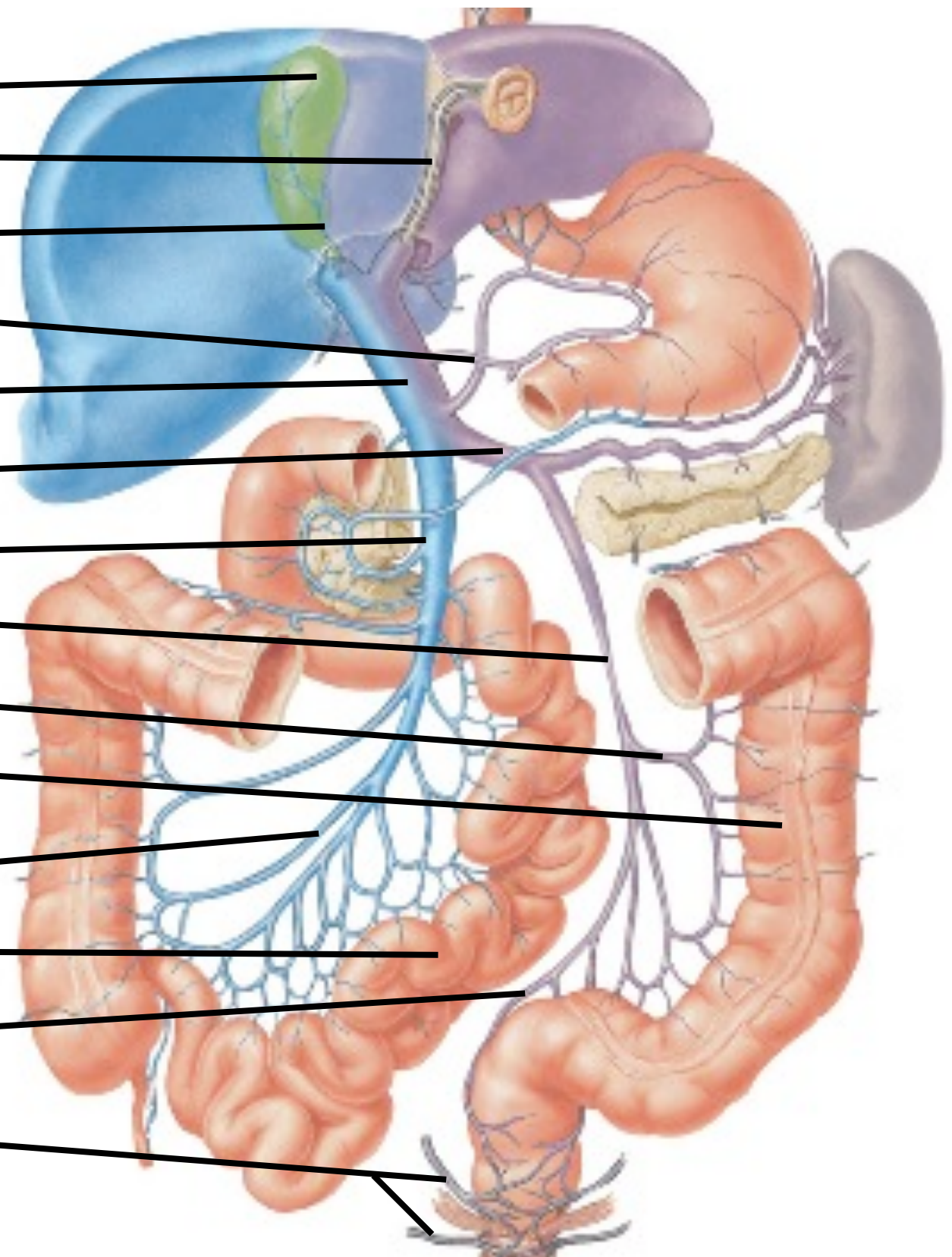
Hepatic portal v



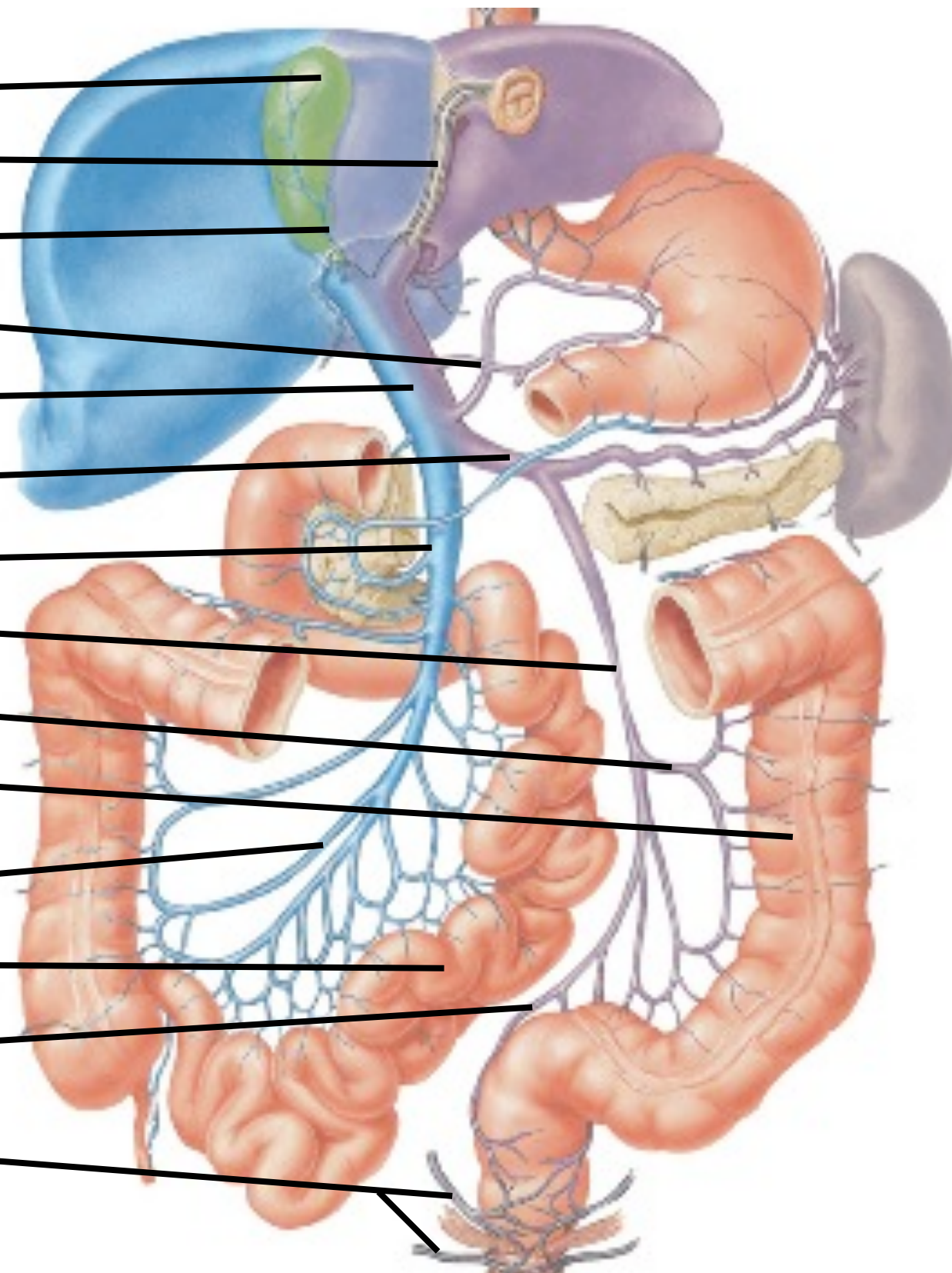
- Gallbladder
- Paraumbilical v
- Cystic v
- Right & Left gastric v
- Hepatic portal v
- Splenic v



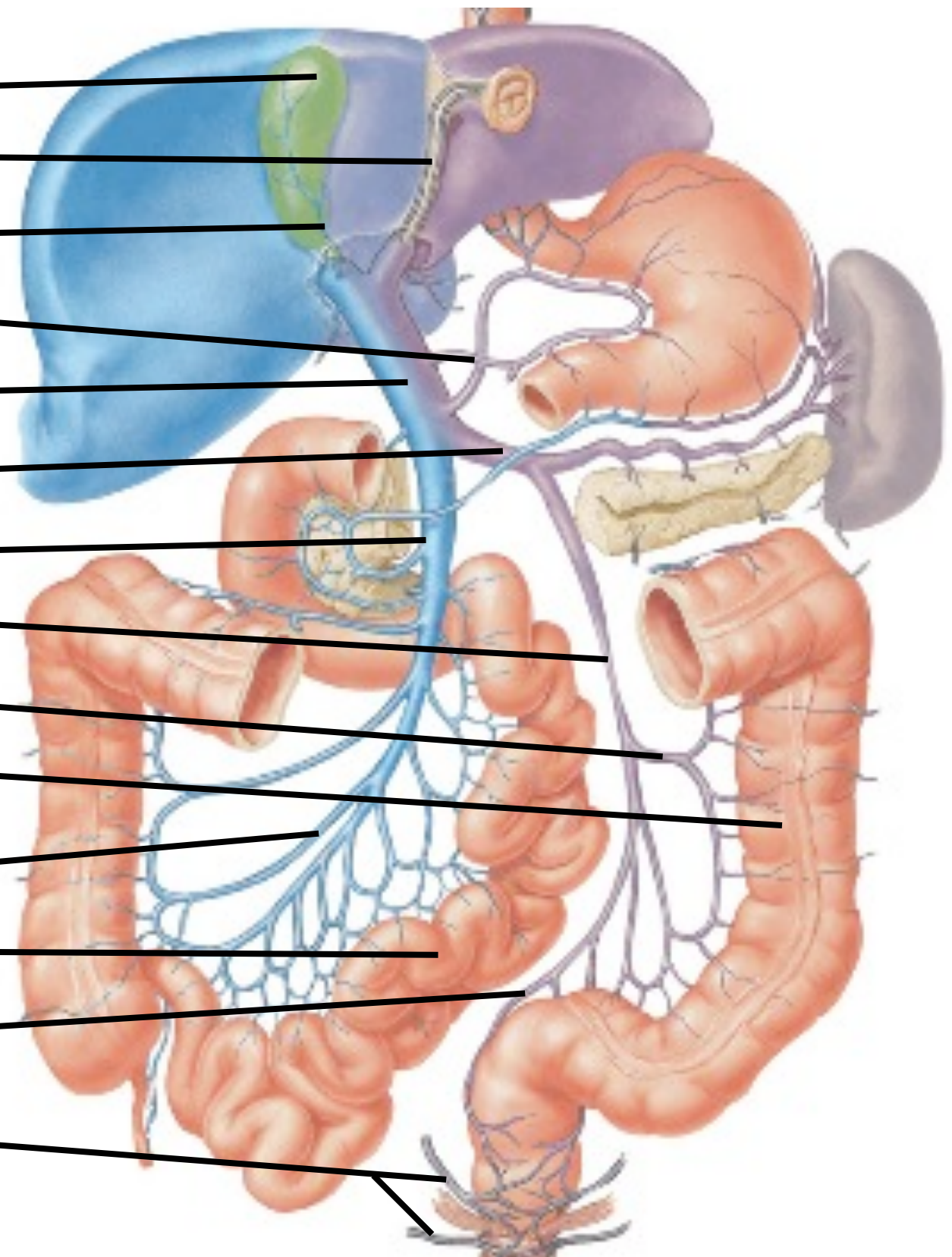
- Gallbladder
- Paraumbilical v
- Cystic v
- Right & Left gastric v
- Hepatic portal v
- Splenic v
- Superior mesenteric v



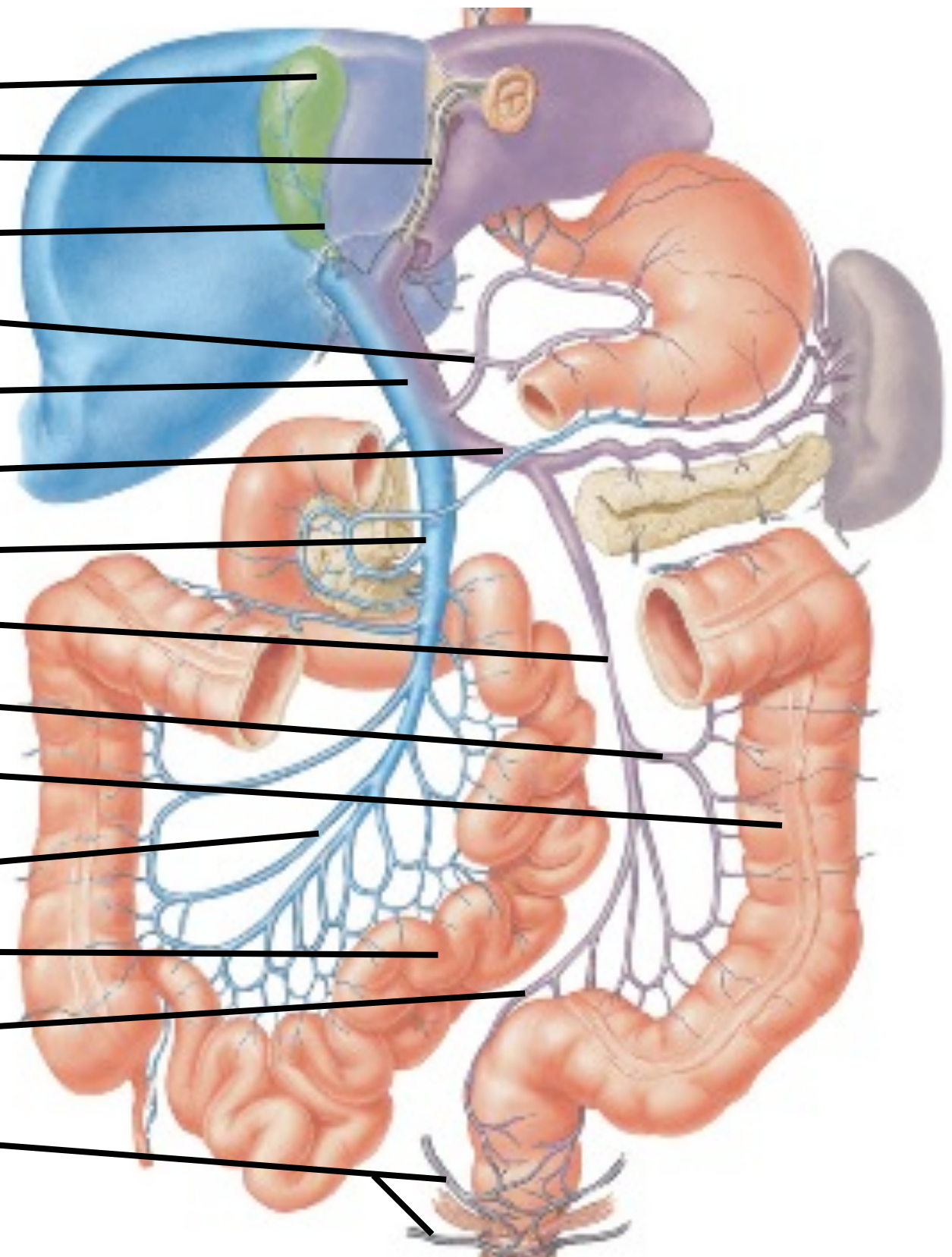
- Gallbladder
- Paraumbilical v
- Cystic v
- Right & Left gastric v
- Hepatic portal v
- Splenic v
- Superior mesenteric v
- Inferior mesenteric v



- Gallbladder
- Paraumbilical v
- Cystic v
- Right & Left gastric v
- Hepatic portal v
- Splenic v
- Superior mesenteric v
- Inferior mesenteric v
- Left colic v



- Gallbladder
- Paraumbilical v
- Cystic v
- Right & Left gastric v
- Hepatic portal v
- Splenic v
- Superior mesenteric v
- Inferior mesenteric v
- Left colic v
- Descending colon



