Foregut Organs & Their Blood Supply

Lab 4

January 30, 2024 - Dr. Doroudi (majid.doroudi@ubc.ca)

Objectives:

- Describe the general arrangement of the peritoneum
- Describe the arrangement of the mesenteries and omenta
- Define the relationships of the major abdominal viscera to each other
- Differentiate the relationships of the major abdominal viscera to the peritoneum, i.e. is the organ **intraperitoneal** (suspended by mesentery) or **retroperitoneal** (attached to the posterior abdominal wall)
- Define the derivatives of the foregut
- Describe the blood supply of the organs derived from foregut
- Describe the innervation of the foregut organs

These are the relevant videos covering the lab objectives:

Acland Atlas (Videos) *(requires CWL login)*

Volume 5 - The Internal Organs

The Abdominal Organs

5.2.4 Greater and lesser omentum
5.2.6 Duodenum
5.2.8 Attachments of the duodenum
5.2.16 Liver: principal features
5.2.17 Liver: peritoneal attachment
5.2.18 Liver: posterior surface
5.2.19 Pancreas
5.2.20 Biliary system
5.2.23 Arteries of the abdominal organs

Watch these dissection guide videos:

Foregut Dissection (Video)

Peritoneum Dissection (Video)

Foregut (Atlas)

Mesentery (3D)

Liver + Biliary (3D)

Foregut Organs (3D)

Liver/Gallbladder (3D)

Cadaver dissections showing abdominal cavity with the greater omentum (left) and organs beneath (right)

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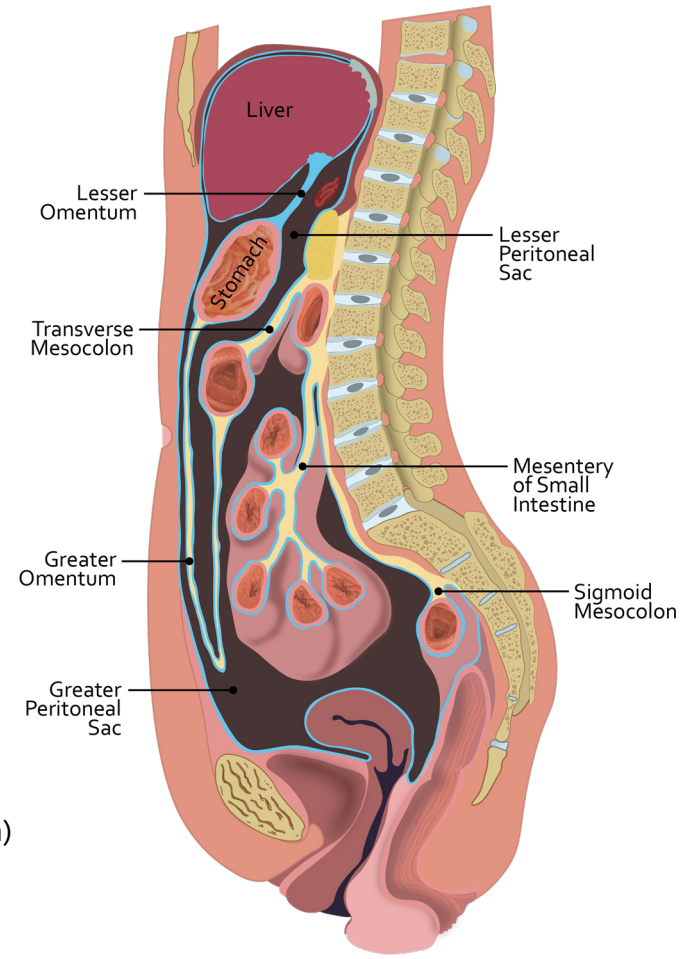
Mesentery & Ligaments:

Starting with the oesophagus, trace all components of the GI system to the rectum and identify which are **intraperitoneal** and which are **retroperitoneal**.

- ◯ Derivatives of the dorsal mesentery
  - Greater omentum
  - Mesentery of small intestine *(2 layers)*
  - Transverse mesocolon *(2 layers)*
  - Sigmoid mesocolon *(2 layers)*
  - Mesoappendix *(2 layers)*
- ◯ Derivatives of the ventral mesentery
  - Falciform ligament *(you can find the **ligamentum teres haptis** OR **round ligament of liver** along its inferior border)*
  - Lesser omentum
    - Hepatoduodenal ligament and its contents:
      - Hepatic portal vein
      - Hepatic artery
      - Common bile duct
- ◯ Greater peritoneal sac
- ◯ Lesser peritoneal sac (omental bursa)
  - Epiploic foramen of Winslow (gastroepiploic foramen)

Note: The 4 layers of the greater omentum are only found at the early stage of the embryonic stage. The layers will fuse right after formation in a way that eventually the greater omentum will have only two layers. The blood vessels, nerves and lymphatics of the greater omentum are located between these two layers. This illustration shows the conceptual overview of how the anatomy of the greater omentum comes together.



Sagittal Section of Peritoneum (blue line)

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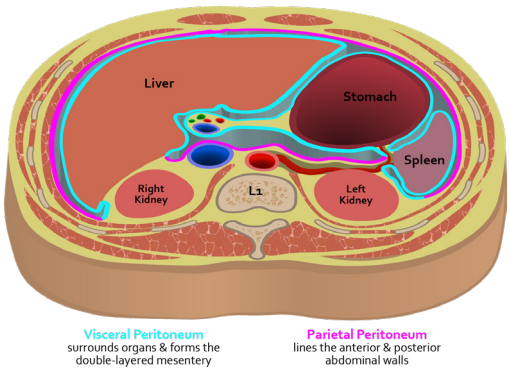

Transverse Section of Abdomen (Inferior View)

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