Gallbladder

Paraumbilical v

Cystic v

Right & Left gastric v

Hepatic portal v

Splenic v

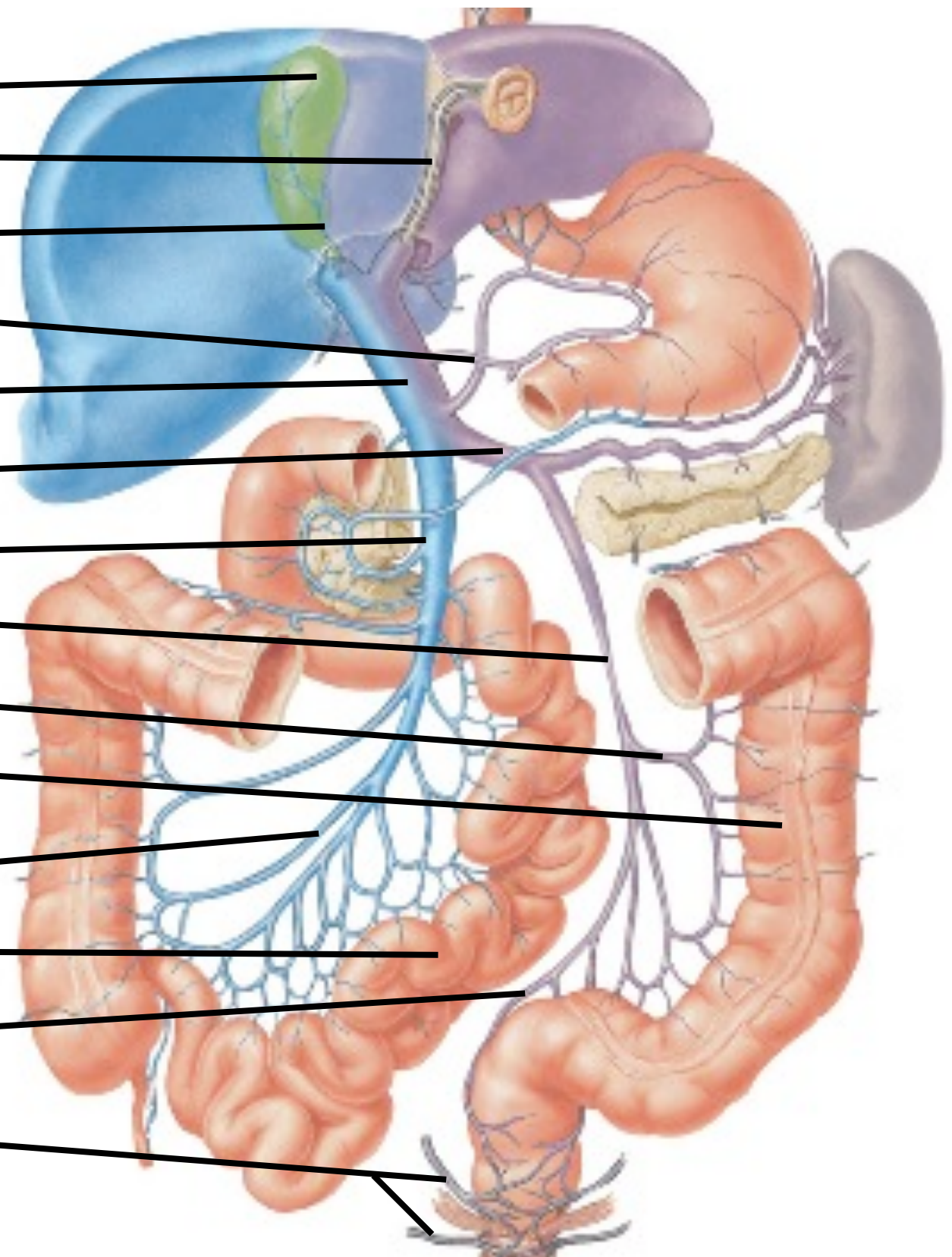
Superior mesenteric v

Inferior mesenteric v

Left colic v

Descending colon

Iliocoliv v



Gallbladder

Paraumbilical v

Cystic v

Right & Left gastric v

Hepatic portal v

Splenic v

Superior mesenteric v

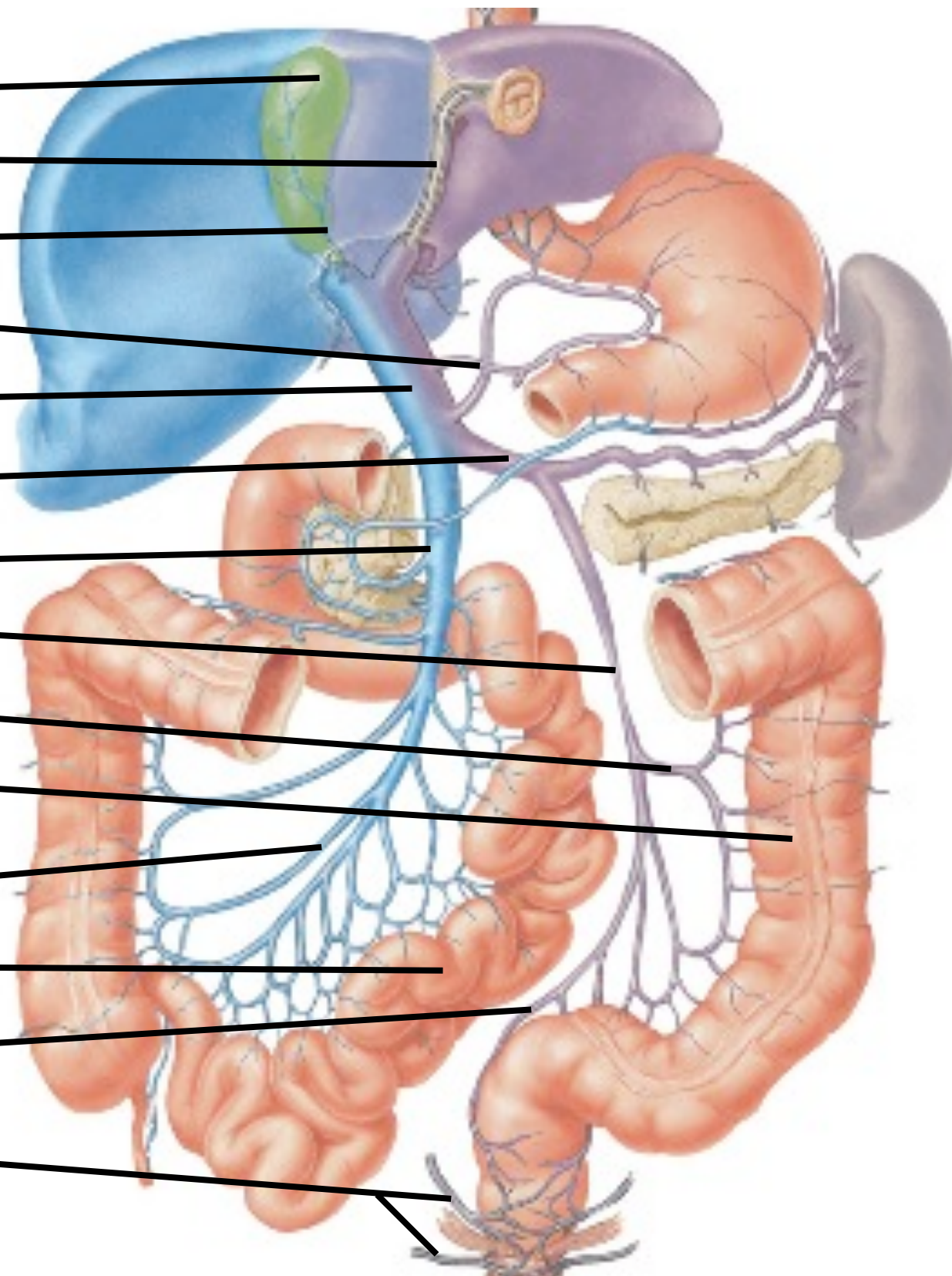
Inferior mesenteric v

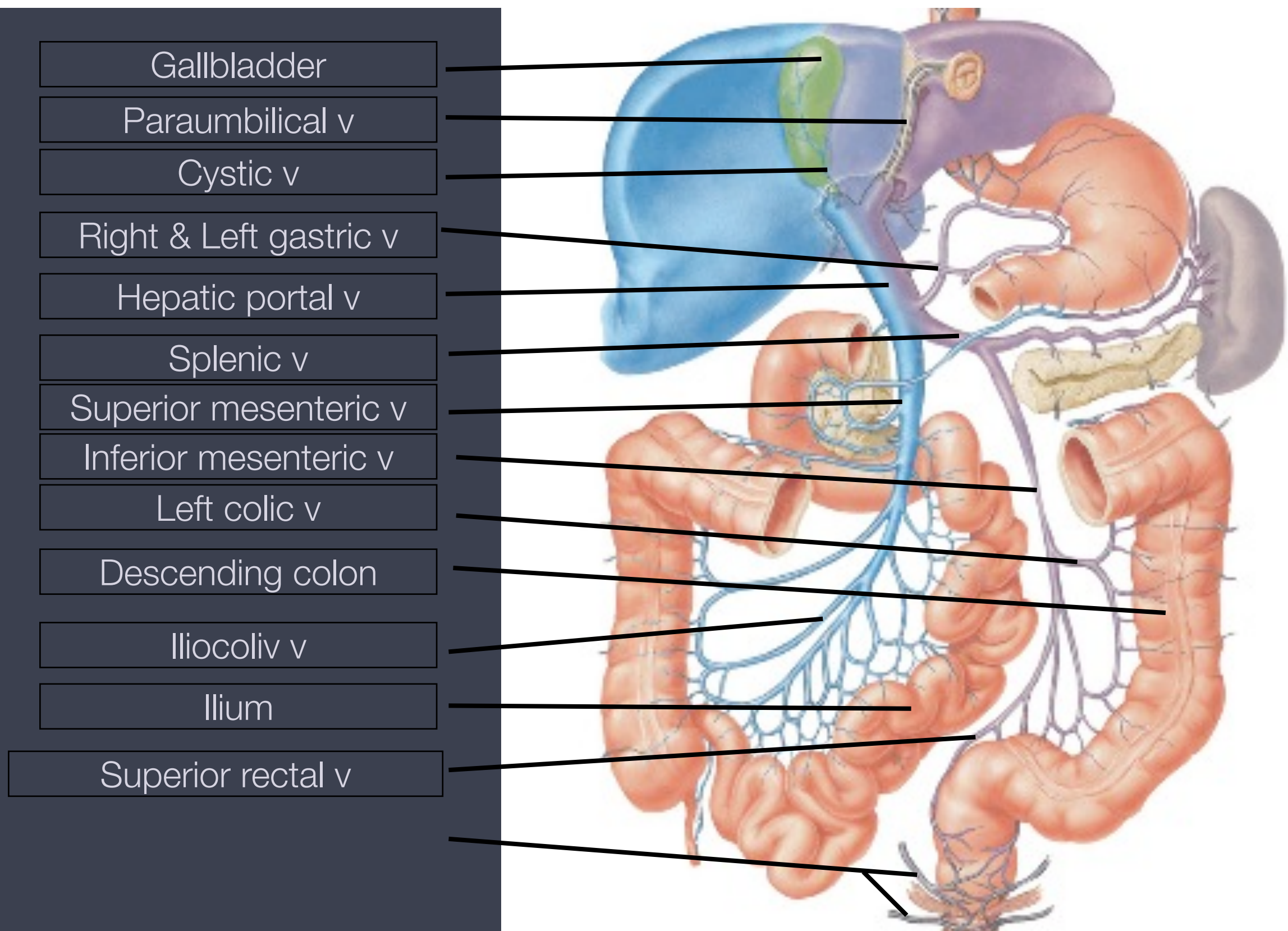
Left colic v

Descending colon

Iliocoliv v

Ilium





Gallbladder

Paraumbilical v

Cystic v

Right & Left gastric v

Hepatic portal v

Splenic v

Superior mesenteric v

Inferior mesenteric v

Left colic v

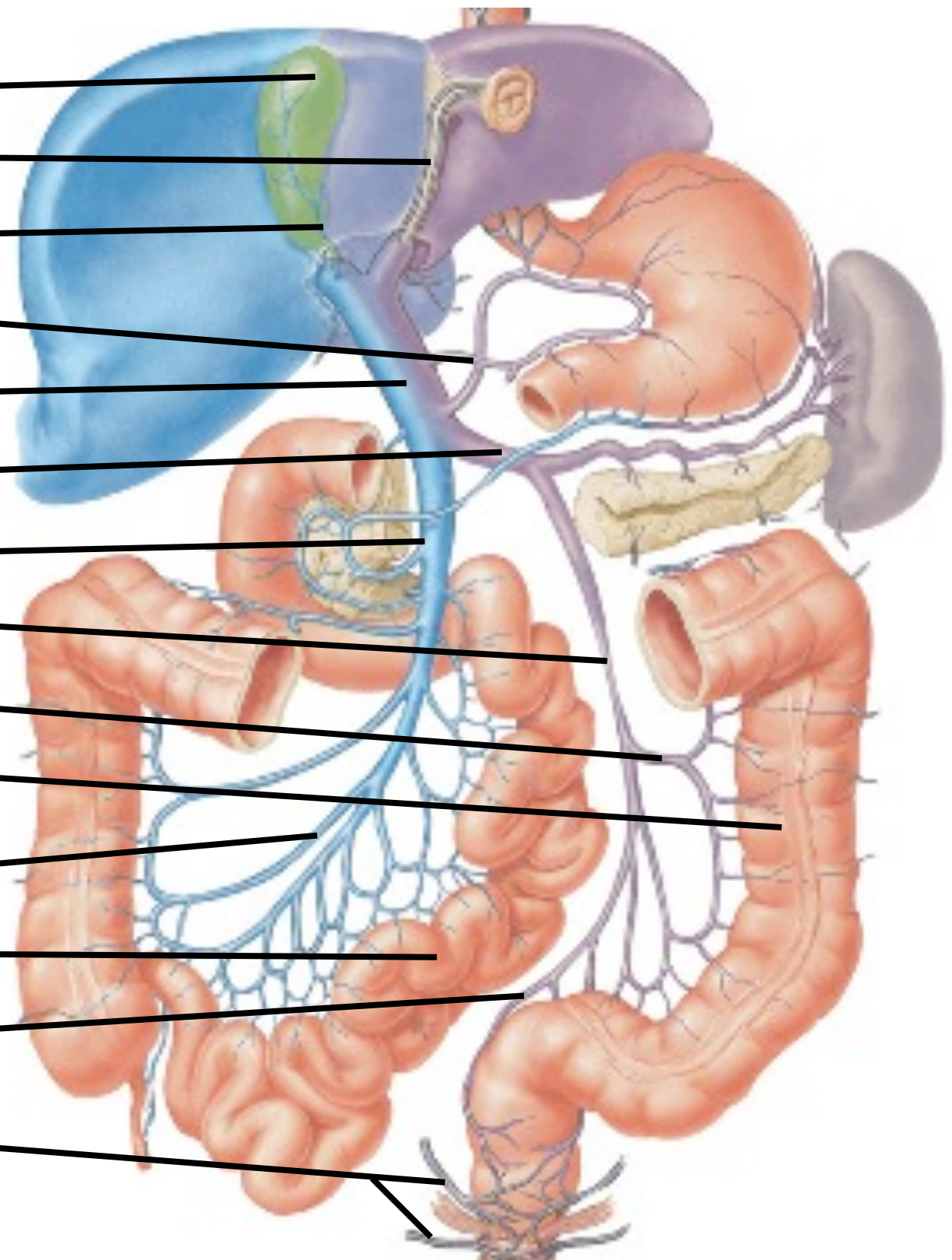
Descending colon

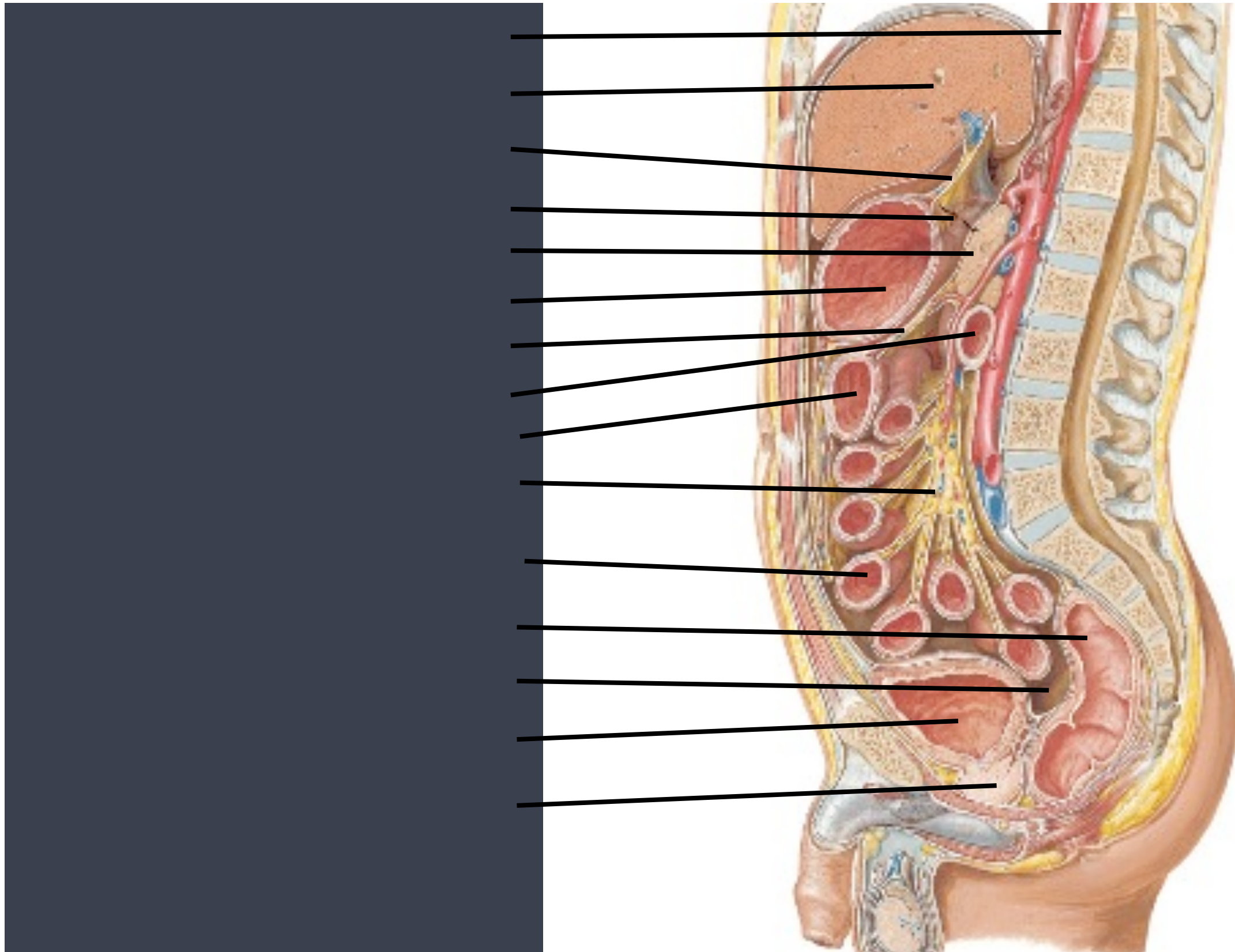
Iliocoliv v

Ilium

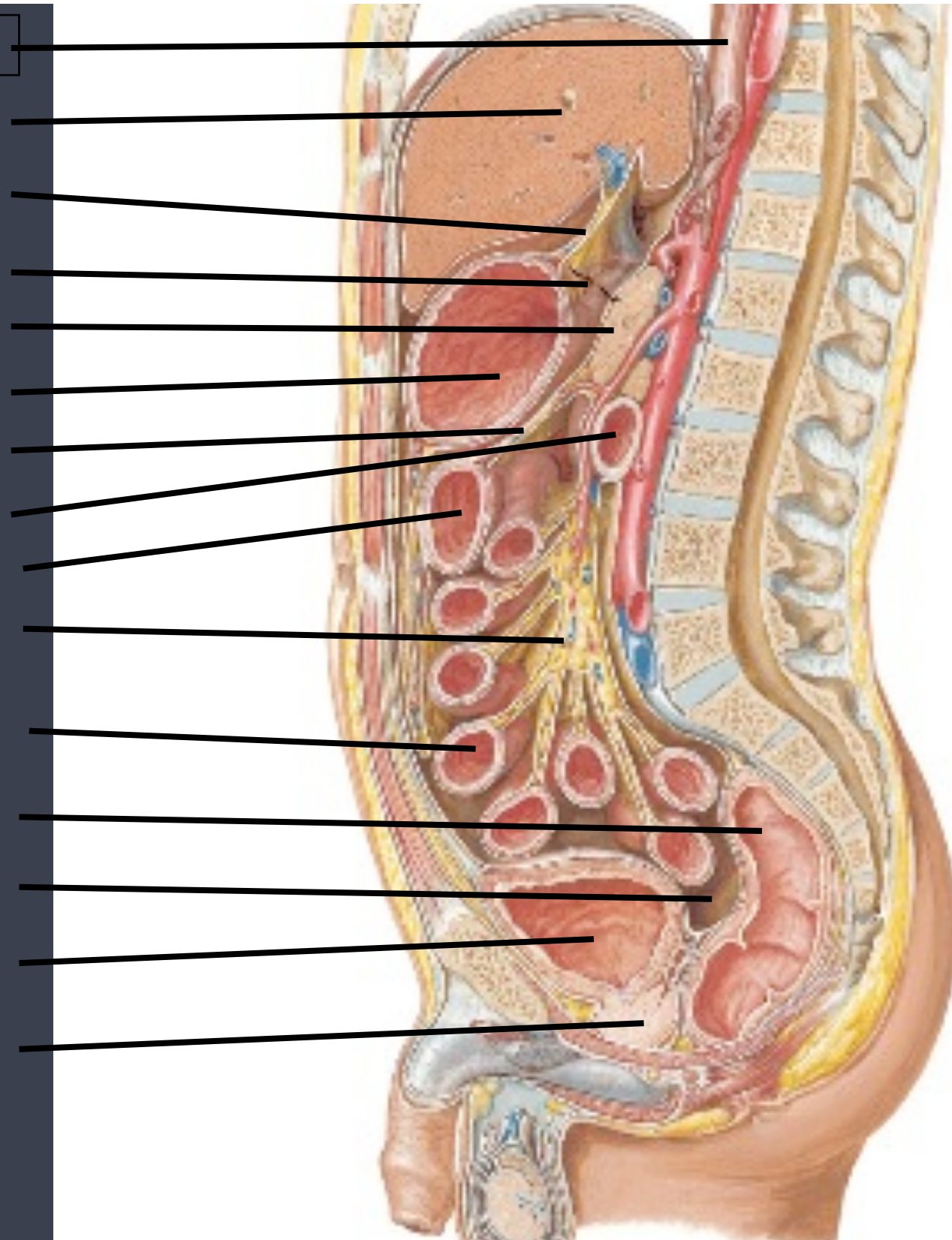
Superior rectal v

Inferior rectal v



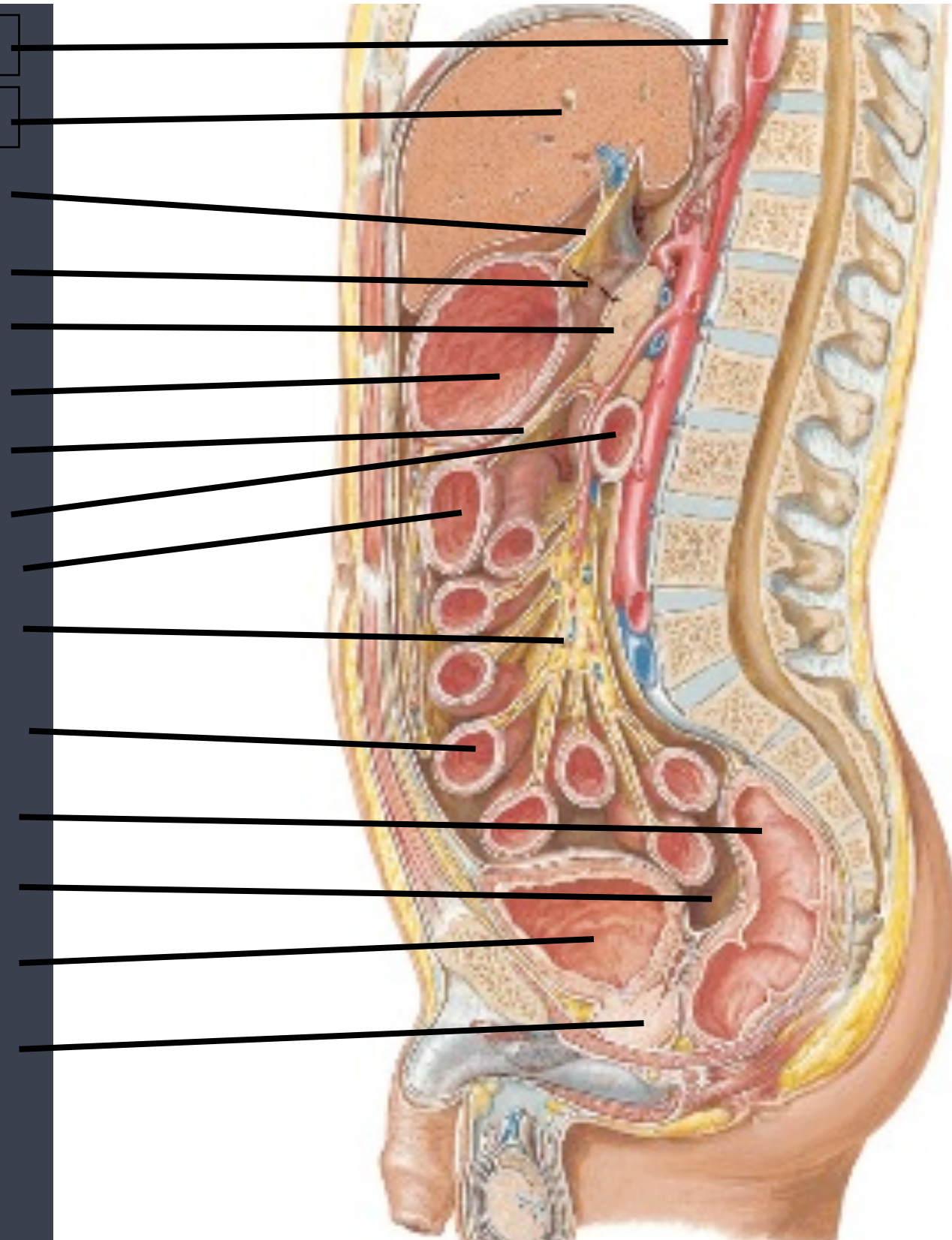


Oesophagus



Oesophagus

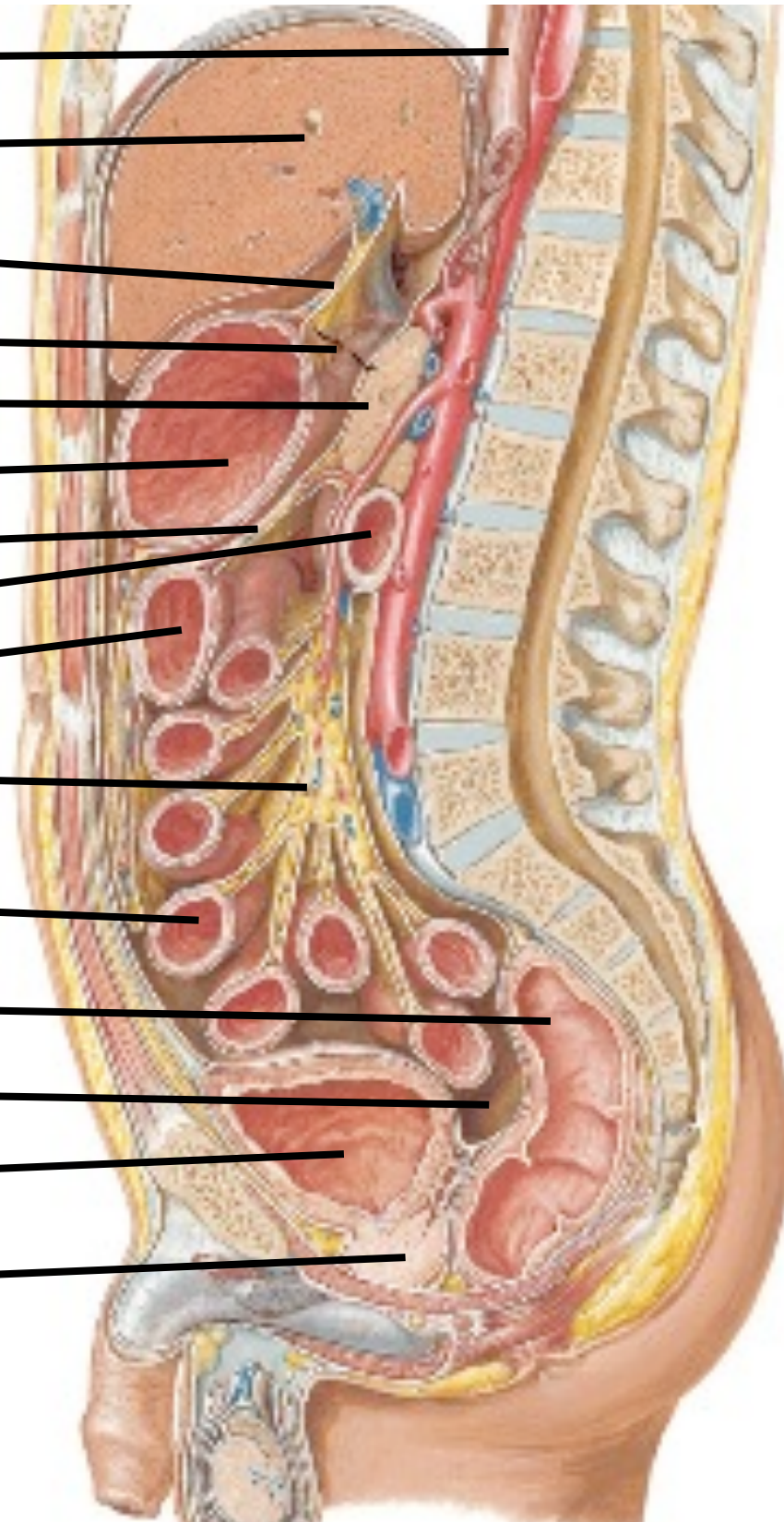
Liver



Oesophagus

Liver

Lesser omentum

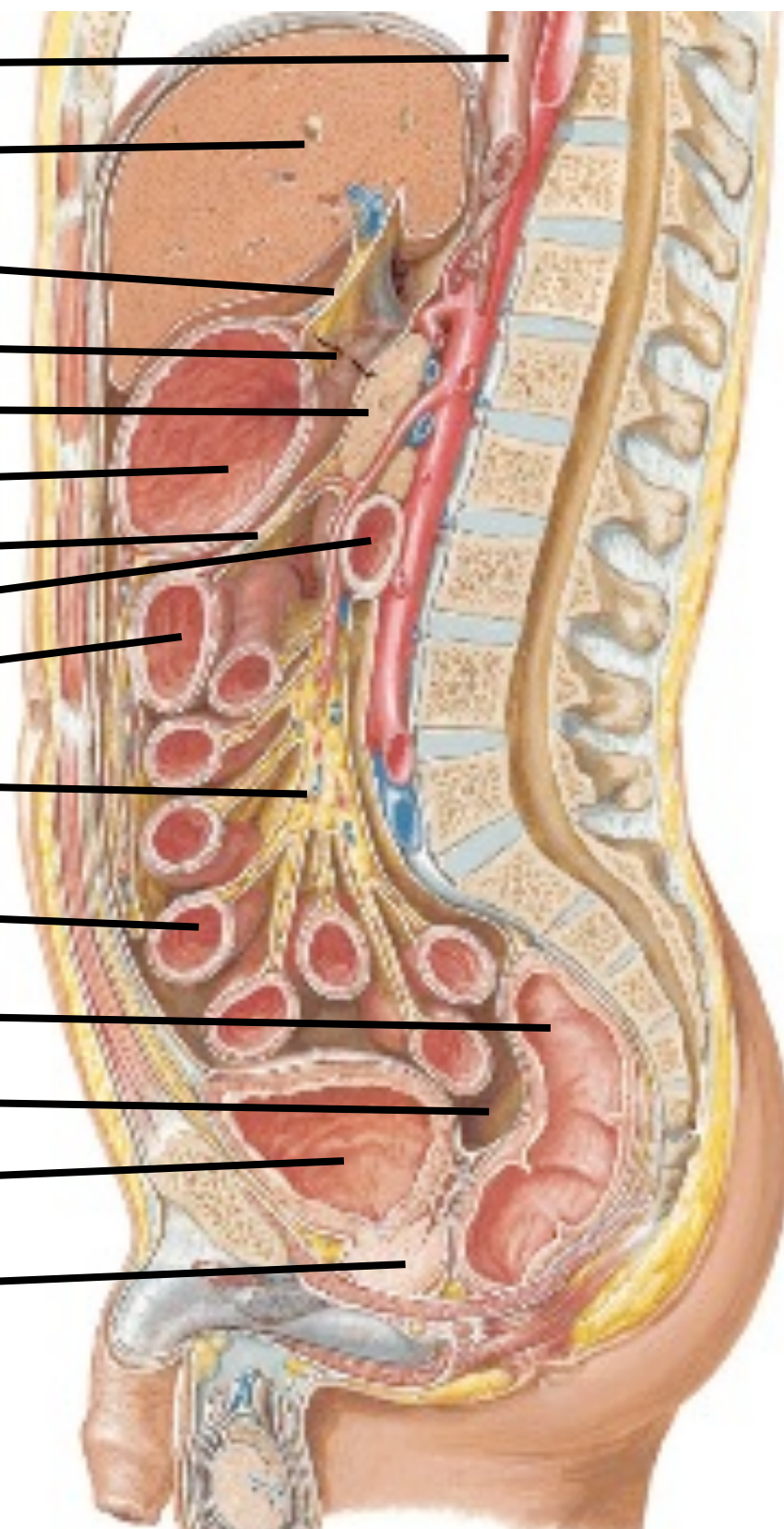


Oesophagus

Liver

Lesser omentum

Lesser sac



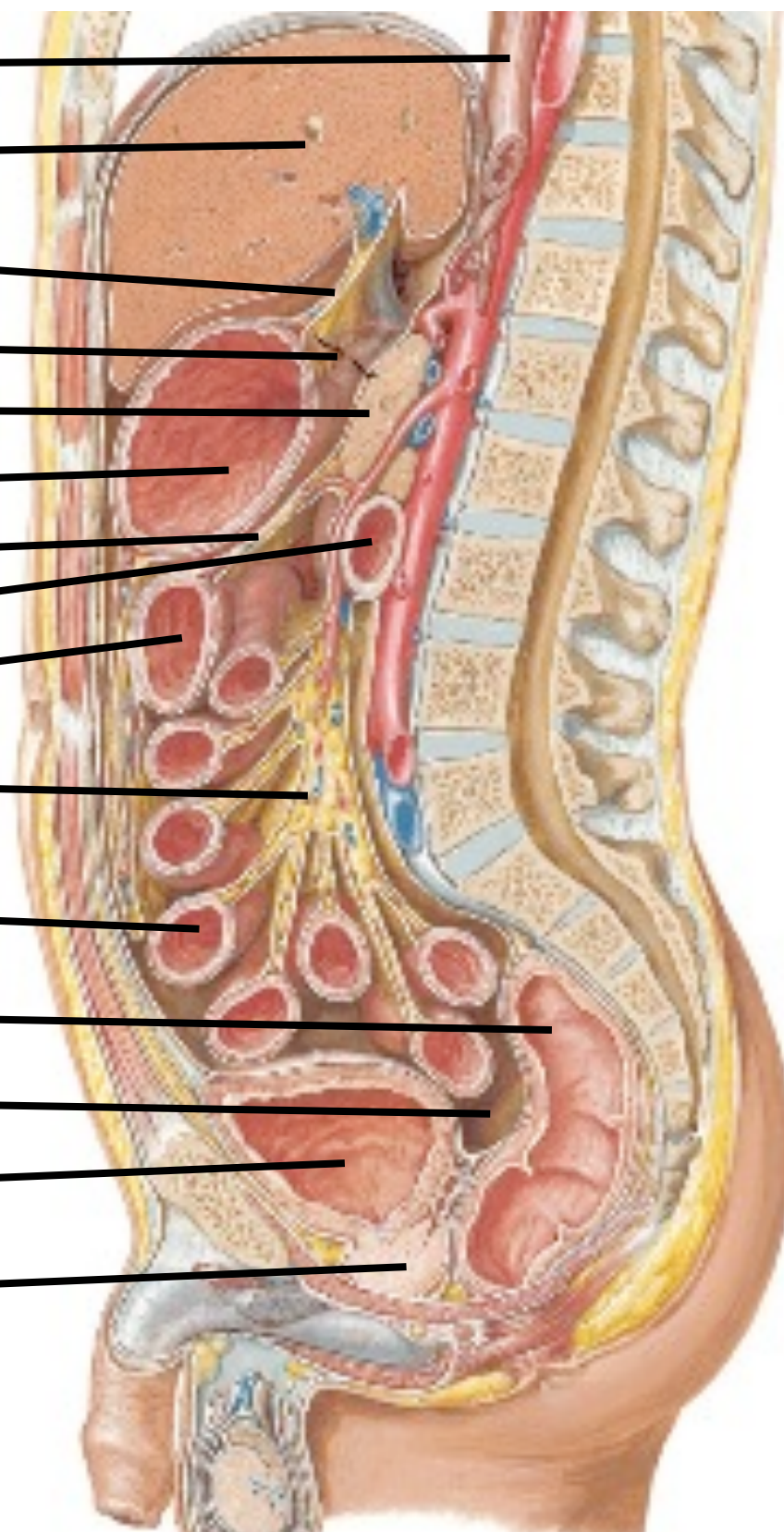
Oesophagus

Liver

Lesser omentum

Lesser sac

Pancreas



Oesophagus

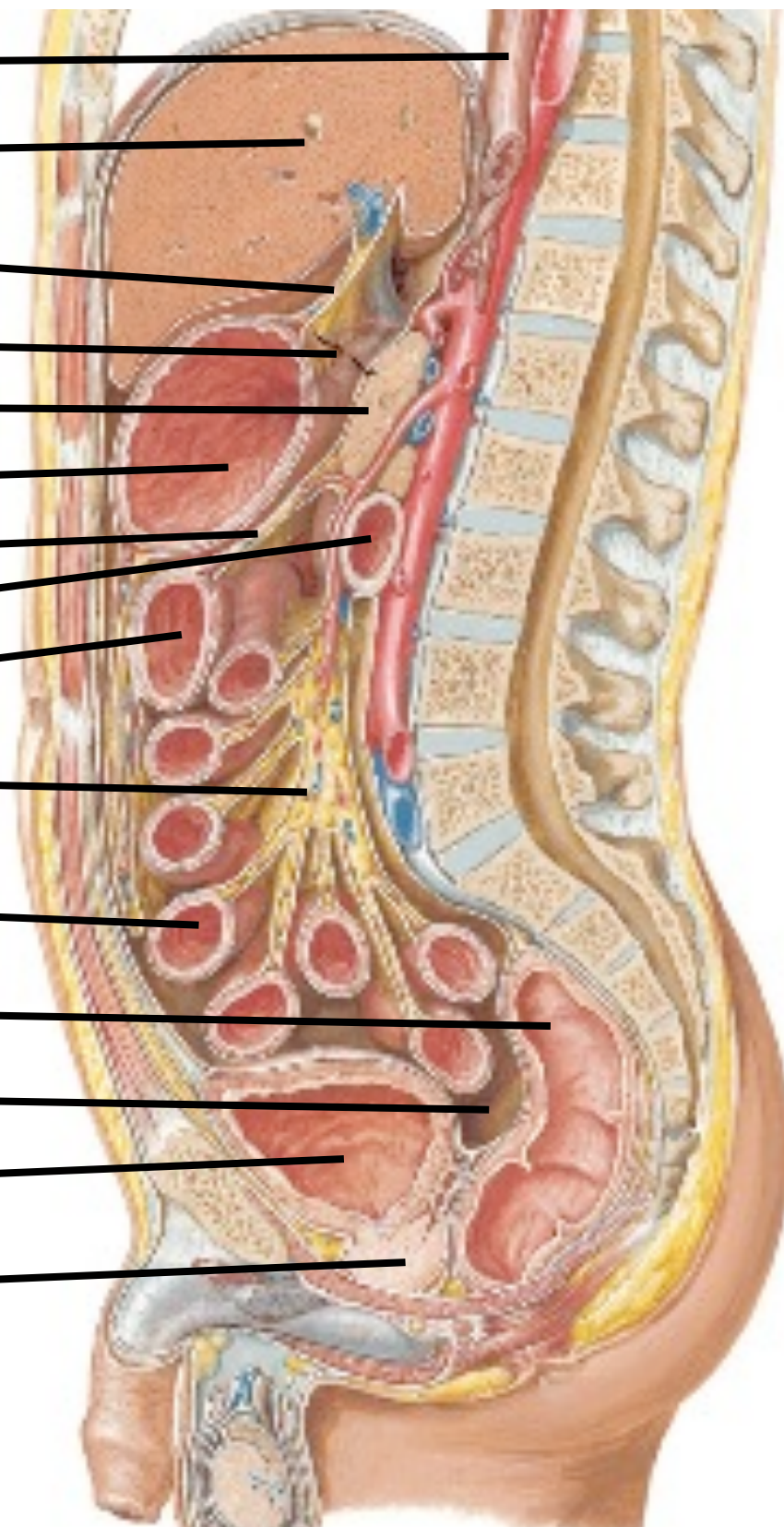
Liver

Lesser omentum

Lesser sac

Pancreas

Stomach



Oesophagus

Liver

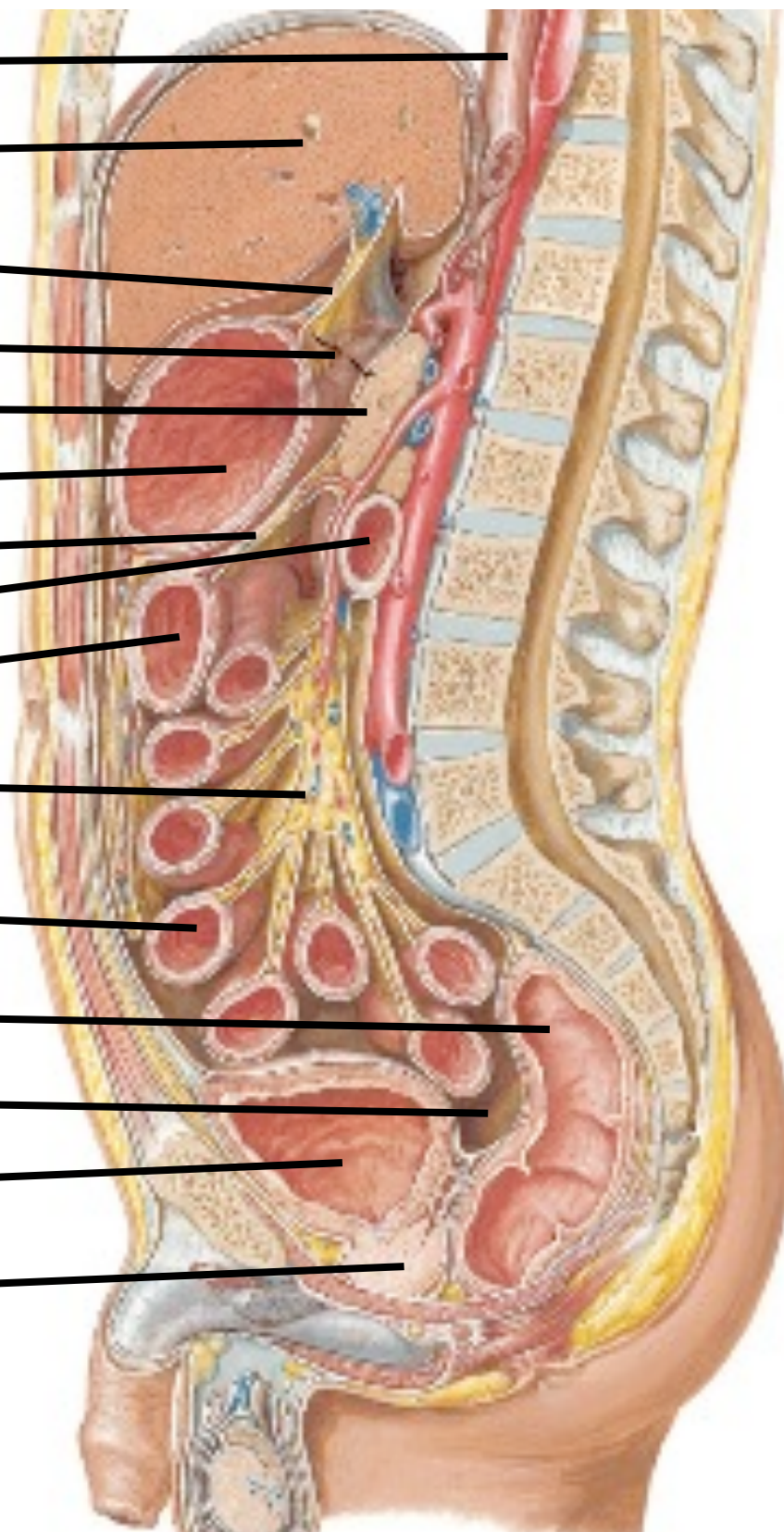
Lesser omentum

Lesser sac

Pancreas

Stomach

Transverse Mesocolon



Oesophagus

Liver

Lesser omentum

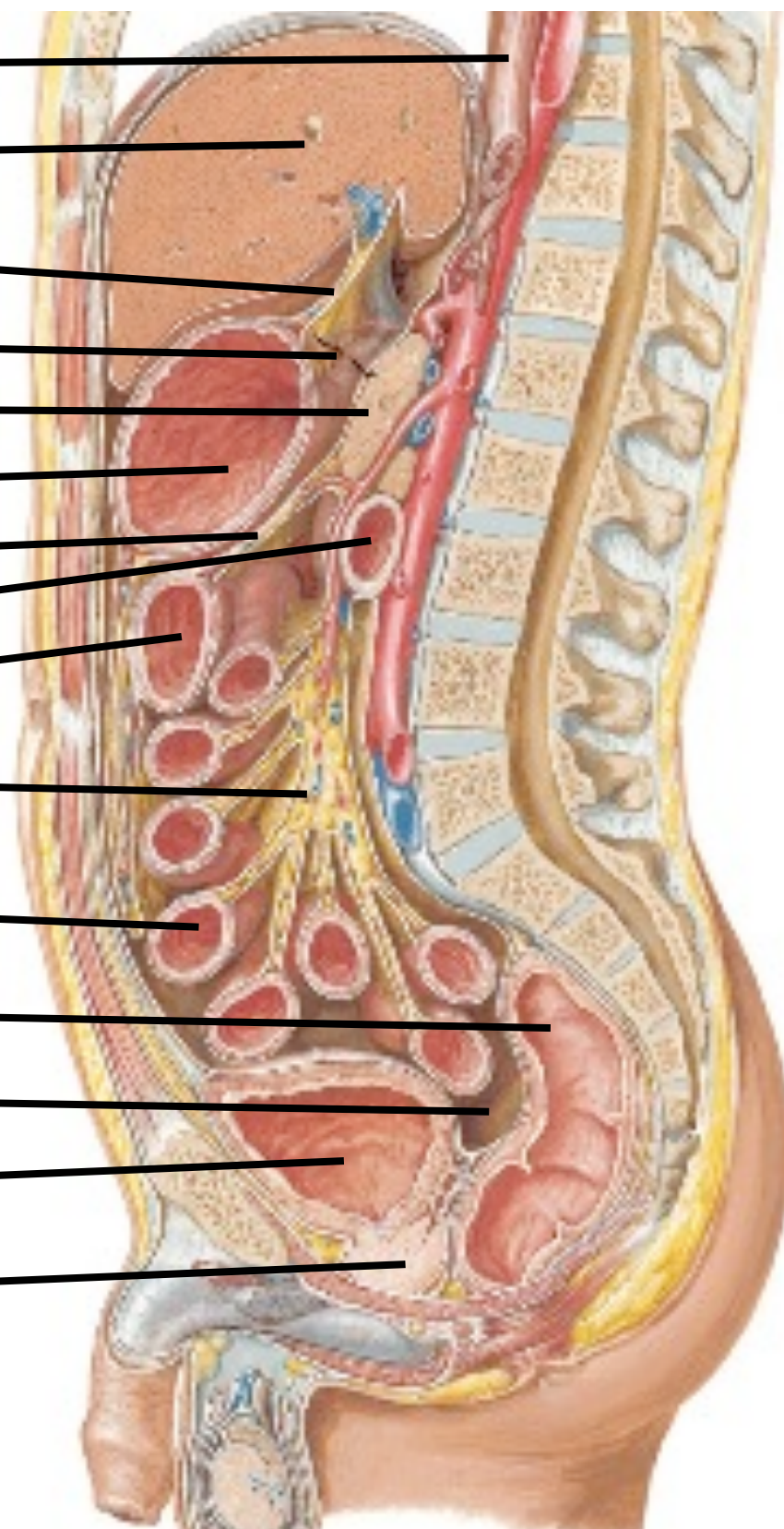
Lesser sac

Pancreas

Stomach

Transverse Mesocolon

Inferior duodenum



Oesophagus

Liver

Lesser omentum

Lesser sac

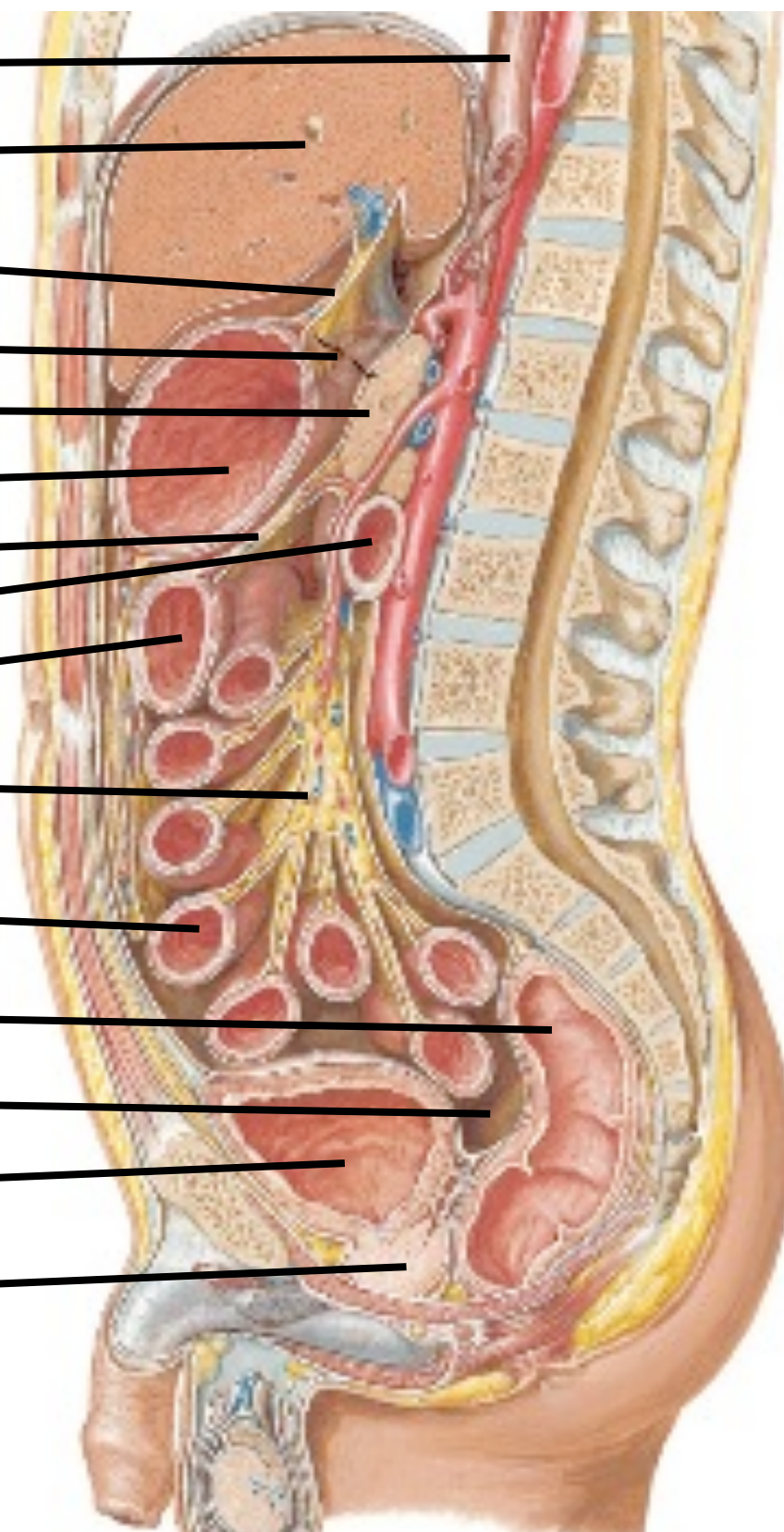
Pancreas

Stomach

Transverse Mesocolon

Inferior duodenum

Transverse colon



Oesophagus

Liver

Lesser omentum

Lesser sac

Pancreas

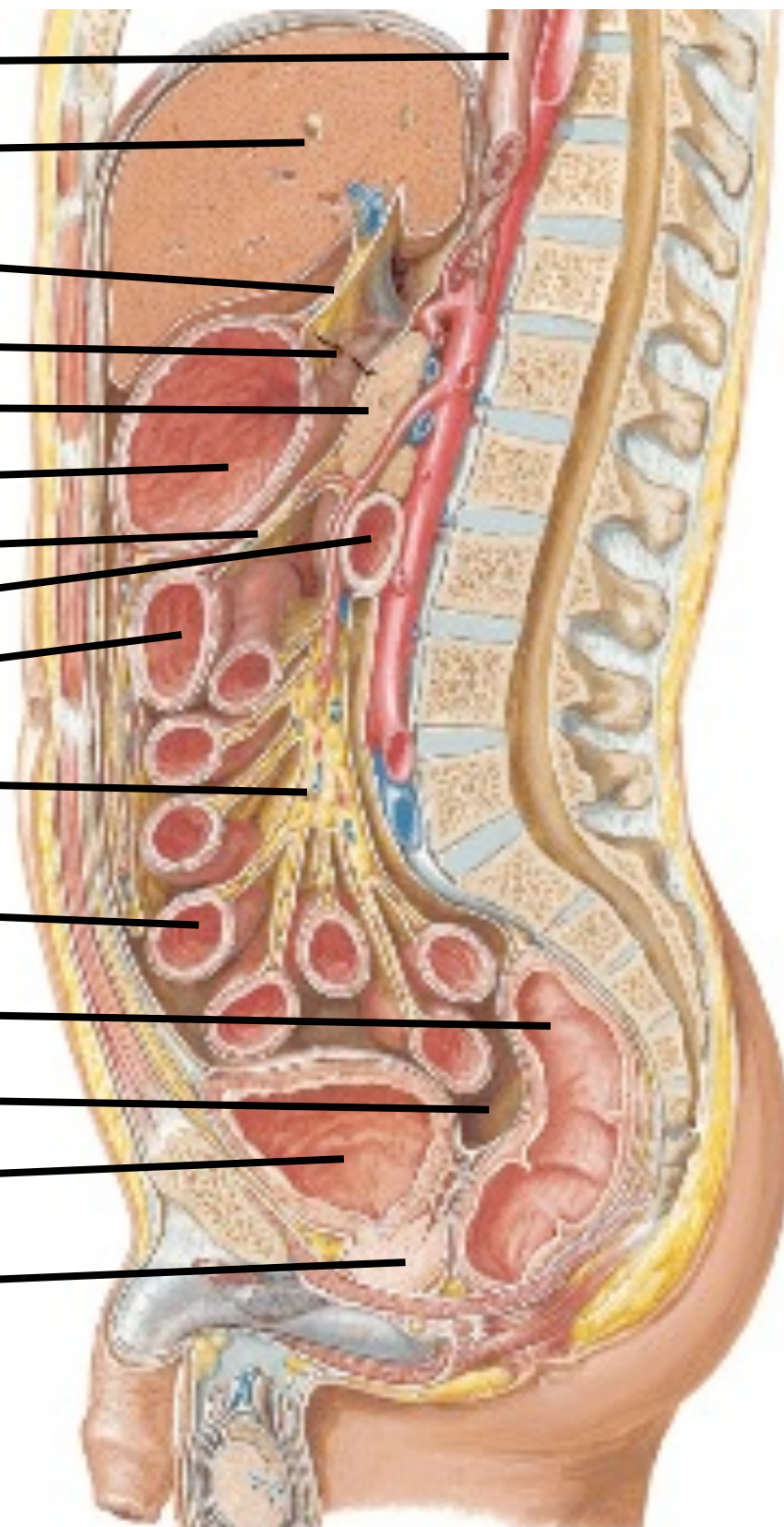
Stomach

Transverse Mesocolon

Inferior duodenum

Transverse colon

Mysentery



Oesophagus

Liver

Lesser omentum

Lesser sac

Pancreas

Stomach

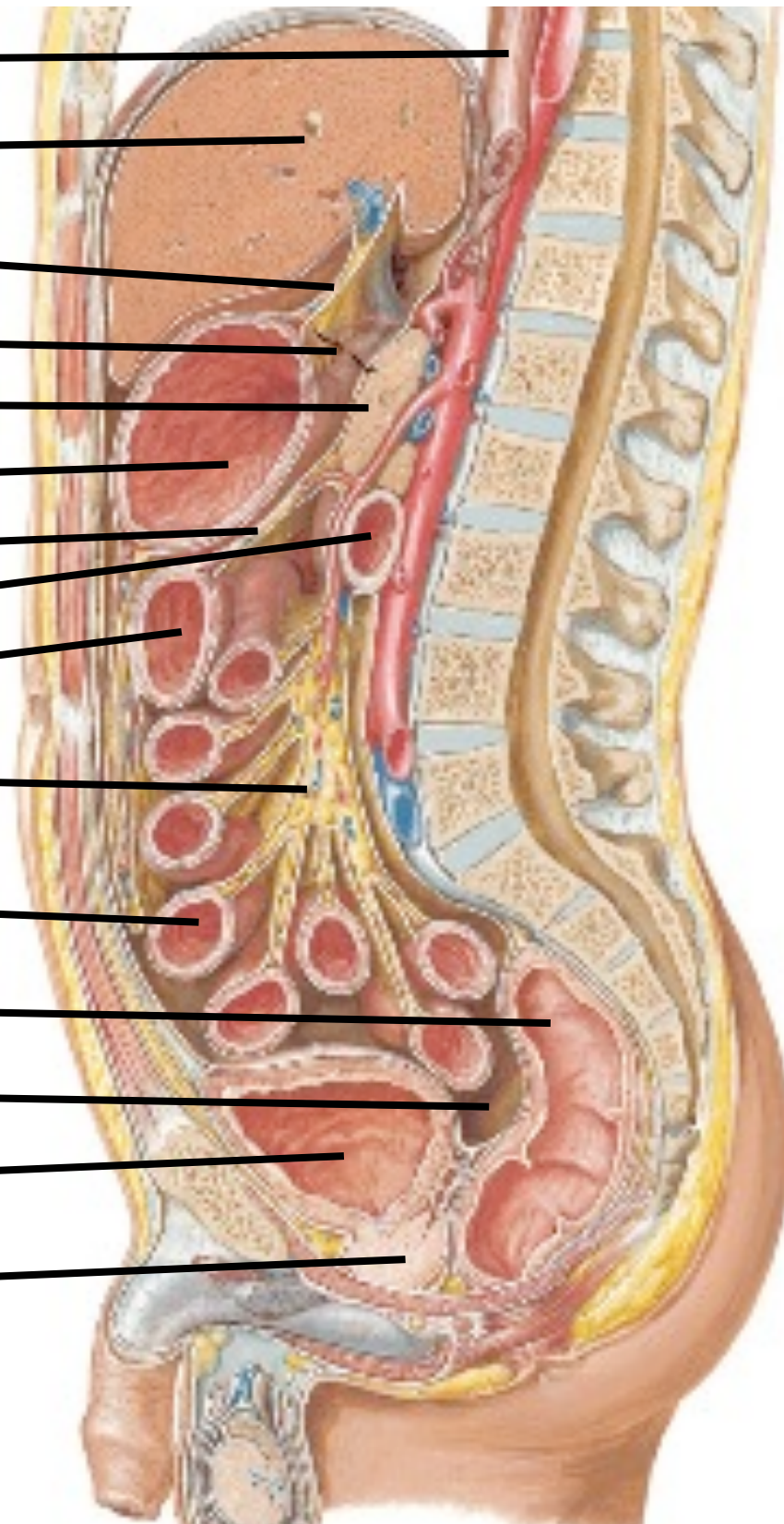
Transverse Mesocolon

Inferior duodenum

Transverse colon

Mysentery

Small intestine



Oesophagus

Liver

Lesser omentum

Lesser sac

Pancreas

Stomach

Transverse Mesocolon

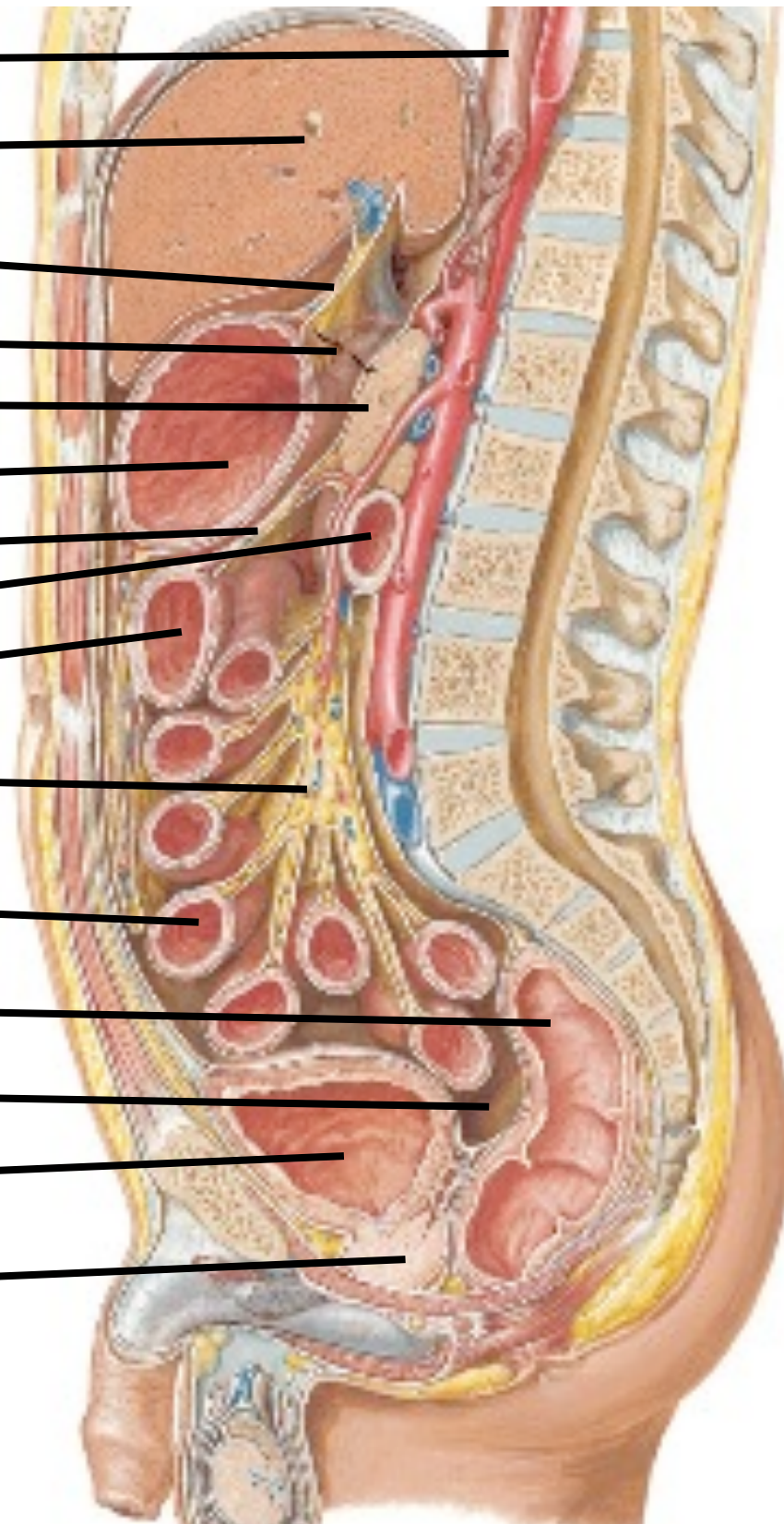
Inferior duodenum

Transverse colon

Mysentery

Small intestine

Rectum



Oesophagus

Liver

Lesser omentum

Lesser sac

Pancreas

Stomach

Transverse Mesocolon

Inferior duodenum

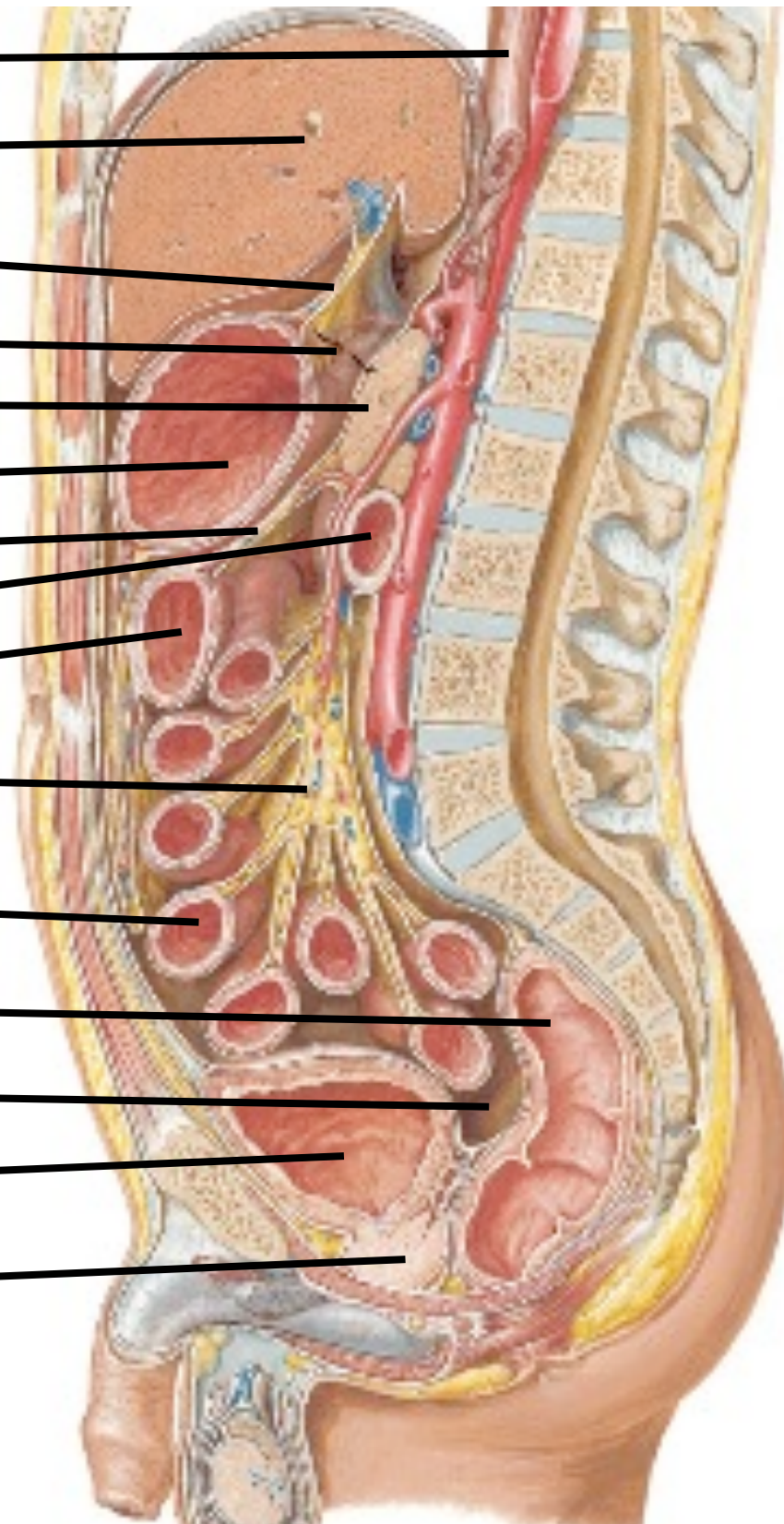
Transverse colon

Mysentery

Small intestine

Rectum

Rectovesical pouch



Oesophagus

Liver

Lesser omentum

Lesser sac

Pancreas

Stomach

Transverse Mesocolon

Inferior duodenum

Transverse colon

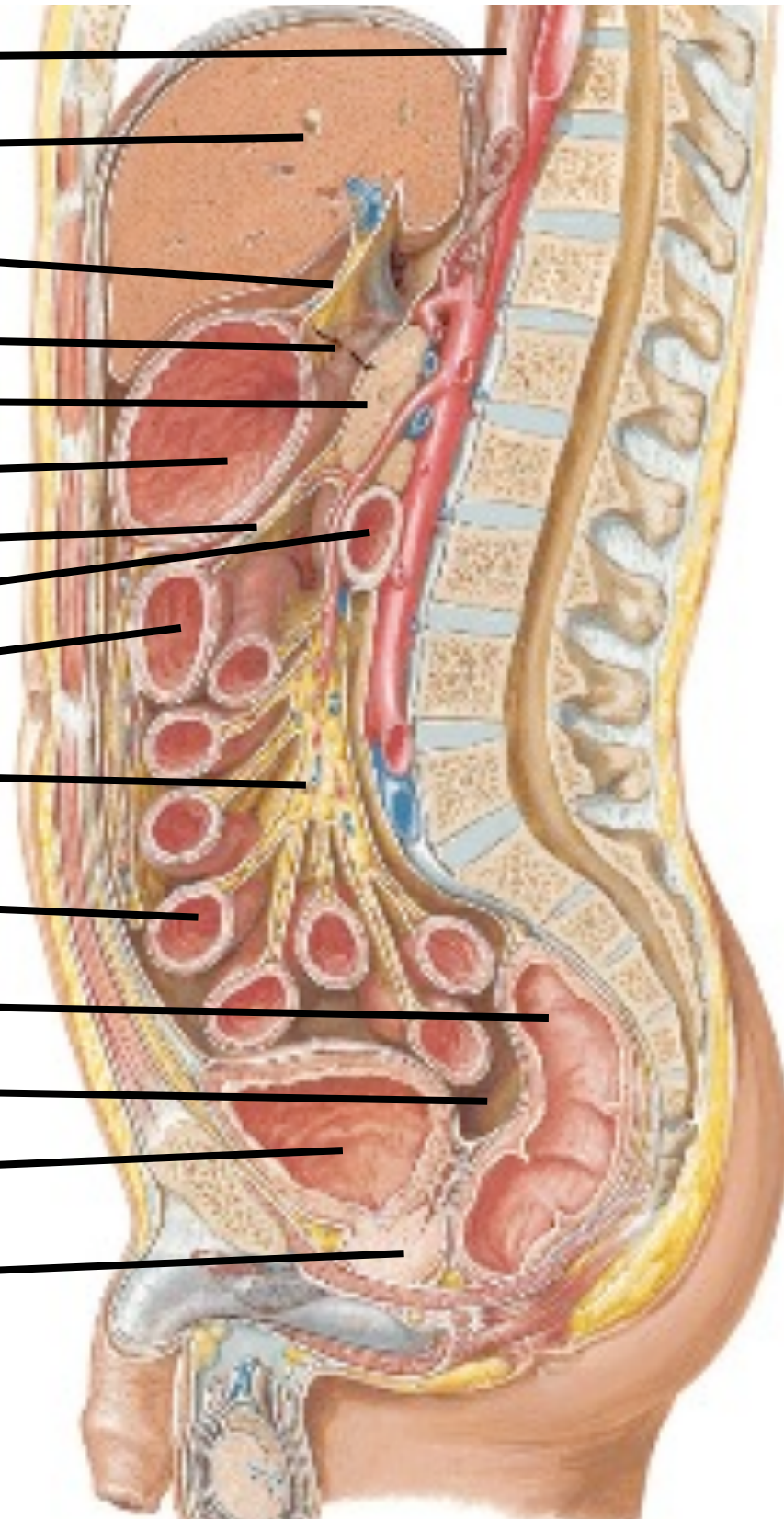
Mysentery

Small intestine

Rectum

Rectovesical pouch

Bladder



Oesophagus

Liver

Lesser omentum

Lesser sac

Pancreas

Stomach

Transverse Mesocolon

Inferior duodenum

Transverse colon

Mysentery

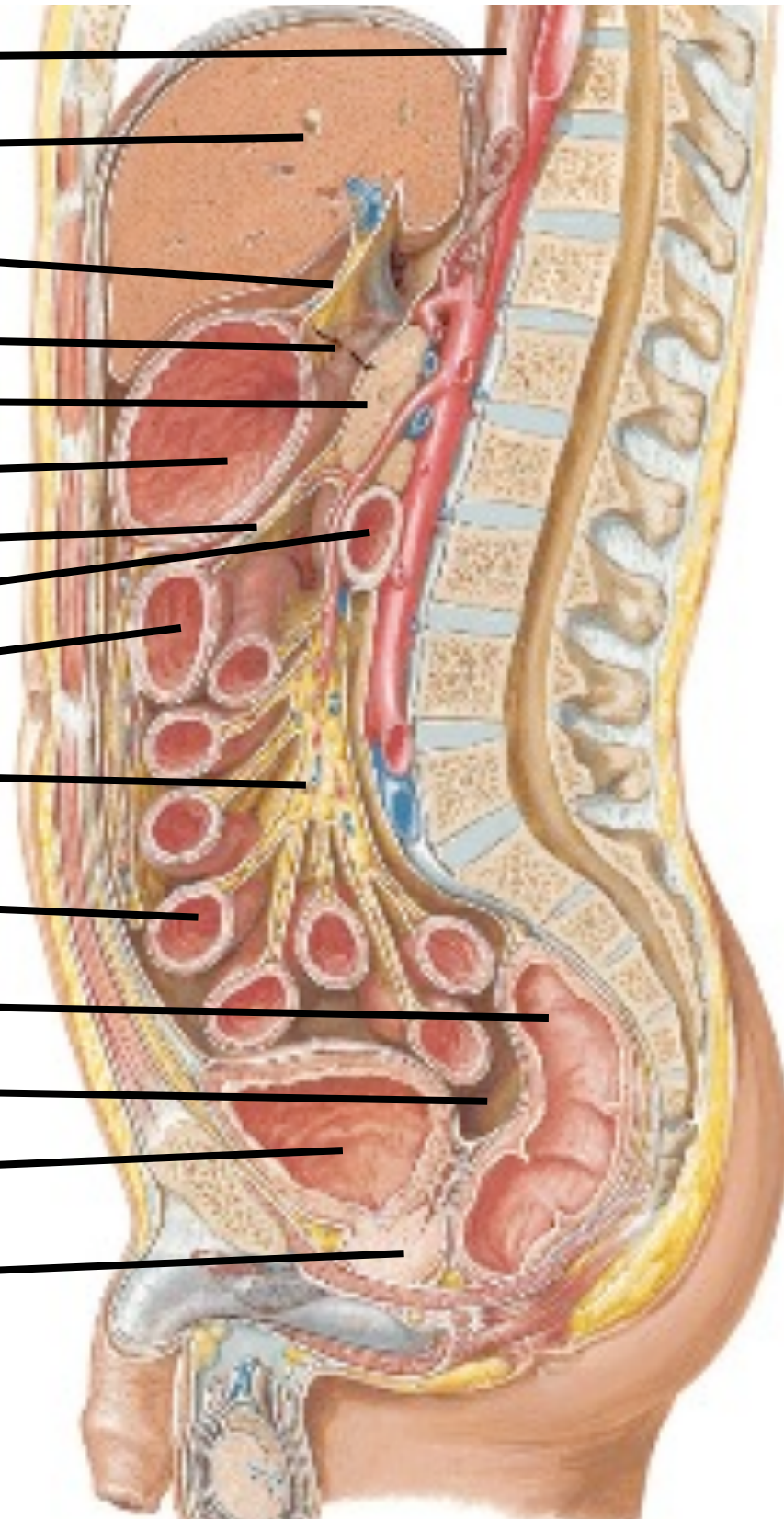
Small intestine

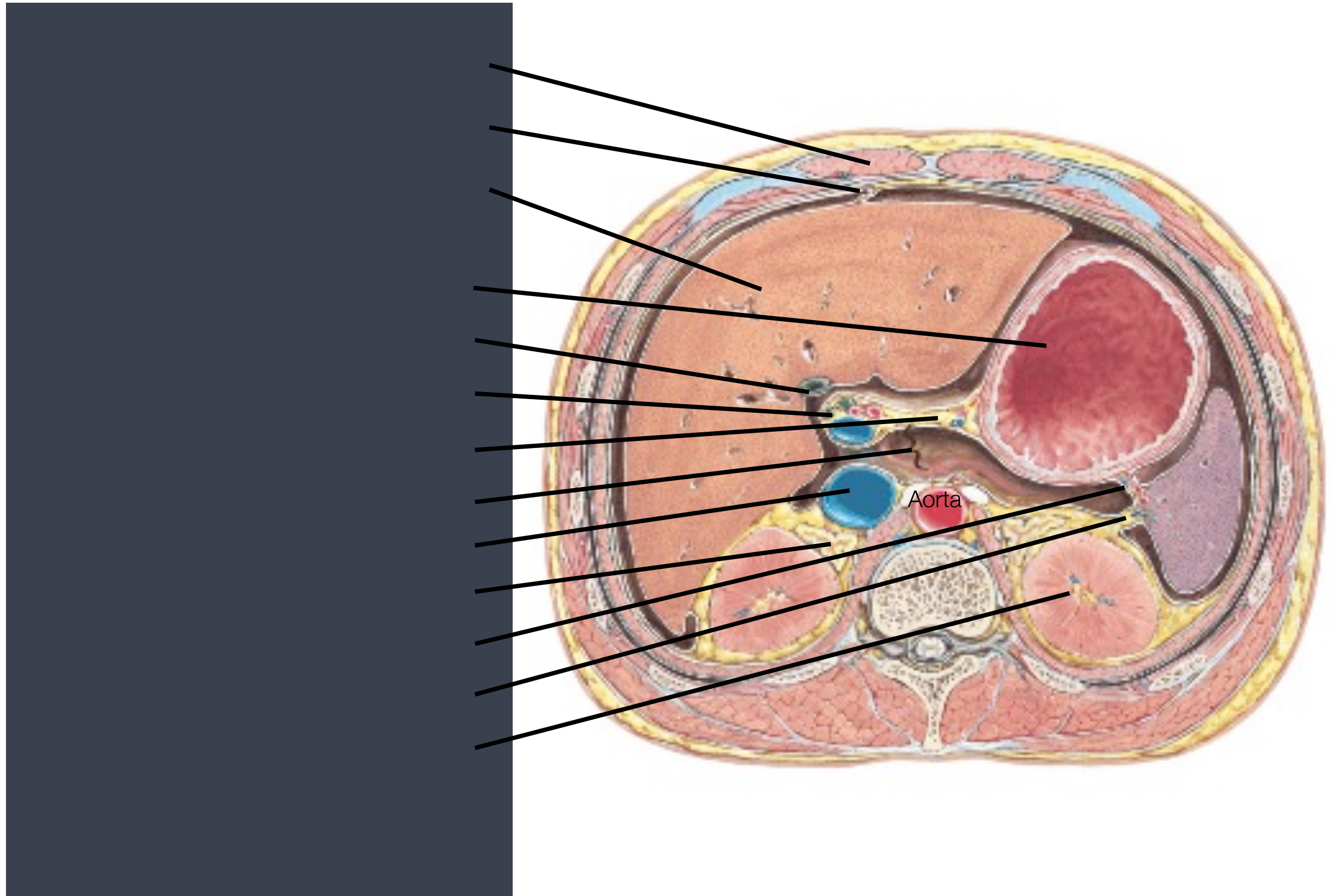
Rectum

Rectovesical pouch

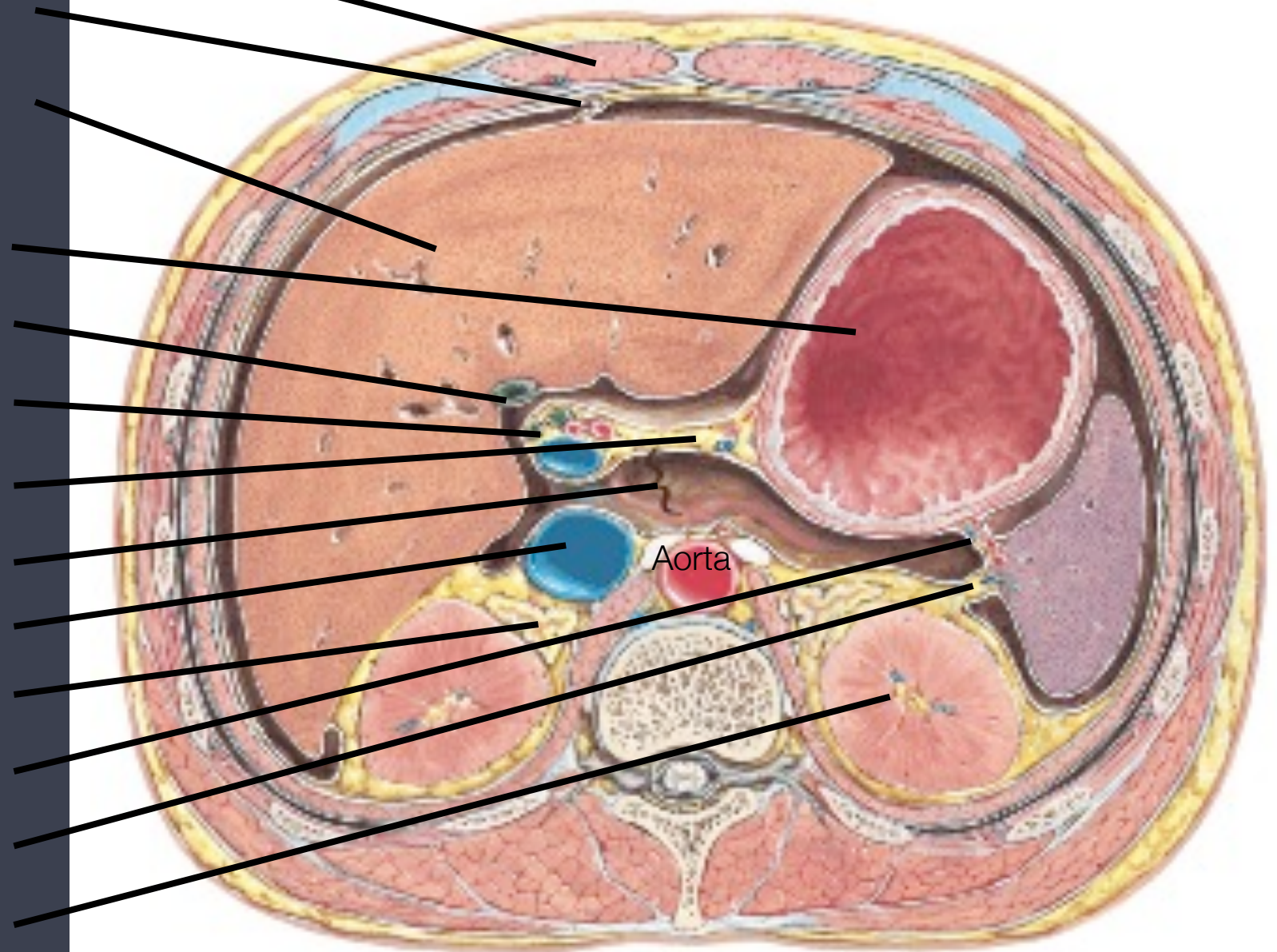
Bladder

Prostate



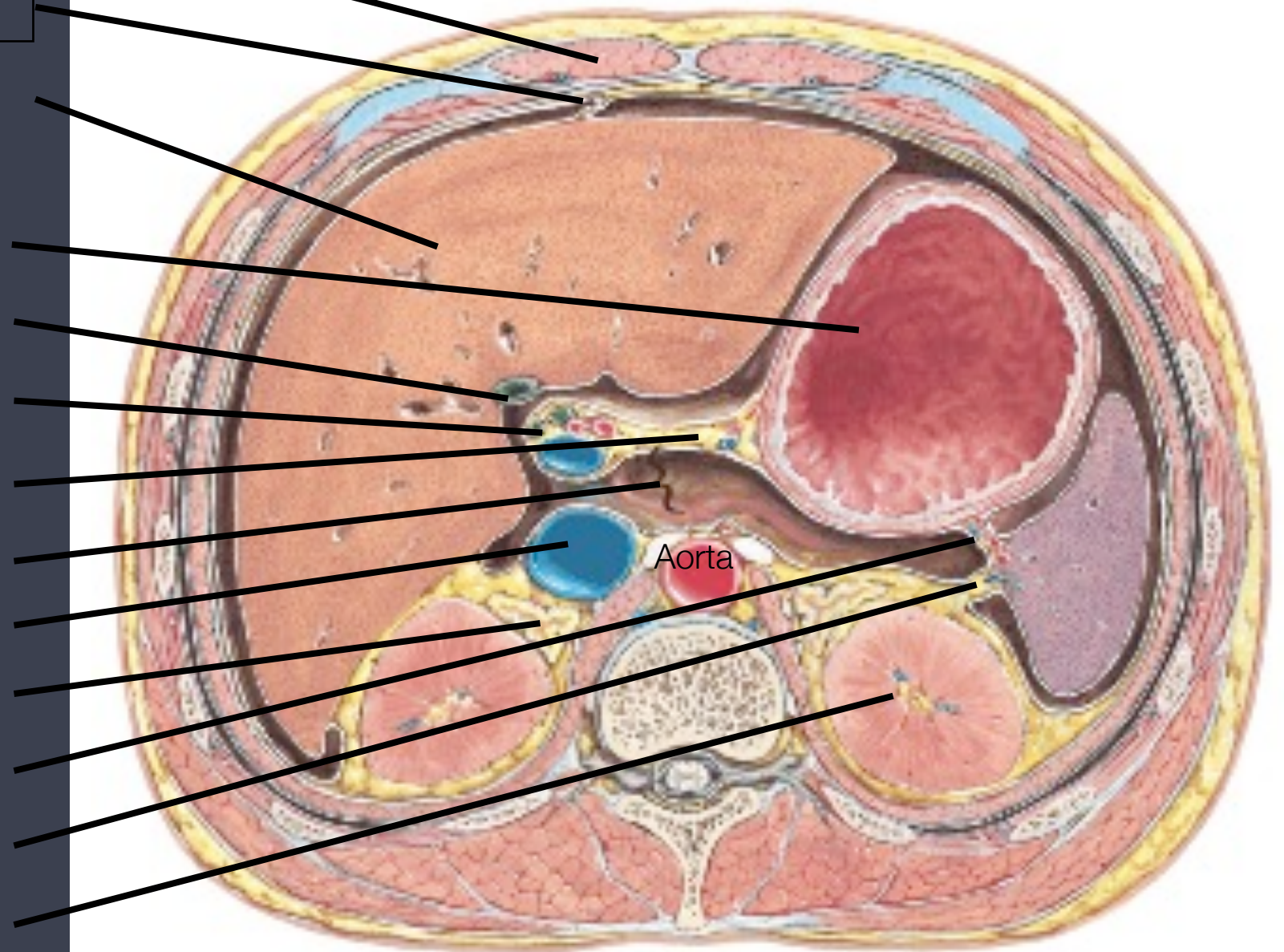


Rectus abdominus m.



Rectus abdominus m.

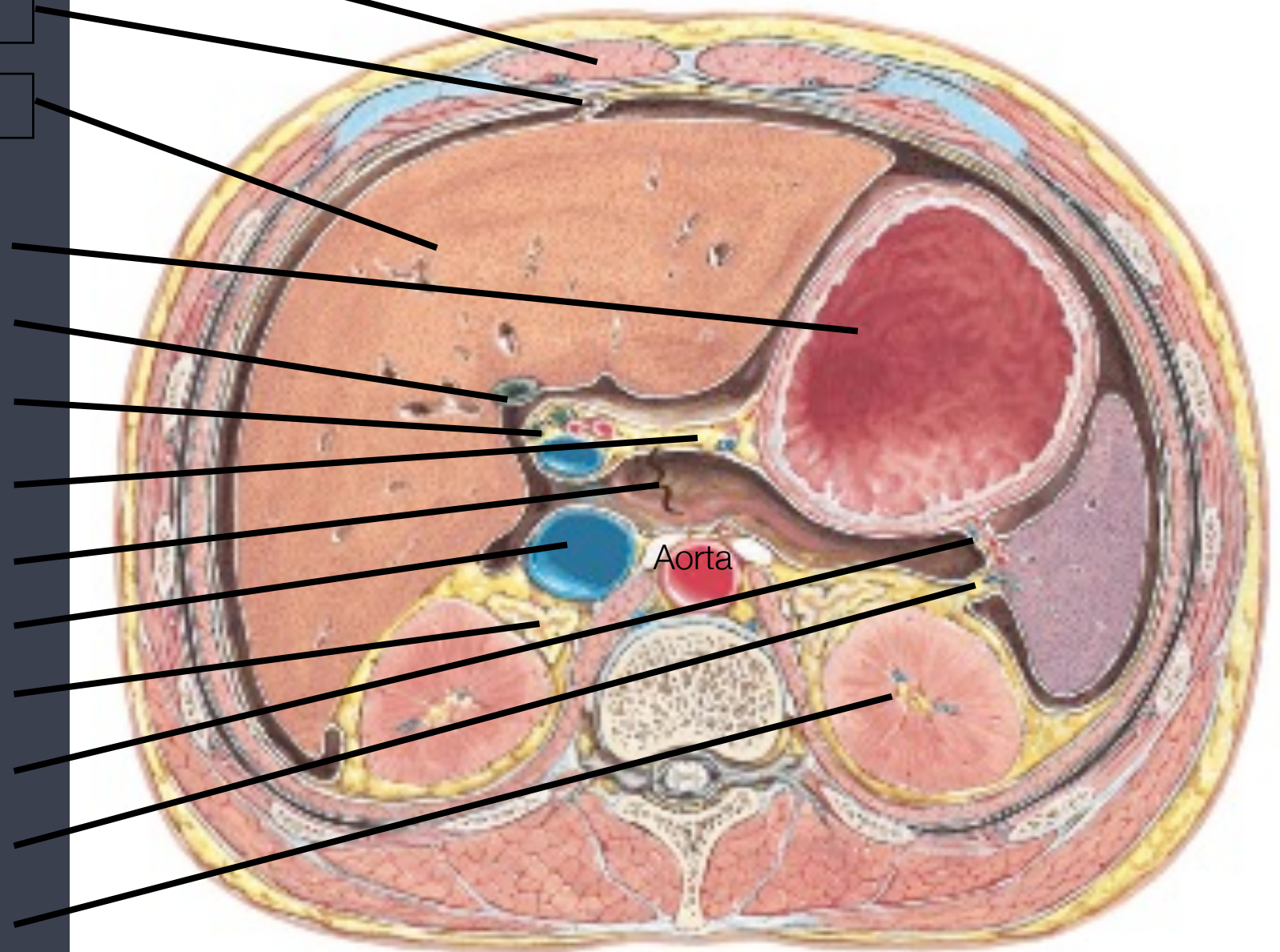
Falciform ligament



Rectus abdominus m.

Falciform ligament

Liver

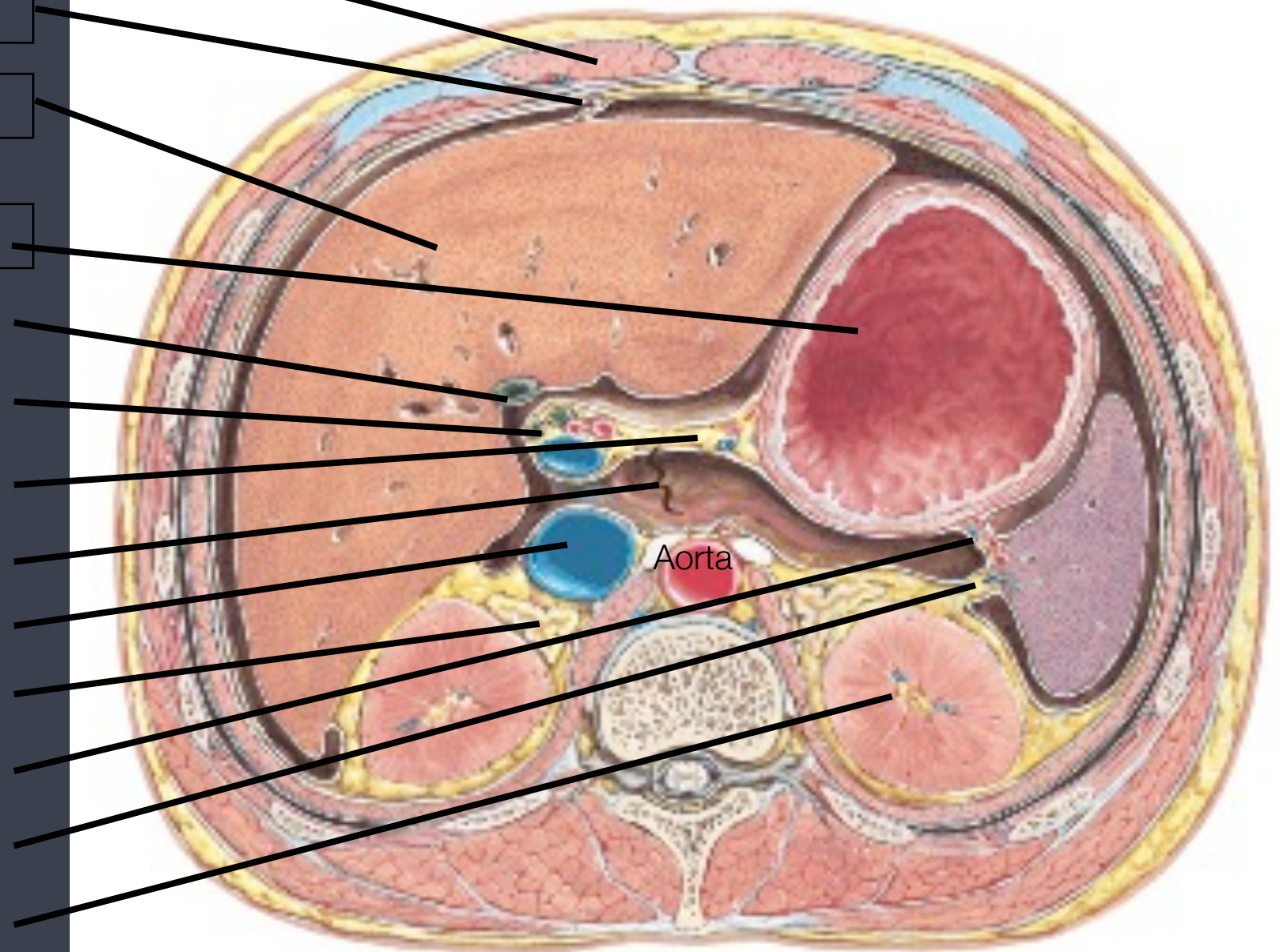


Rectus abdominus m.

Falciform ligament

Liver

Stomach



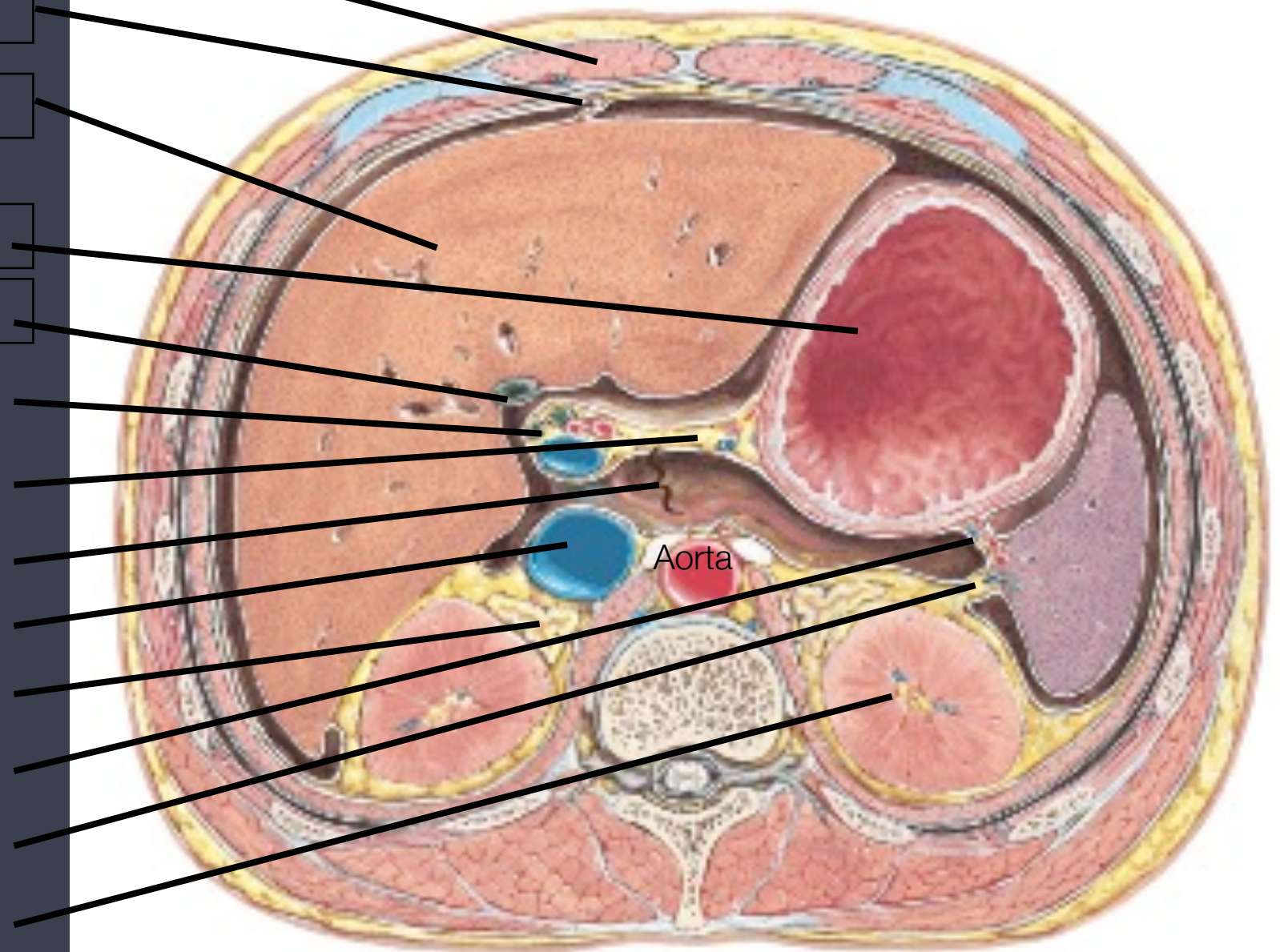
Rectus abdominus m.

Falciform ligament

Liver

Stomach

Common bile duct



Rectus abdominus m.

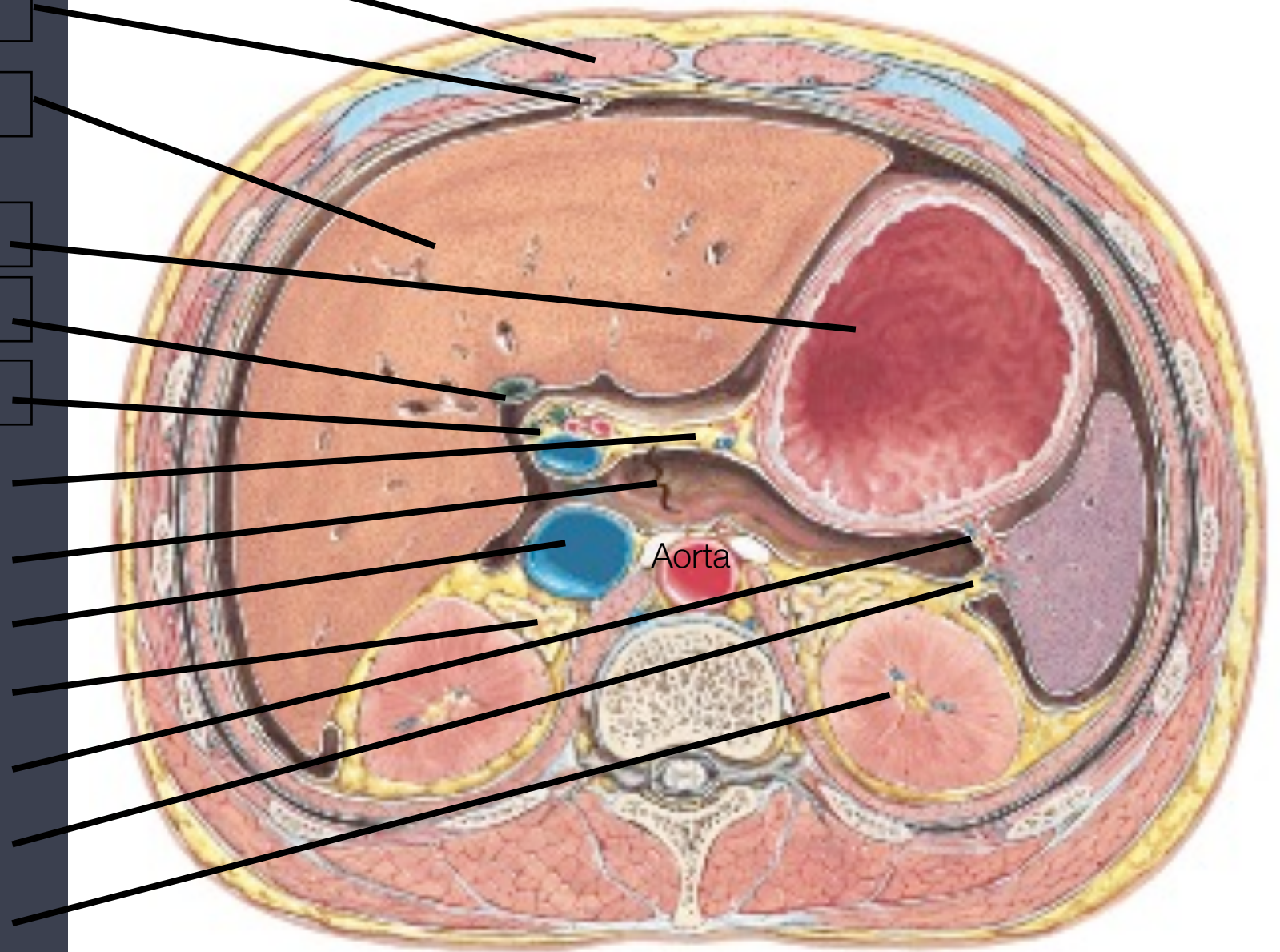
Falciform ligament

Liver

Stomach

Common bile duct

Porta hepatis



Rectus abdominus m.

Falciform ligament

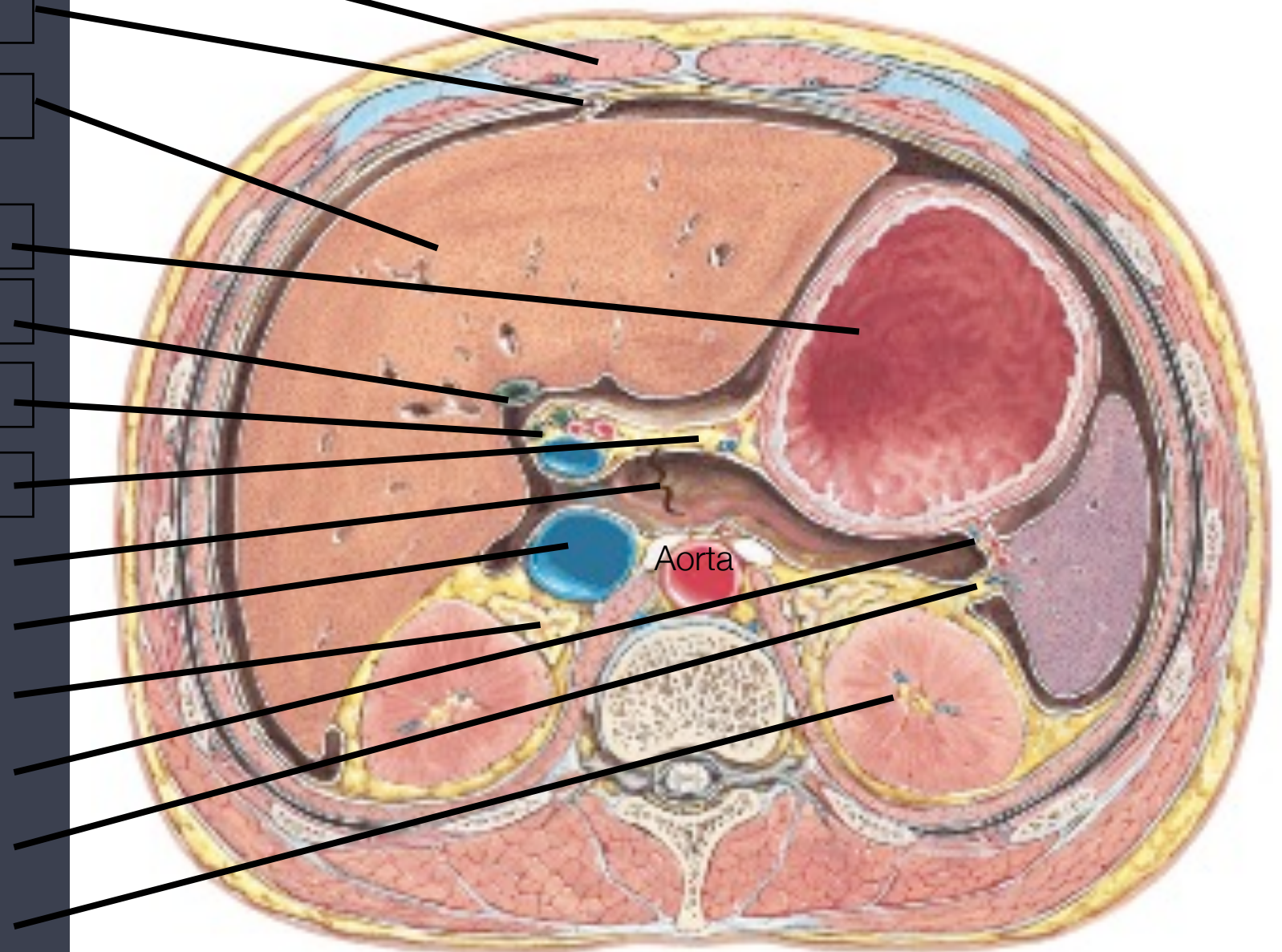
Liver

Stomach

Common bile duct

Porta hepatis

Lesser omentum



Rectus abdominus m.

Falciform ligament

Liver

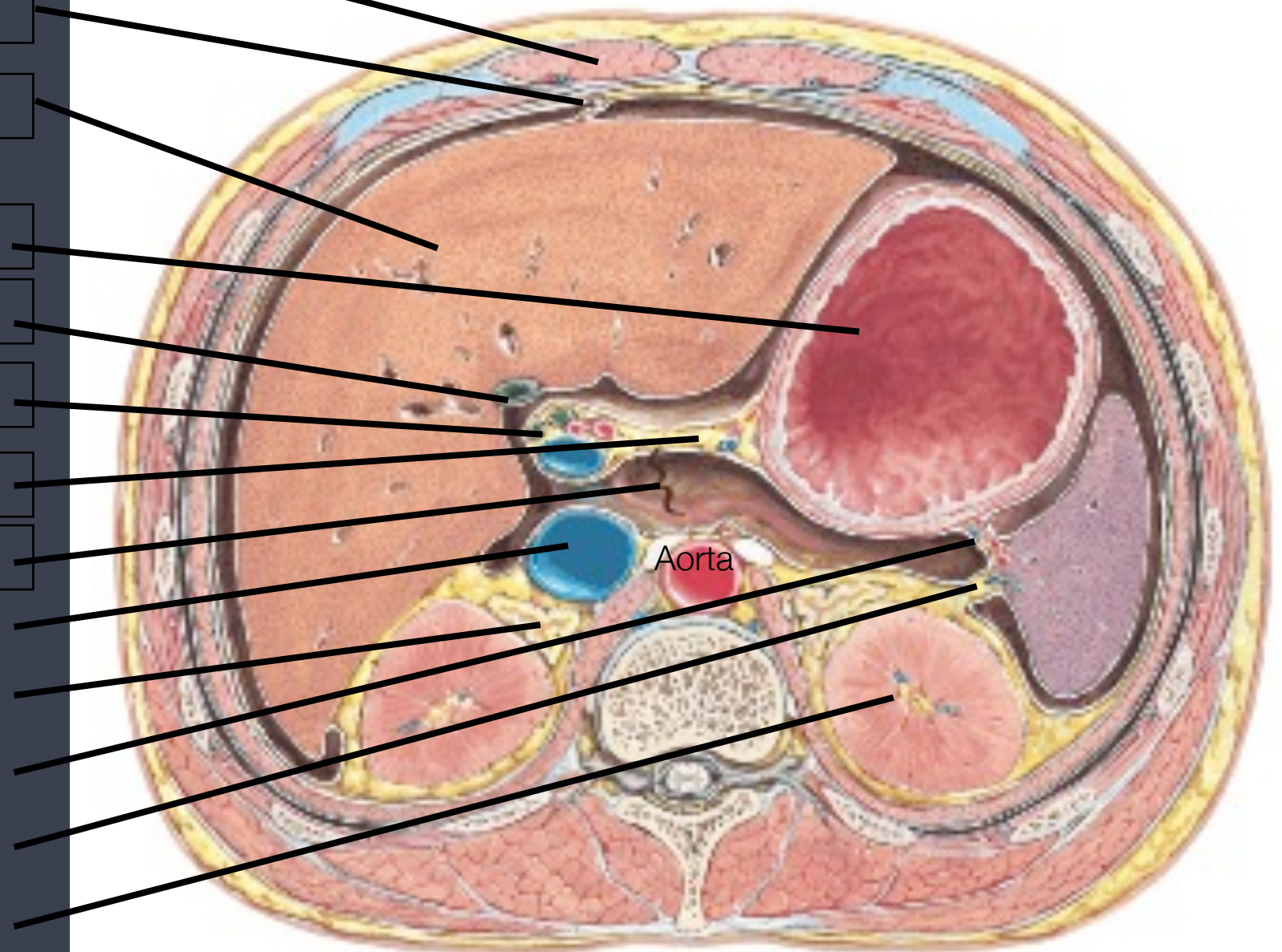
Stomach

Common bile duct

Porta hepatis

Lesser omentum

Lesser sac



Rectus abdominus m.

Falciform ligament

Liver

Stomach

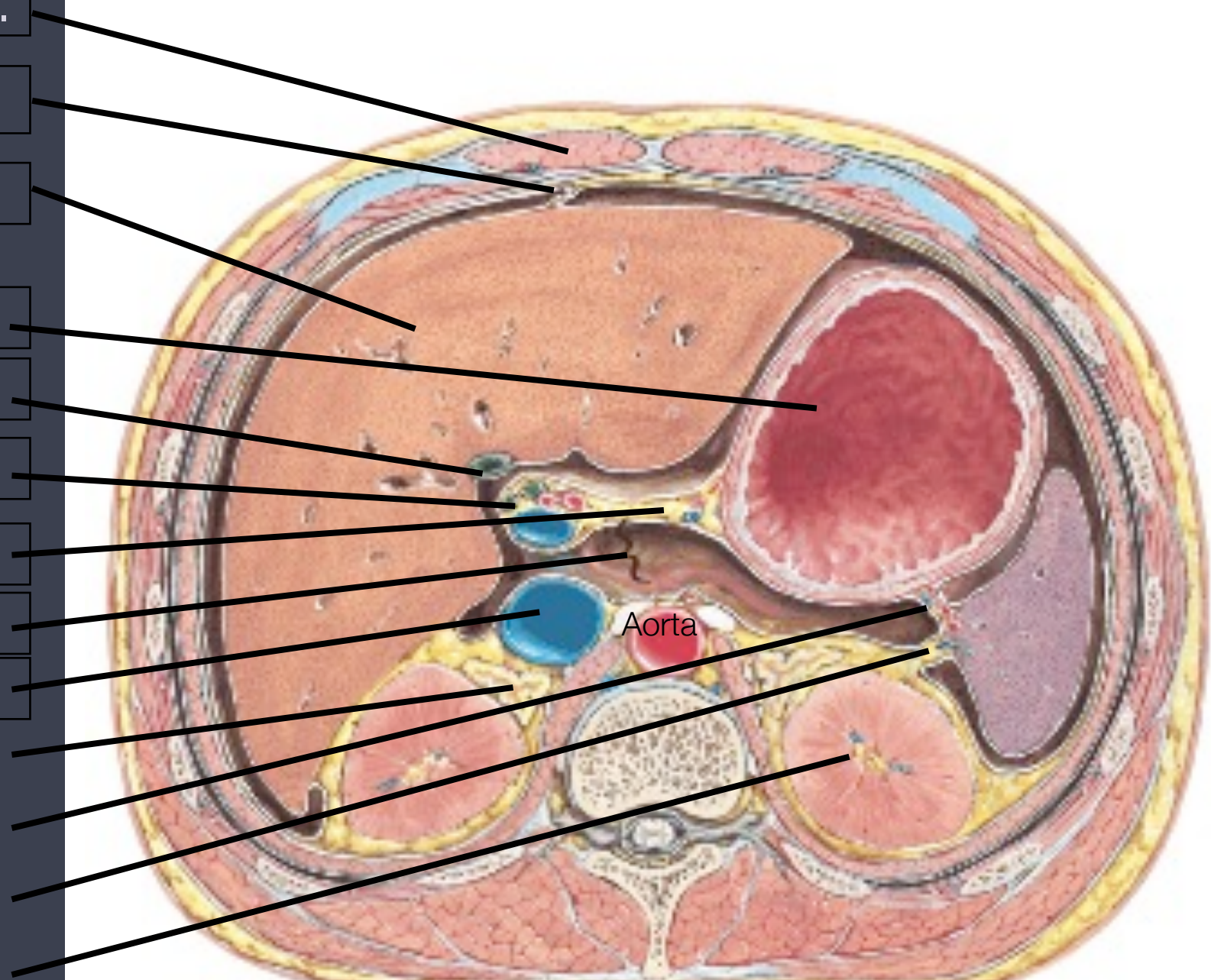
Common bile duct

Porta hepatis

Lesser omentum

Lesser sac

IVC



Rectus abdominus m.

Falciform ligament

Liver

Stomach

Common bile duct

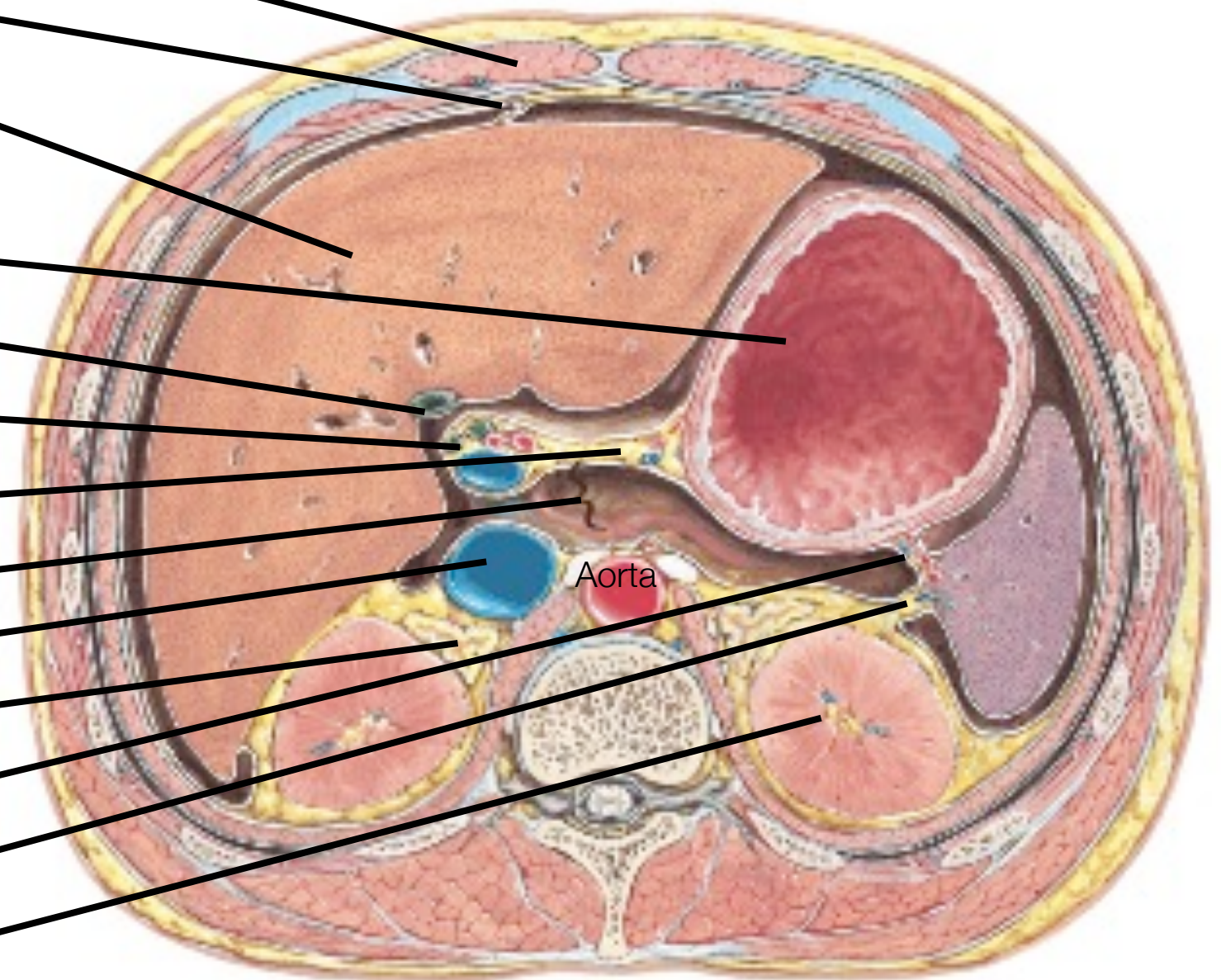
Porta hepatis

Lesser omentum

Lesser sac

IVC

Right suprarenal gland



Rectus abdominus m.

Falciform ligament

Liver

Stomach

Common bile duct

Porta hepatis

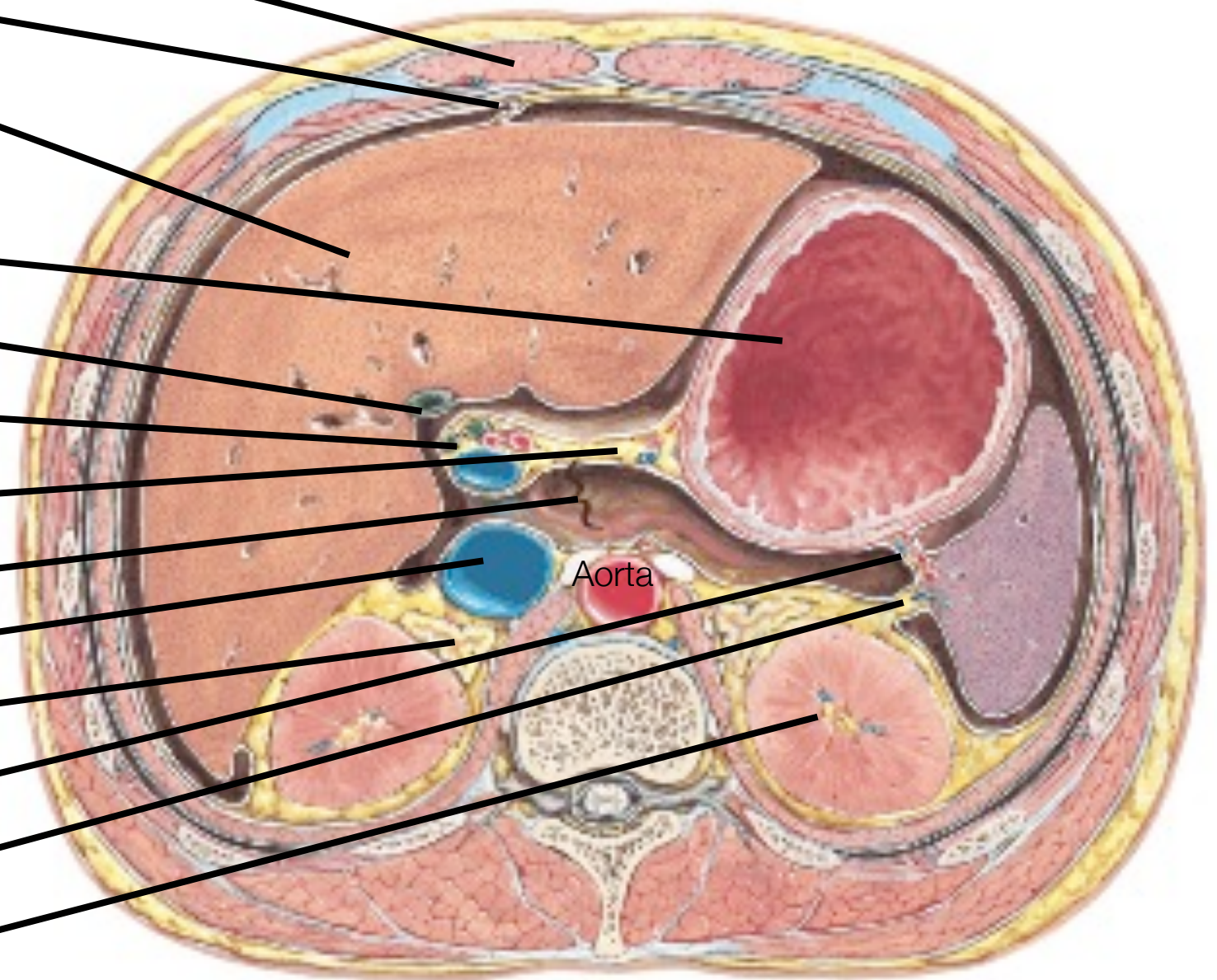
Lesser omentum

Lesser sac

IVC

Right suprarenal gland

Gastrosplenic ligament



Rectus abdominus m.

Falciform ligament

Liver

Stomach

Common bile duct

Porta hepatis

Lesser omentum

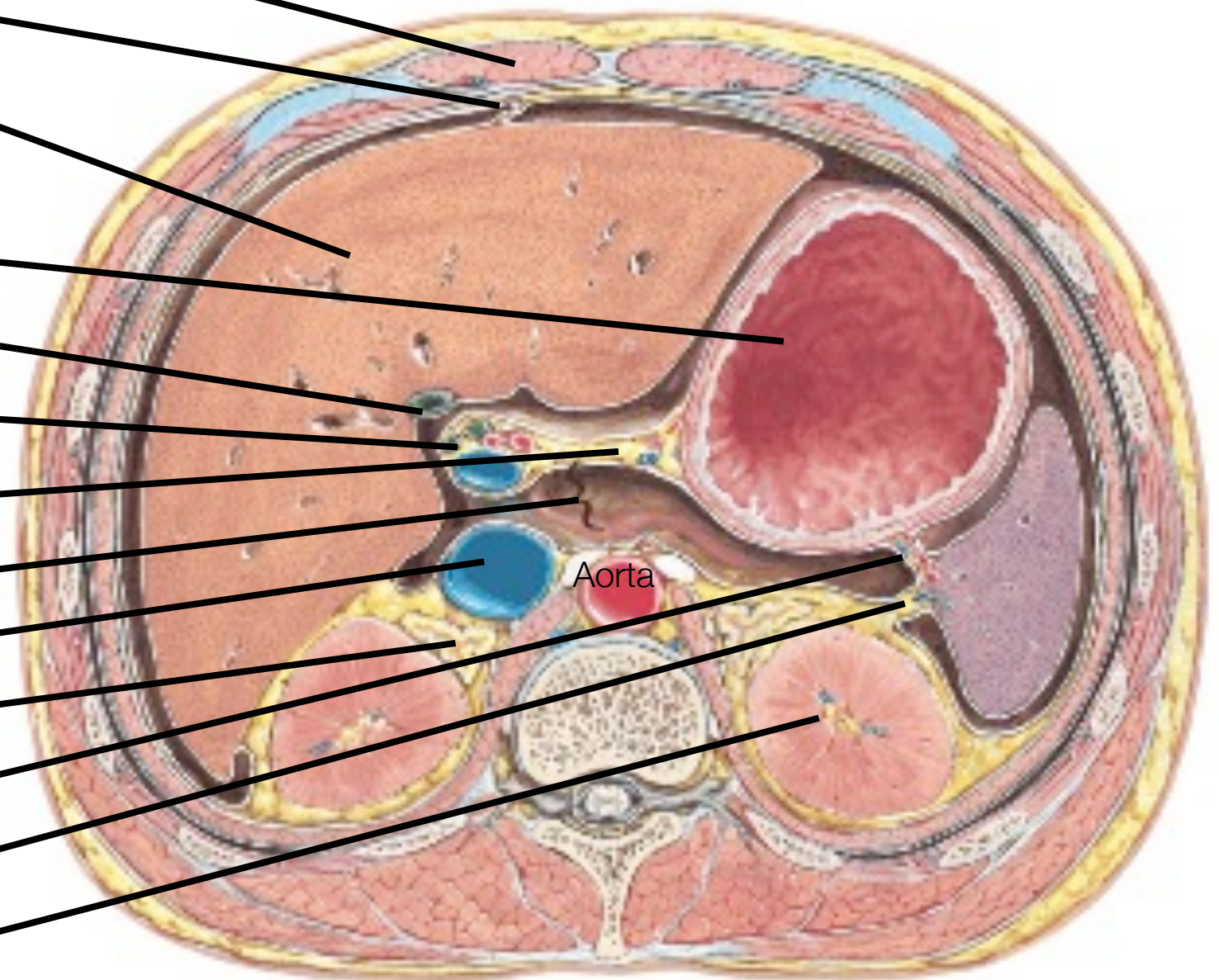
Lesser sac

IVC

Right suprarenal gland

Gastrosplenic ligament

Splenorenal ligament



Rectus abdominus m.

Falciform ligament

Liver

Stomach

Common bile duct

Porta hepatis

Lesser omentum

Lesser sac

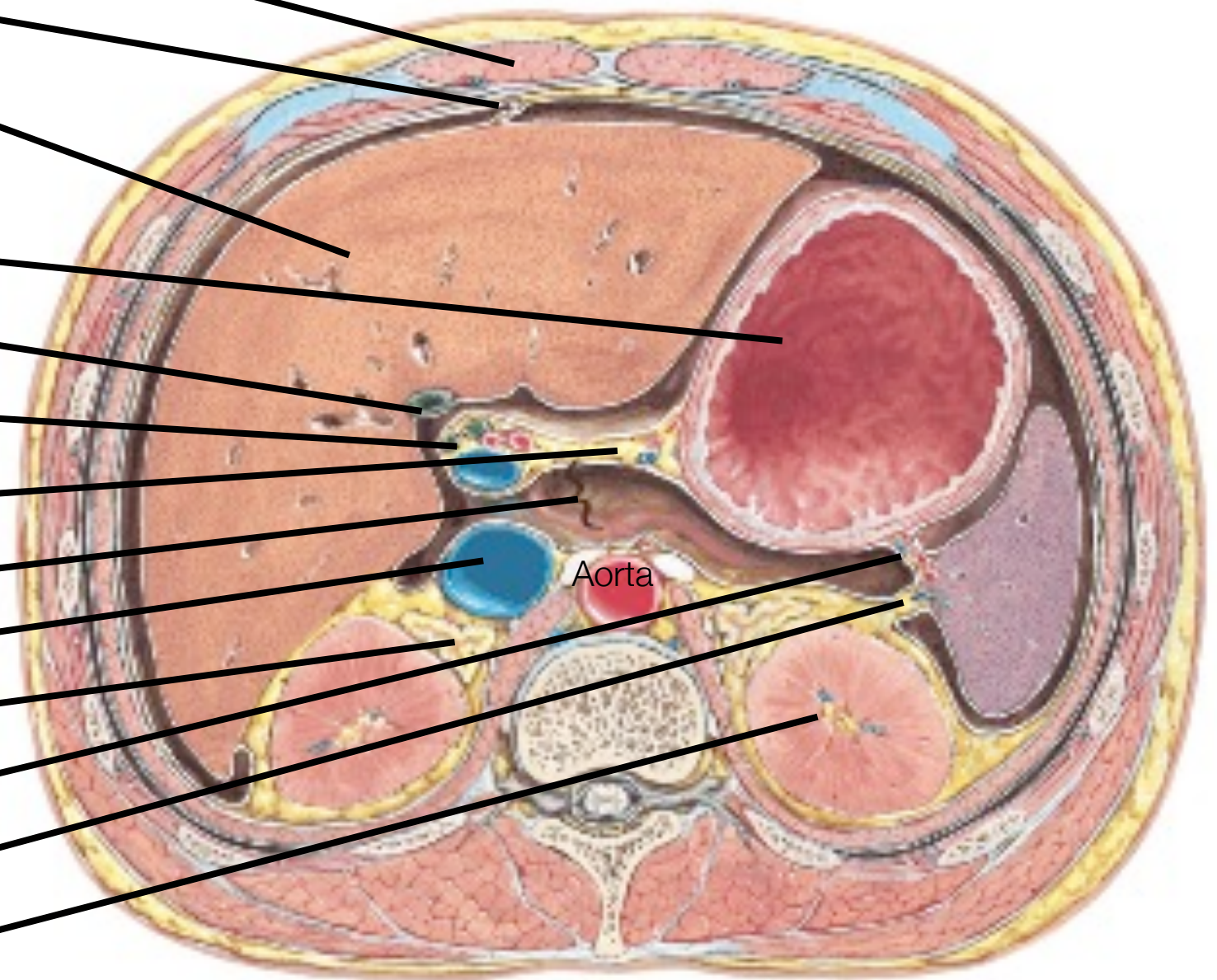
IVC

Right suprarenal gland

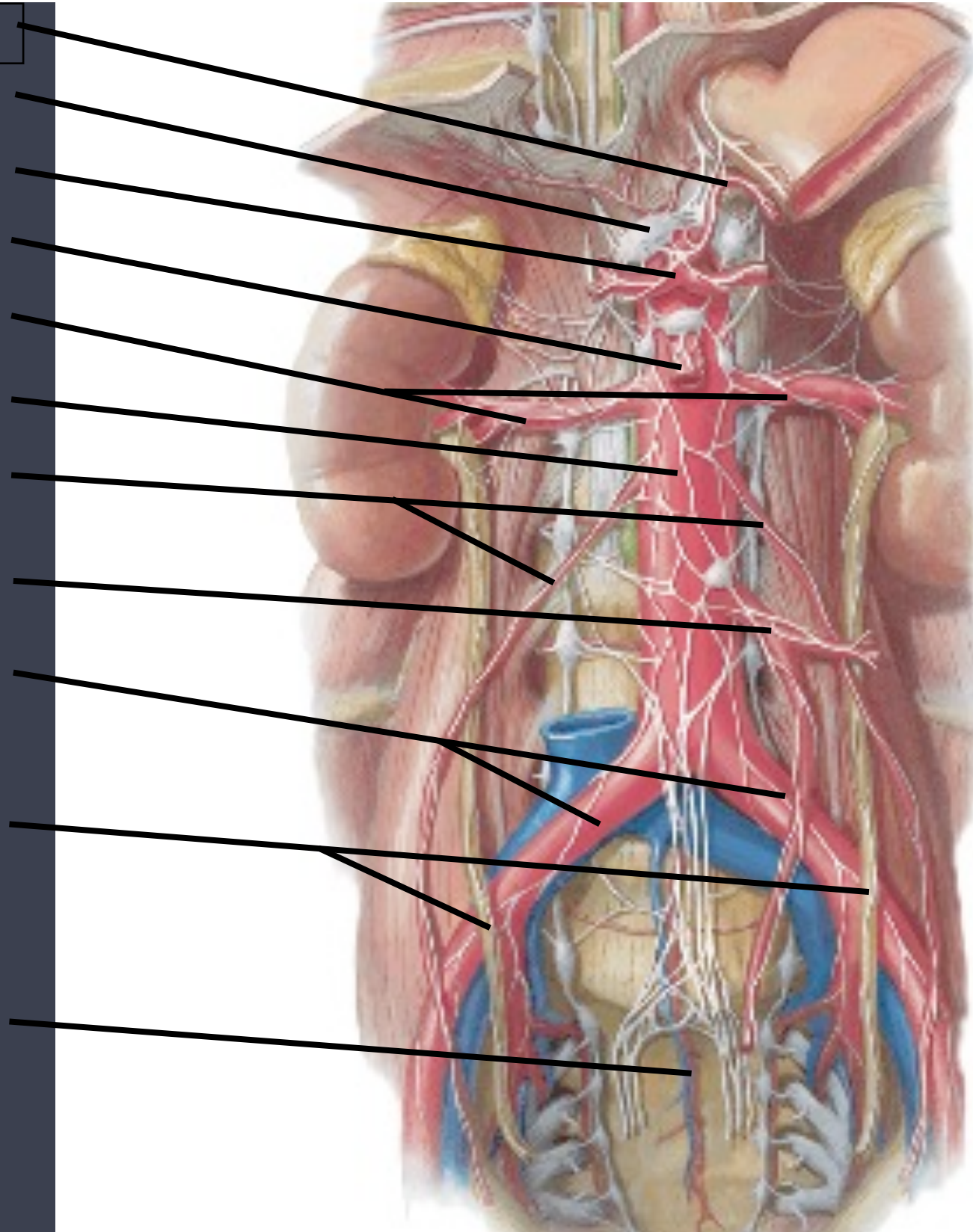
Gastrosplenic ligament

Splenorenal ligament

Left kidney

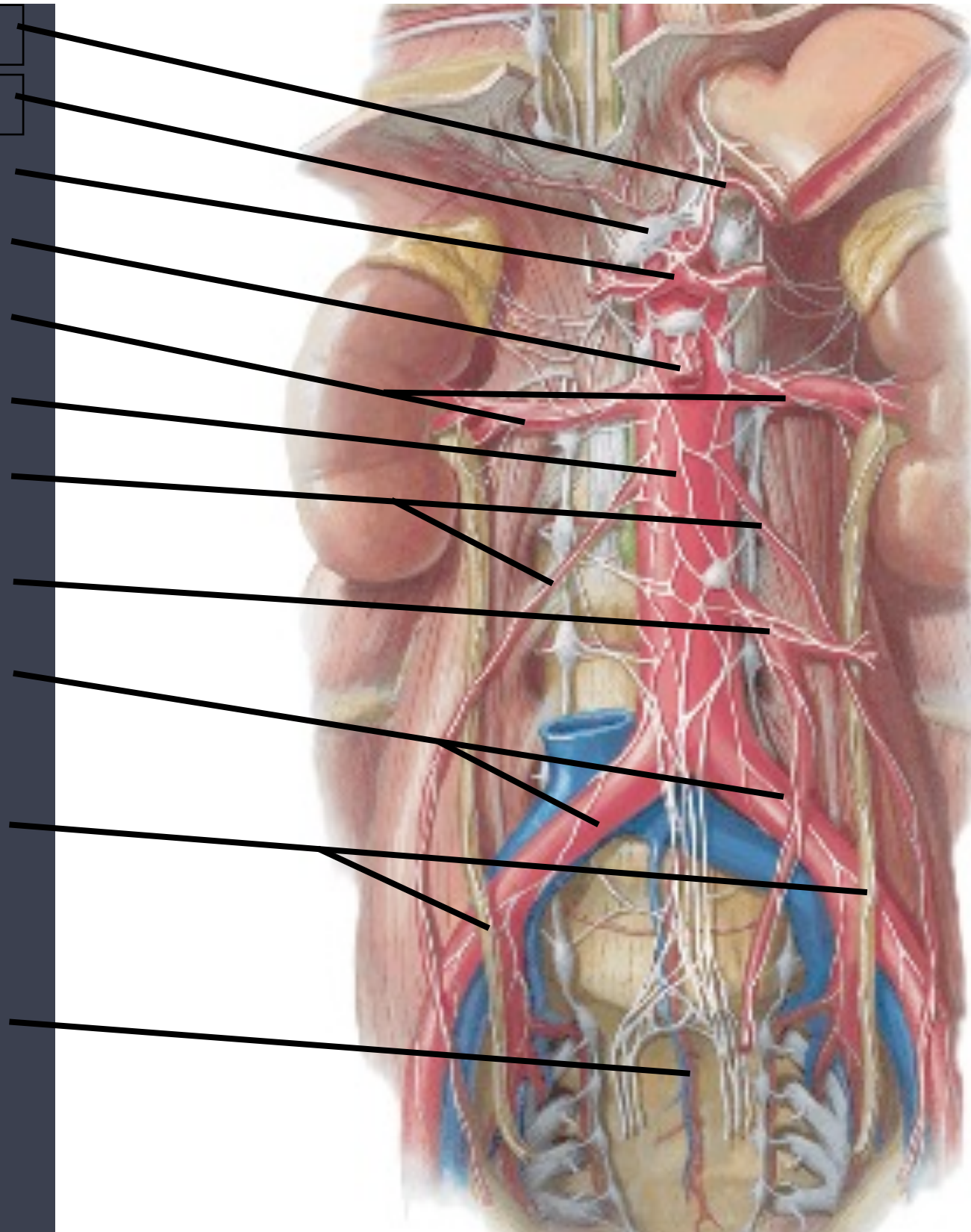


Left gastric a.



Left gastric a.

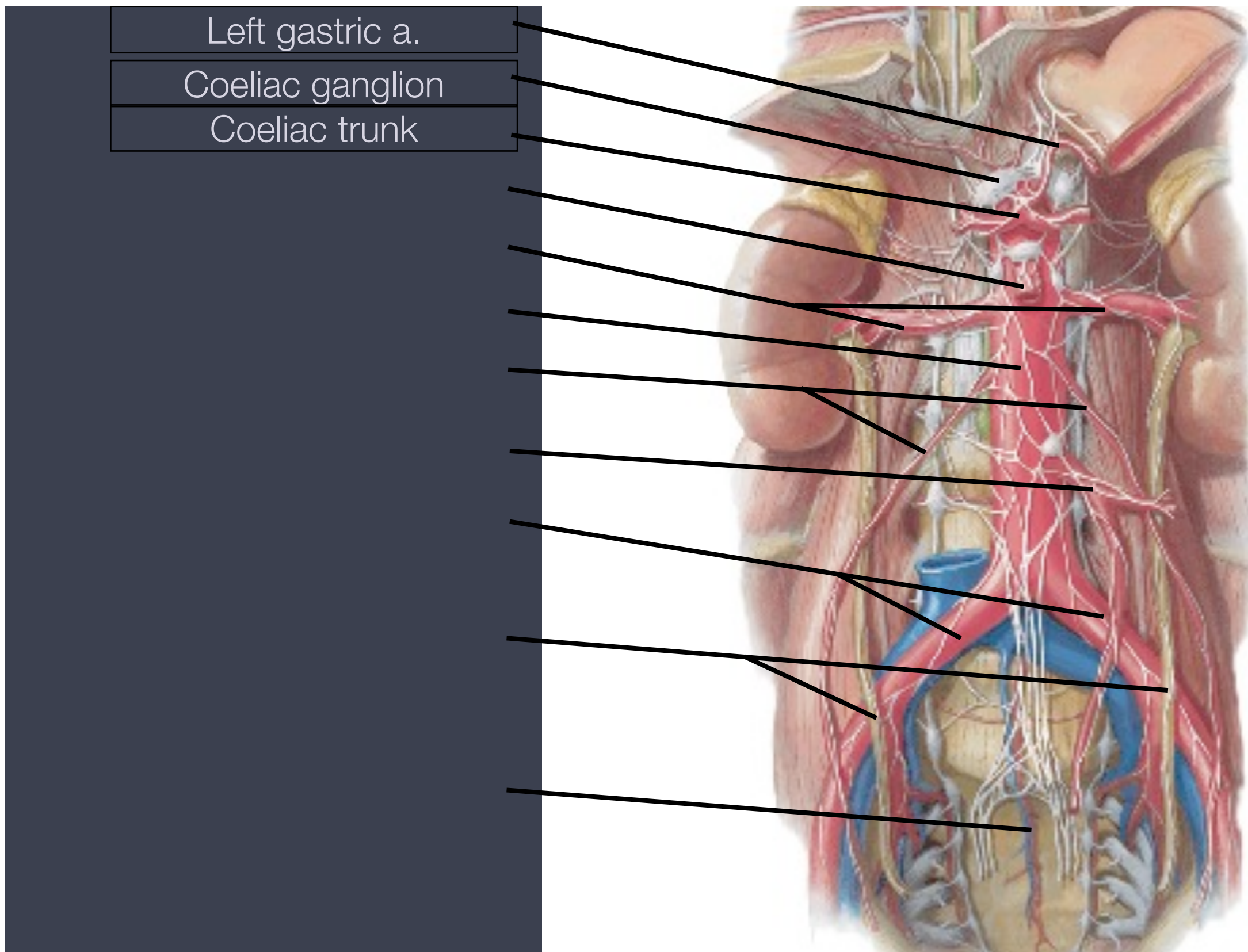
Coeliac ganglion



Left gastric a.

Coeliac ganglion

Coeliac trunk

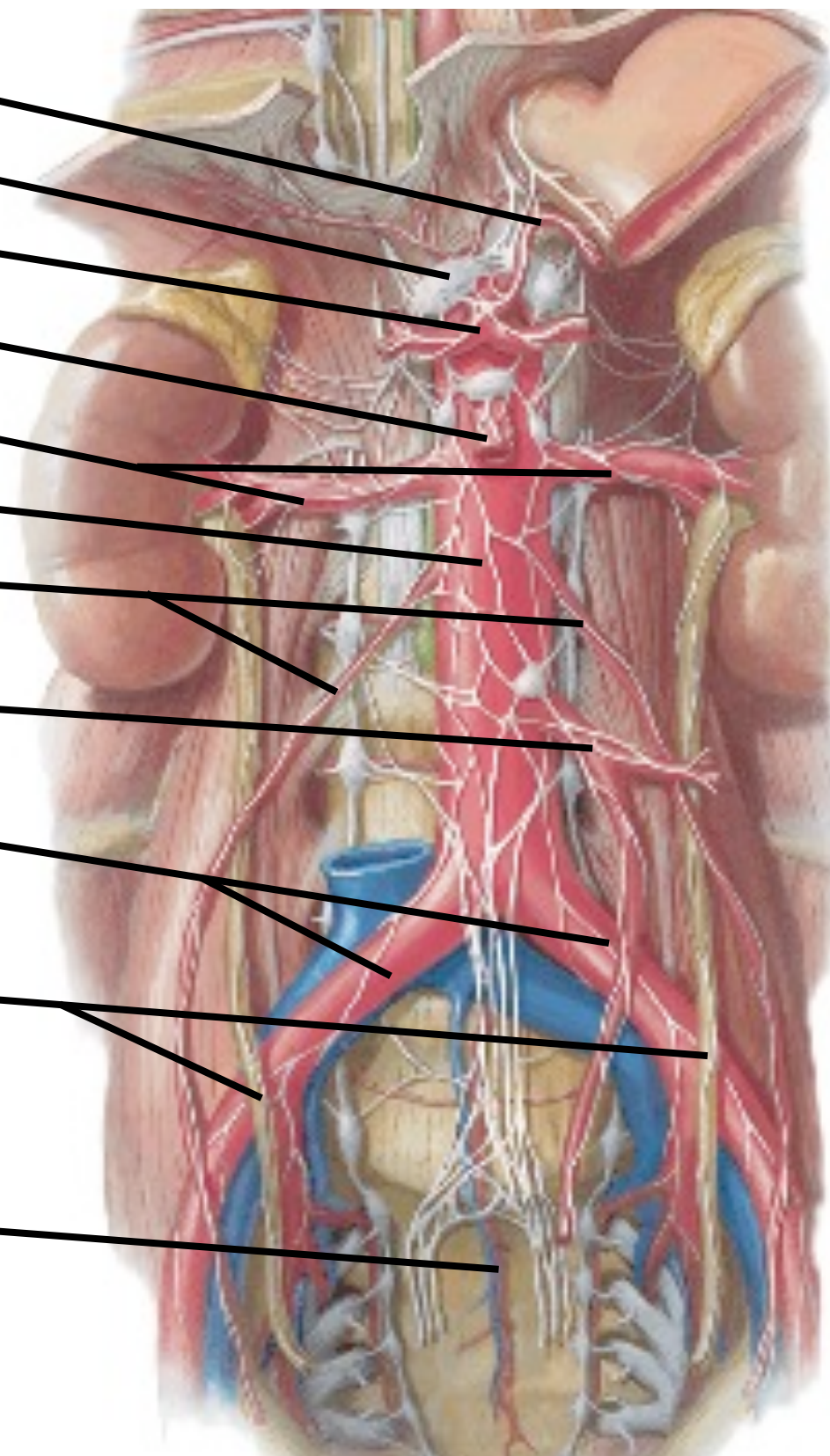


Left gastric a.

Coeliac ganglion

Coeliac trunk

Superior mesenteric a.



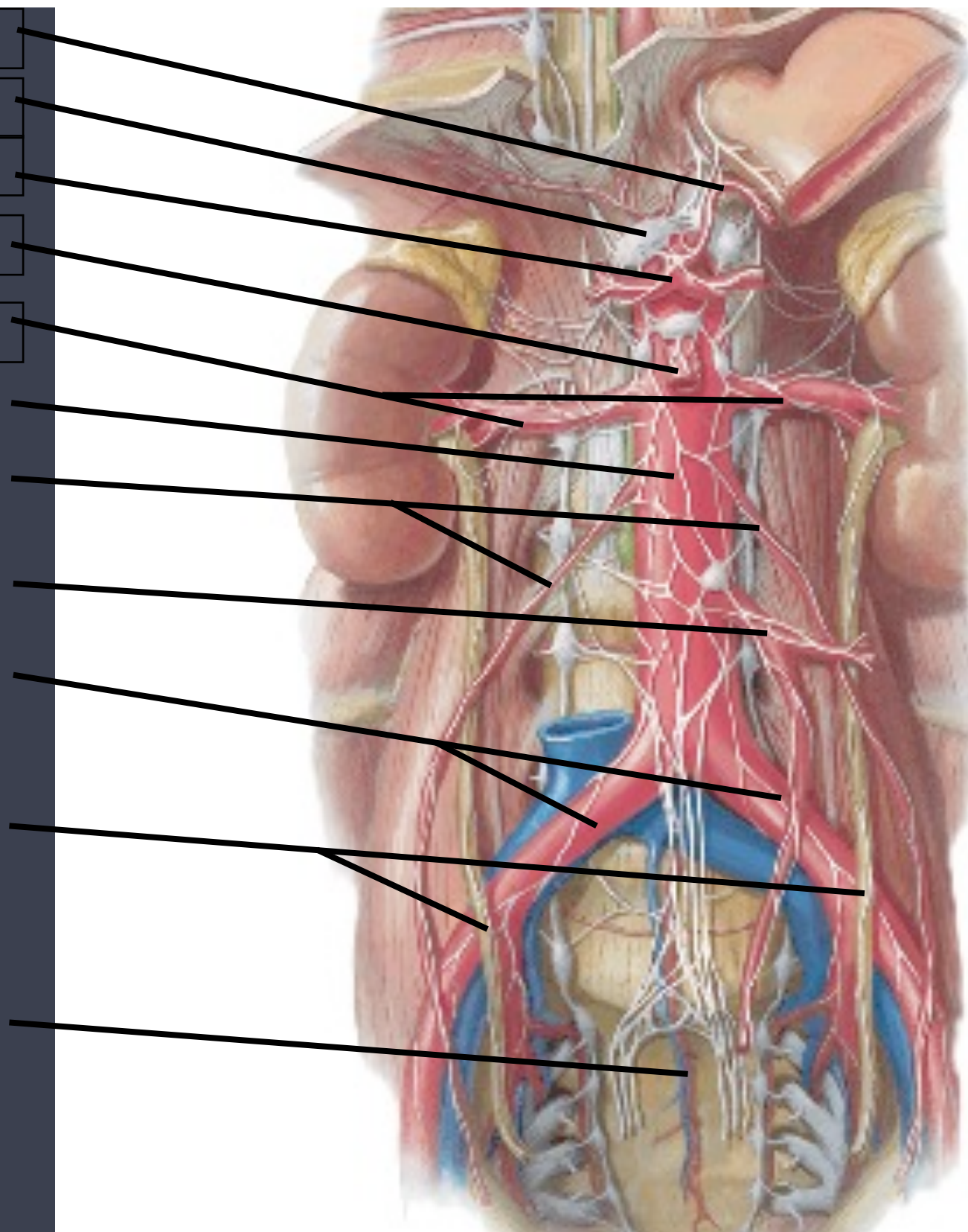
Left gastric a.

Coeliac ganglion

Coeliac trunk

Superior mesenteric a.

Lt & Rt Renal a.



Left gastric a.

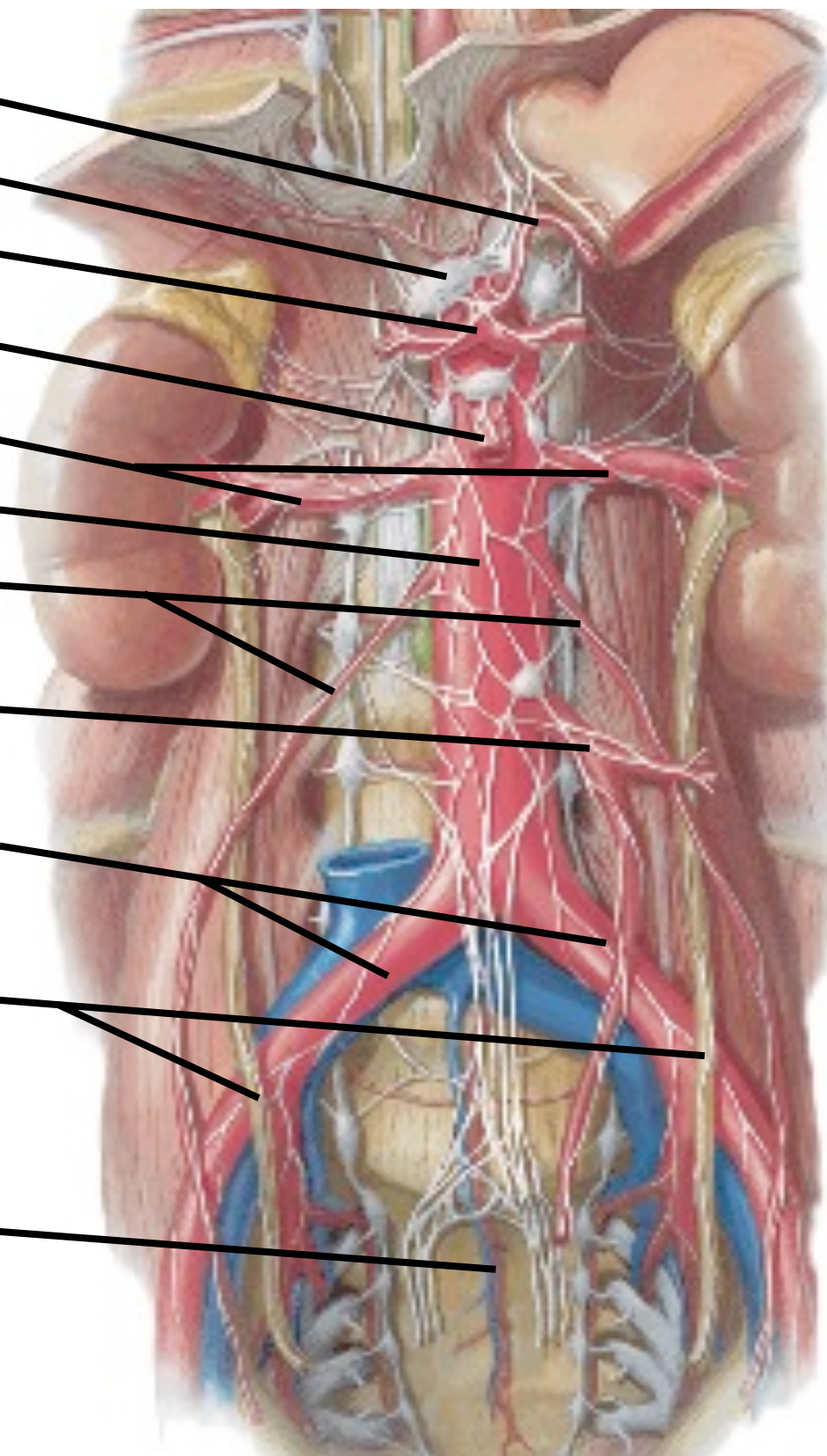
Coeliac ganglion

Coeliac trunk

Superior mesenteric a.

Lt & Rt Renal a.

Aorta



Left gastric a.

Coeliac ganglion

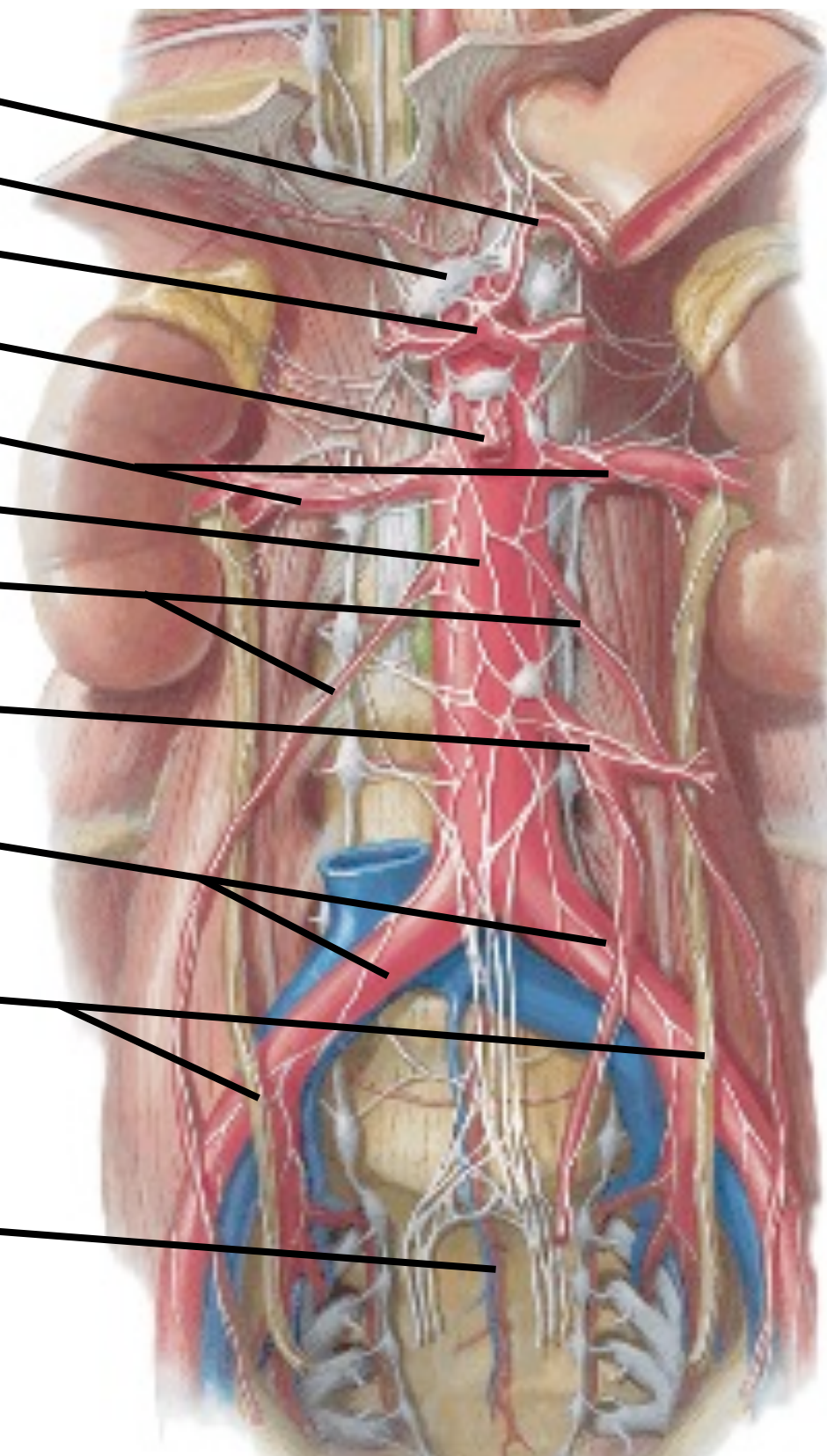
Coeliac trunk

Superior mesenteric a.

Lt & Rt Renal a.

Aorta

Lt & Rt Testicular/Ovarian a.



Left gastric a.

Coeliac ganglion

Coeliac trunk

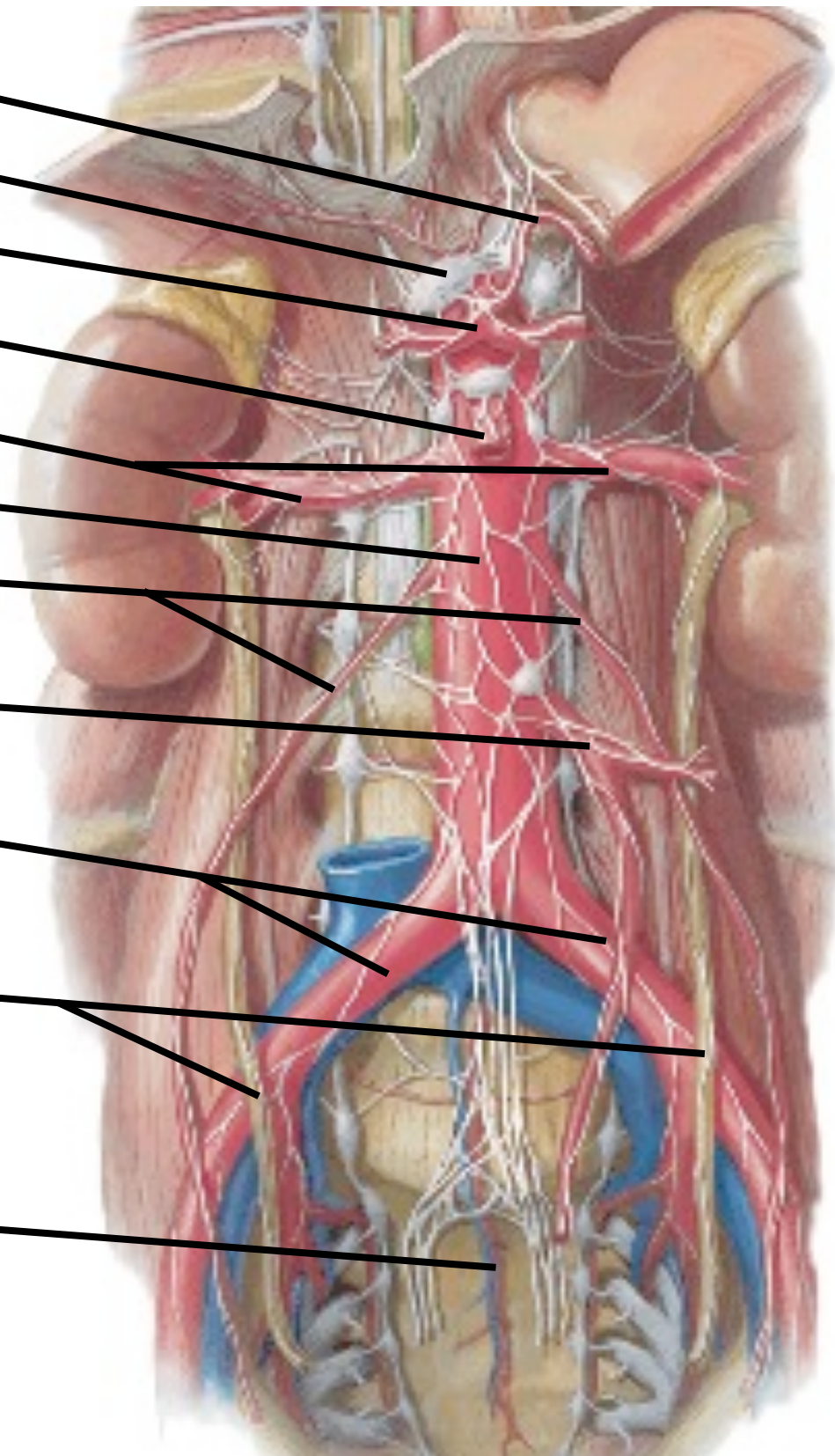
Superior mesenteric a.

Lt & Rt Renal a.

Aorta

Lt & Rt Testicular/Ovarian a.

Inferior mesenteric a.



Left gastric a.

Coeliac ganglion

Coeliac trunk

Superior mesenteric a.

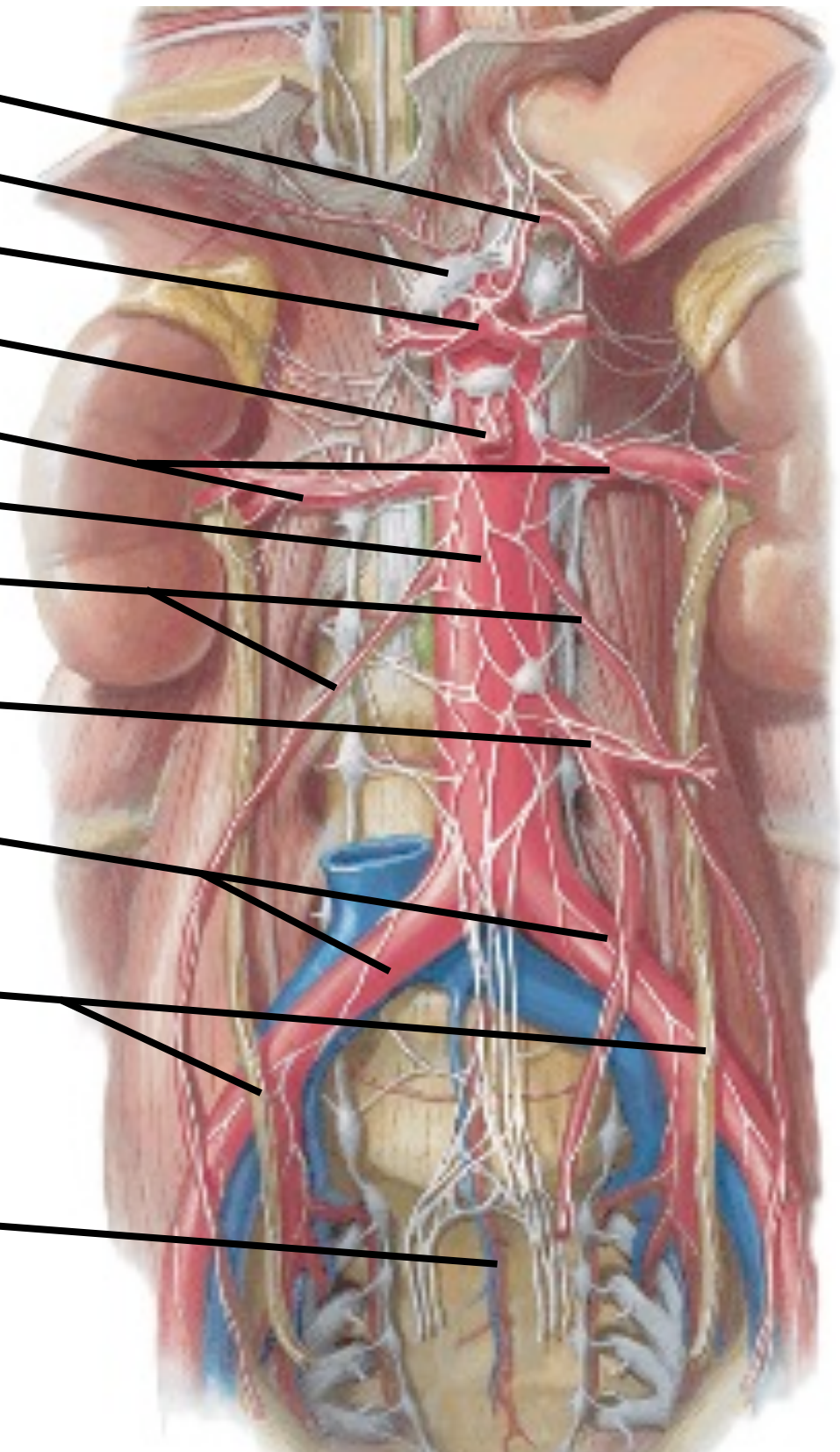
Lt & Rt Renal a.

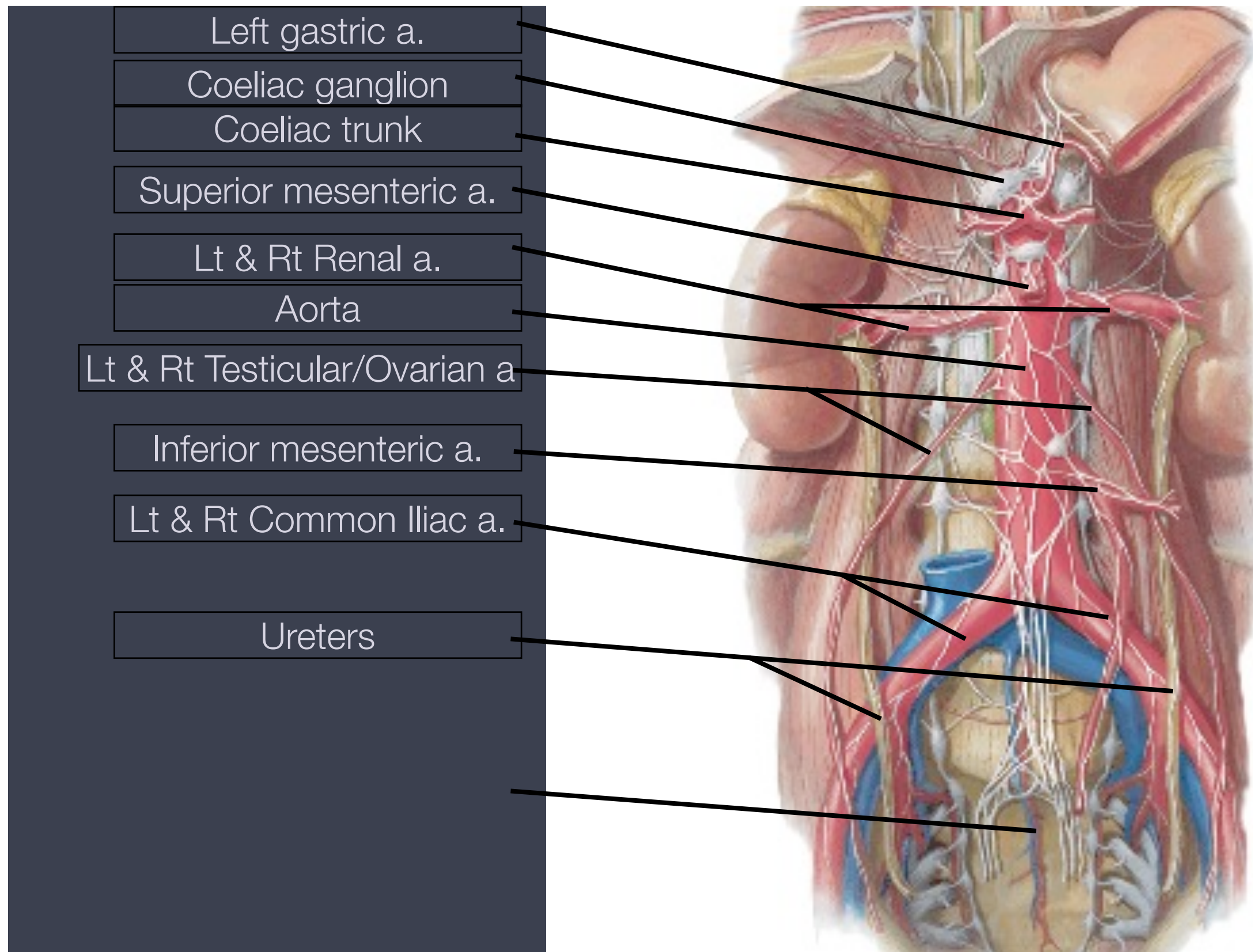
Aorta

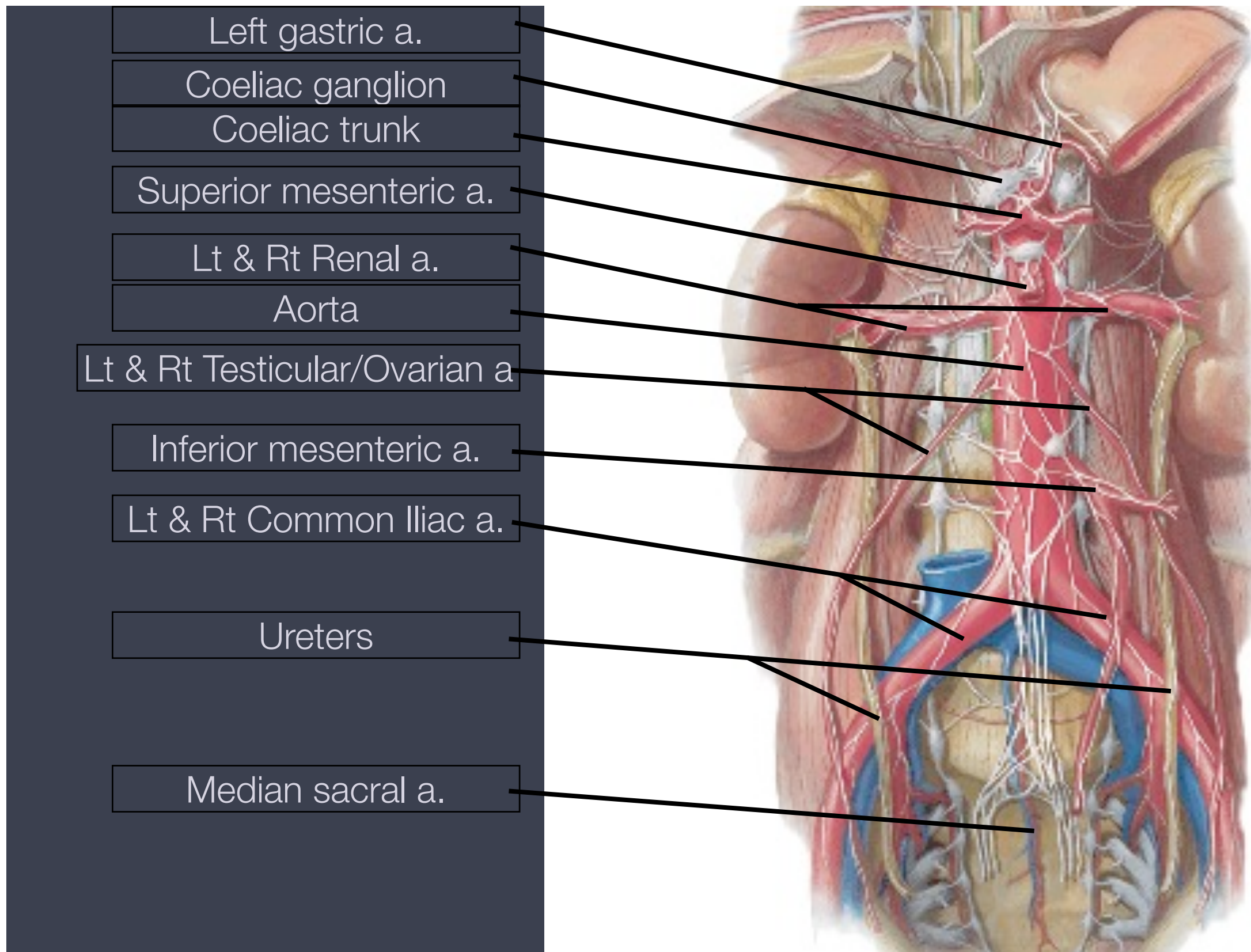
Lt & Rt Testicular/Ovarian a.

Inferior mesenteric a.

Lt & Rt Common Iliac a.







Differential Diagnosis-immense

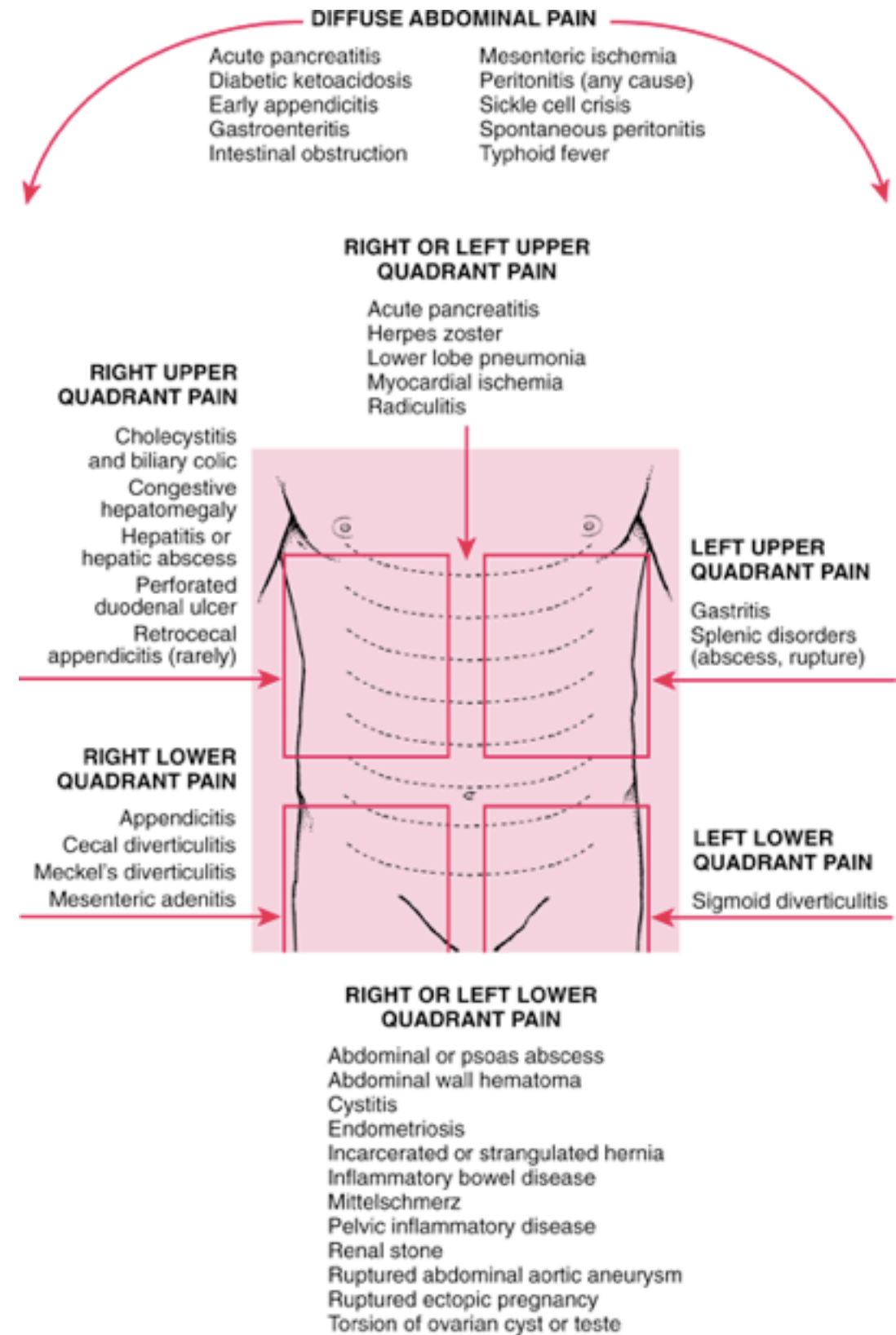
- ▶ Have a system, for example:
 - ▶ “Surgical sieve”
 - ▶ Anatomical Causes: Abdominal/extra-abdominal
- ▶ History will narrow down most, and focus exam/confirm suspicions
- ▶ Hand on belly vital. PR (“if you don’t put your finger in it or you’ll put your foot in it”)

Surgical Sieve e.g.

- ▶ **Congenital:** hypertrophic pyloric stenosis, hypoplasia, Meckels
- ▶ **Vascular:** mesenteric ischaemia, AAA, dissection, ruptured ectopic, AMI, PE, Sickle cell, testicular torsion
- ▶ **Metabolic:** hypercalcaemia
- ▶ **Endocrine:** DKA, porphyria
- ▶ **Trauma:** blunt/penetrating
- ▶ **Mechanical:** obstruction, herniae, intussusception,
- ▶ **Infective:** viral mesenteric adenitis/GE/TB/Typhoid/Ameoba/worms/UTI/cholecystitis/appendicitis/hepatitis/diverticulitis/PID/pneumonia/H.zoster
- ▶ **Malignant:** Ca bowel/bladder/head of pancreas
- ▶ **Dietary:** IBS/constipation
- ▶ **Psychological:** IBS/bezoars/PUD/psychosomatic/OD (methanol, alcoholic ketoacidosis)
- ▶ **Inflammatory:** Crohns/UC/PUD

Anatomical

Abdominal Causes



Anatomical

Extra-Abdominal Causes of Abdominal Pain

Abdominal wall

Rectus muscle hematoma

Gu

Testicular torsion

Infectious

Herpes zoster

Metabolic

Alcoholic ketoacidosis

Diabetic ketoacidosis

Porphyria

Sickle cell disease

Thoracic

Myocardial infarction

Pneumonia

Pulmonary embolism

Radiculitis

Toxic

Black widow spider bite

Heavy metal poisoning

Methanol poisoning

Scorpion sting

Opioid withdrawal

Approach

ABCD & stabilise if ill

History

Examination

Investigation

Treatment



Question	Potential Responses and Indication
Where is the pain?	see previous slide (6)
What is the pain like?	<p>waves of very severe sharp constricting pain (renal or biliary colic)</p> <p>Waves of dull pain with vomiting (intestinal obstruction)</p> <p>Colicky pain that becomes steady (appendicitis, strangulating intestinal obstruction, mesenteric ischemia)</p> <p>Sharp, constant pain, worsened by movement (peritonitis)</p> <p>Tearing pain (dissecting aneurysm)</p> <p>Dull ache (appendicitis, diverticulitis, pyelonephritis)</p>
Have you had it before?	recurrent problems (eg ulcer disease, gallstone colic, diverticulitis, or mittelschmerz)
Was the onset sudden?	(perforated ulcer, renal stone, ruptured ectopic pregnancy, torsion of ovary or testis, AAA)

Question	Potential Responses and Indication
How severe is the pain?	Severe pain (perforated viscus, kidney stone, peritonitis, pancreatitis) Pain out of proportion to physical findings (mesenteric ischemia)
Does the pain travel to any other part of the body?	Right scapula (gallbladder pain) Left shoulder region (ruptured spleen, pancreatitis) Pubis or vagina (renal pain) Back (ruptured aortic aneurysm)
What relieves the pain?	Antacids (peptic ulcer disease) Lying as quietly as possible (peritonitis)
What other symptoms occur with the pain?	Vomiting precedes pain and is followed by diarrhea (gastroenteritis) Delayed vomiting, absent bowel movement and flatus (acute intestinal obstruction; the delay increases with a lower site of obstruction) Severe vomiting precedes intense epigastric, left chest, or shoulder pain (emetic perforation of the intra-abdominal esophagus)

Examination

- ▶ General (anaemia, liver palms/flap, wasting, clubbing, koilonychia, spider naevi, xanthelasma, furred tongue, dehydration, Observations)
- ▶ Look (caput medusae, distension), **Palpate** (tenderness guarding, rebound, organs), Percuss, Auscultate (abdo/chest)
- ▶ Don't forget hernia sites, pulses, PR and urine disptix/preg test in all women of child bearing age



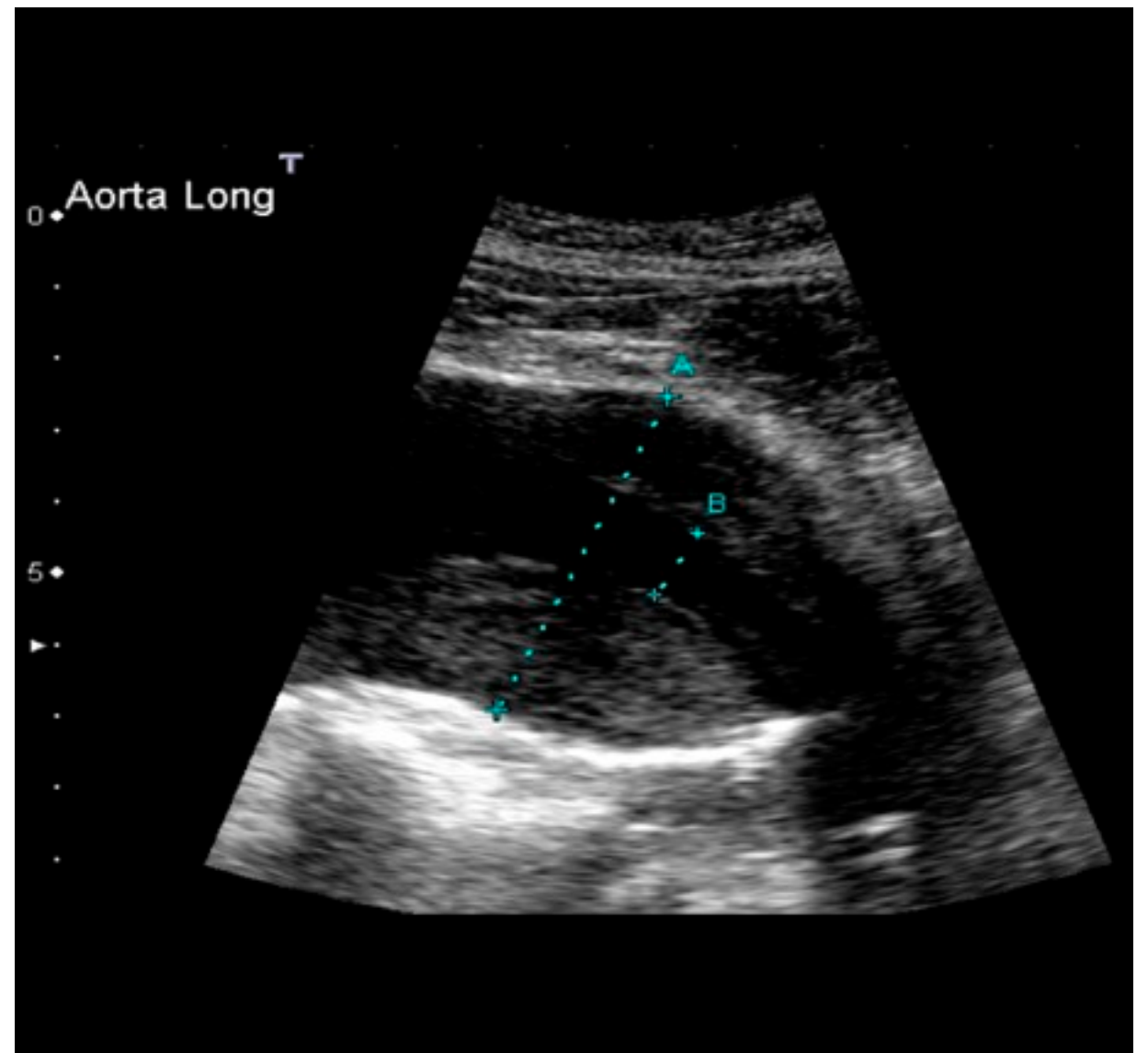


Palpate

- ▶ Sit down level with the patients abdomen
- ▶ Warn patient and put them at ease. Warm hands hopefully
- ▶ Adequate analgesia first
- ▶ Gentle first, then more deeply and for organs later if tolerated
- ▶ If voluntary guarding use distraction such as asking questions
- ▶ Use percussion for rebound (very sore for rebound)
- ▶ Identify ?hepar/spleen with breathing in, bimanual kidneys

Investigation

- ▶ **ONLY** as indicated clinically
- ▶ Routine bloods have very poor specificity
- ▶ Erect CXR/Plain AXR **ONLY** for suspected perforation/obstruction respectively
- ▶ Urine dipstix/hCG in all
- ▶ Abdo USS often helpful (gallstones/AAA)
- ▶ ECG in at risk patients & epigastric pain
- ▶ CT e.g. stable AAA, KUB ?renal



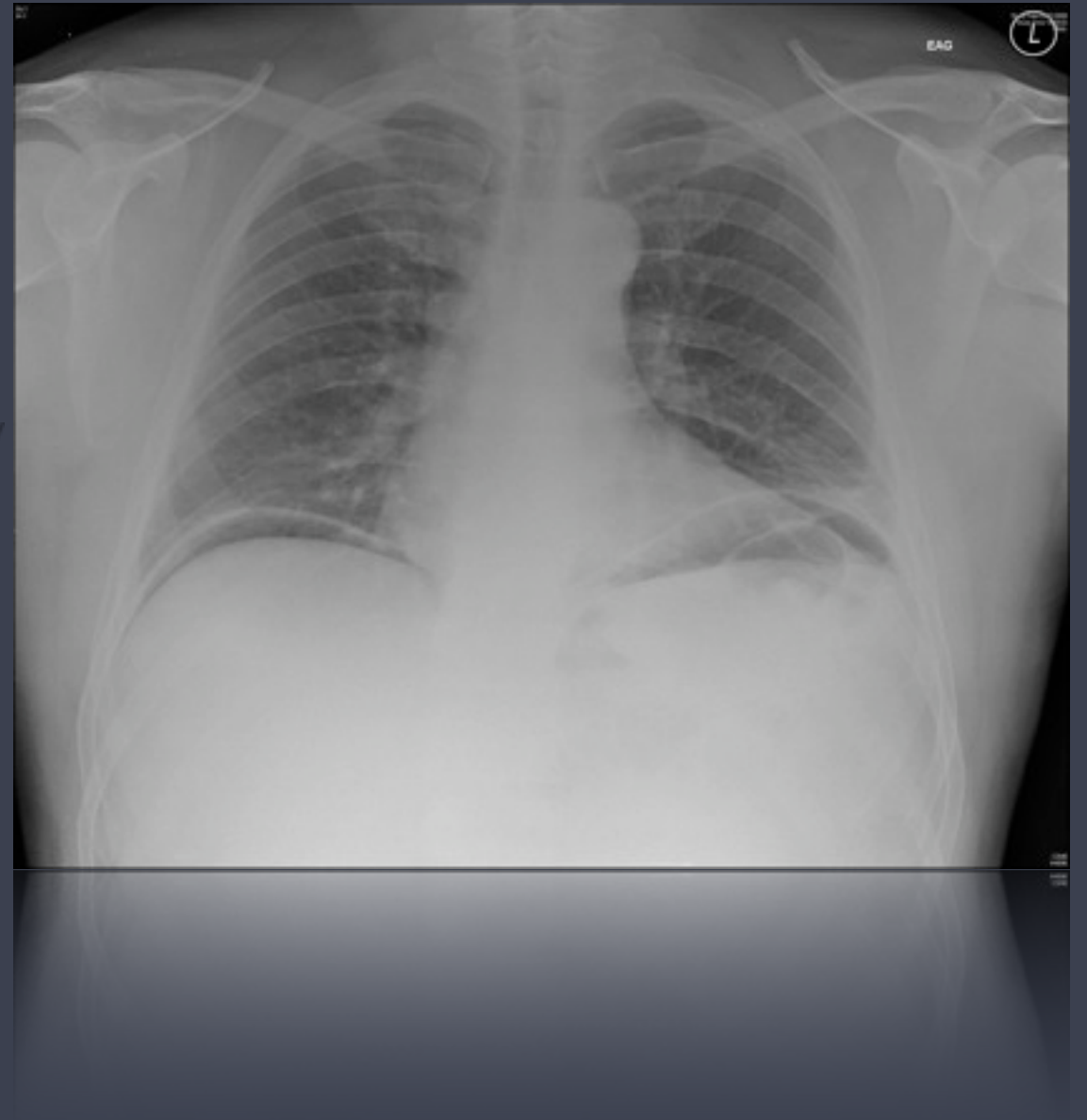
Appendicitis

- ▶ Central colicky--RIF pain over hours, +/- vomiting/diarrhoea. LOA
- ▶ +/- fever, furred tongue, tachy
- ▶ Tender RIF, +/- guarding/rebound, Rovsing
- ▶ +/- raised WCC
- ▶ Clinical diagnosis



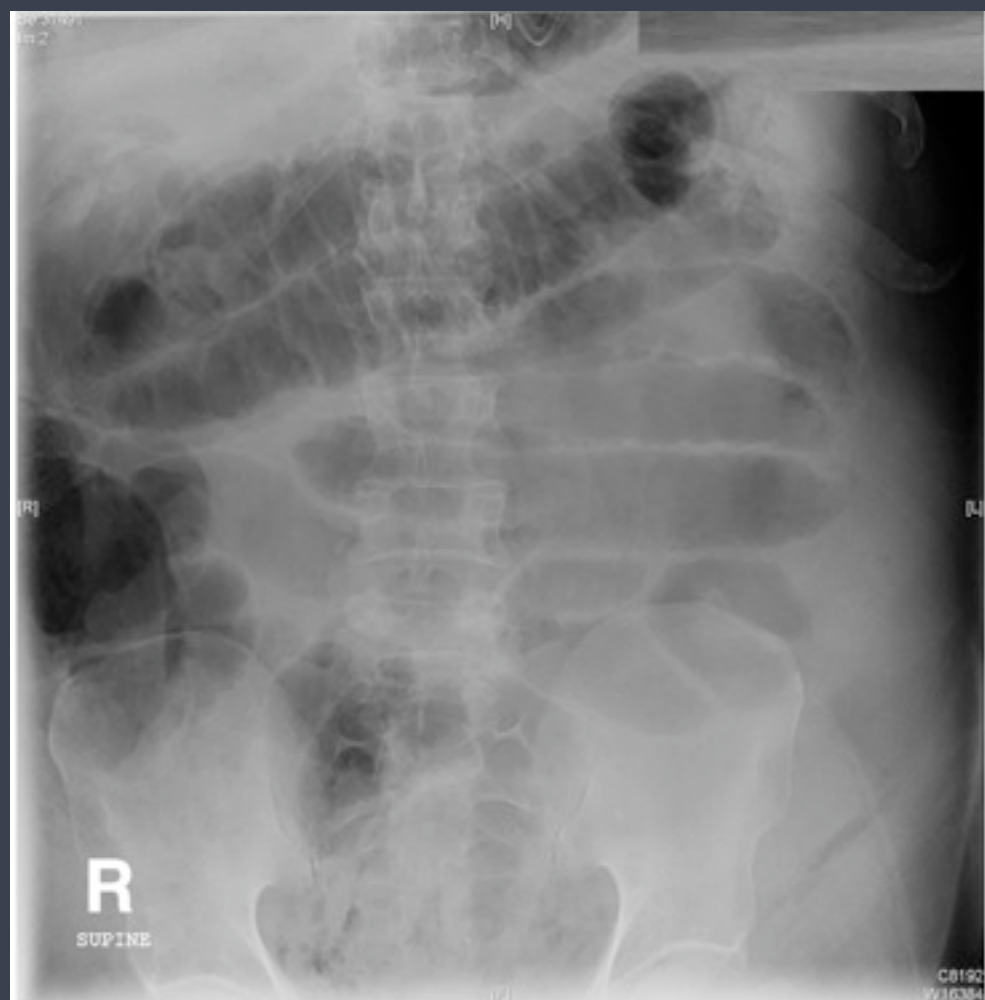
Perforation

- ▶ May have previous Hx e.g. PUD/IBD/diverticulosis etc, blunt trauma
- ▶ Very subtle in elderly/small bowel rupture (for a few hours)
- ▶ Unwell, fever, tachy, shock. Shoulder tip pain.
- ▶ Generalised guarding of abdomen
- ▶ Erect CXR; sub-diaphragmatic gas even as little as 1ml. In about 75% of perf. DU



Intestinal Obstruction

- ▶ Numerous causes (e.g. hernia, previous surgery, tumours, volvulus, PUD, intussusception, gallstone ileus, paralytic ileus, inflammatory masses)
- ▶ Abdo pain, distension, constipation (late in small bowel, early in large bowel), vomiting (late in large bowel, early in small bowel)
- ▶ Dehydration/shock, strangulated hernia, tender abdomen, early tinkling bowel sounds, later no bowel sounds. Peritonism late.
- ▶ Dilated bowel loops, fluid levels. 'Drip and suck' and theatre

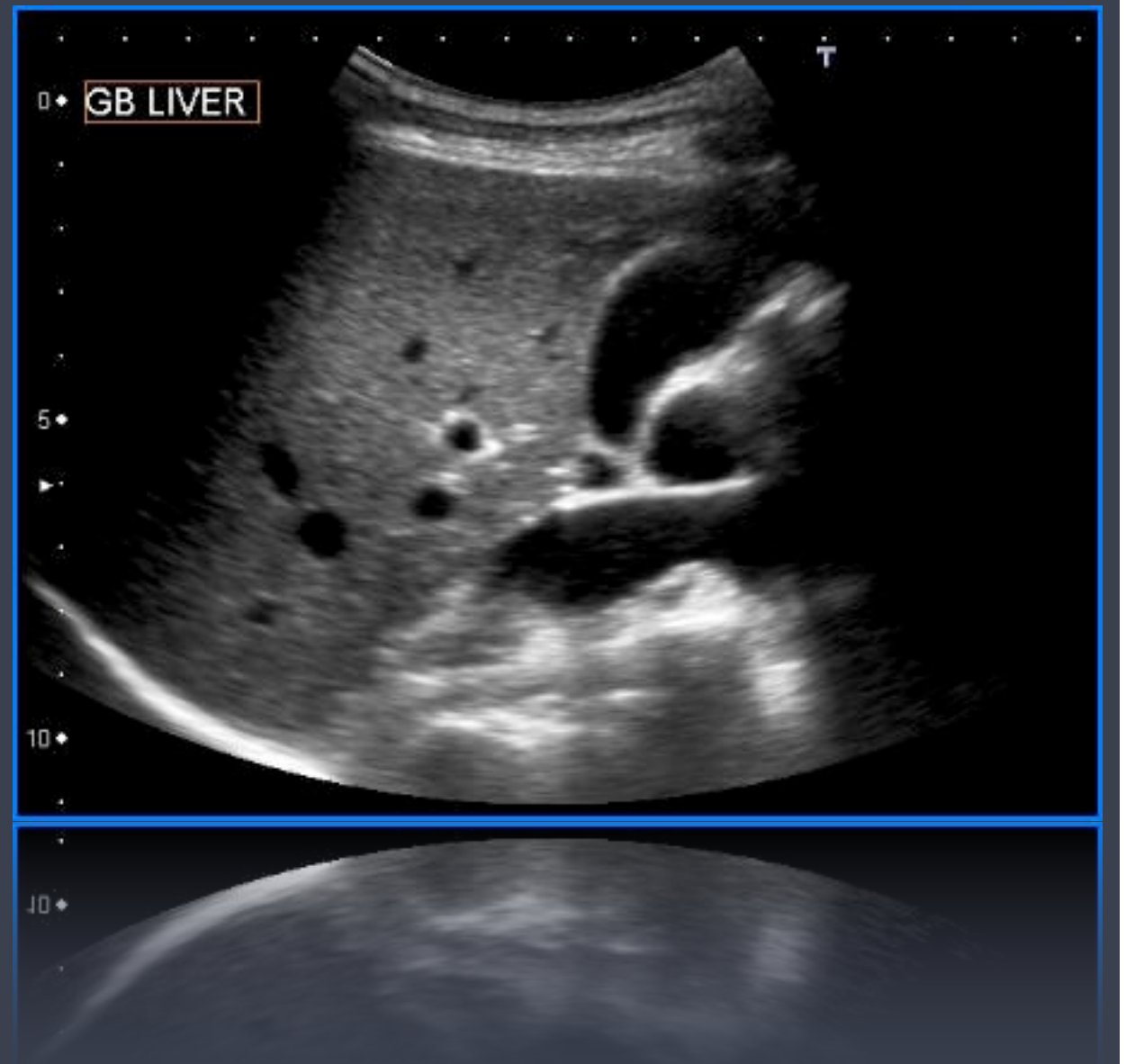


Peptic Ulcer/Gastritis

- ▶ Usually history of many weeks/months
- ▶ May have prev. indigestion/alcohol/NSAIDs/settle with anti-acids
- ▶ If very sudden with shock/peritonism-?perforation
- ▶ Amylase to r/o pancreatitis. If gaurded, drip/suck/opiates and RSO referral.
- ▶ ECG to r/o ACS

Biliary Colic/Cholecystitis

- ▶ Colicky, radiates to Rt back, worse after food (esp fatty) usually insidious, nausea & vomiting
- ▶ fever, RUQ tenderness, +/- Murphy's sign
- ▶ Amylase levels
- ▶ If unwell and Murphy's sign-RSO



Pancreatitis

- ▶ GET SMASHED (Gallstones, Ethanol, Trauma, Steroids, Mumps, Autoimmune (PAN), Scorpion venom, Hyperlipidaemia/Hypothermia/Hypercalcaemia, ERCP/Emboli, Drugs)
- ▶ Severe epigatric, continuous--back, vomiting
- ▶ Ill, fever, tachy, +/- shock. Tender epigastrium. Raised amylase
- ▶ Fluid resus, ABGs, morphine, RSO

Renal Tract Disease

- ▶ Extremely severe pain, colicky loin or loin to groin
- ▶ Often associated with vomiting
- ▶ Blood on urine dipstix, or evidence of urinary infection
- ▶ If suspect stones, KUB (after adequate opiates) and refer Urology
- ▶ BEWARE older patients with ?renal colic (r/o AAA)

Inflammatory Bowel Disease

- ▶ >6 loose/bloody motions/d
- ▶ May be febrile, tachycardic
- ▶ Risk of haemorrhage, perforation and toxic megacolon
- ▶ Rapid fluid resuscitation required, often need medical (GE) and surgical input. May need IV and PR steroids.





Questions?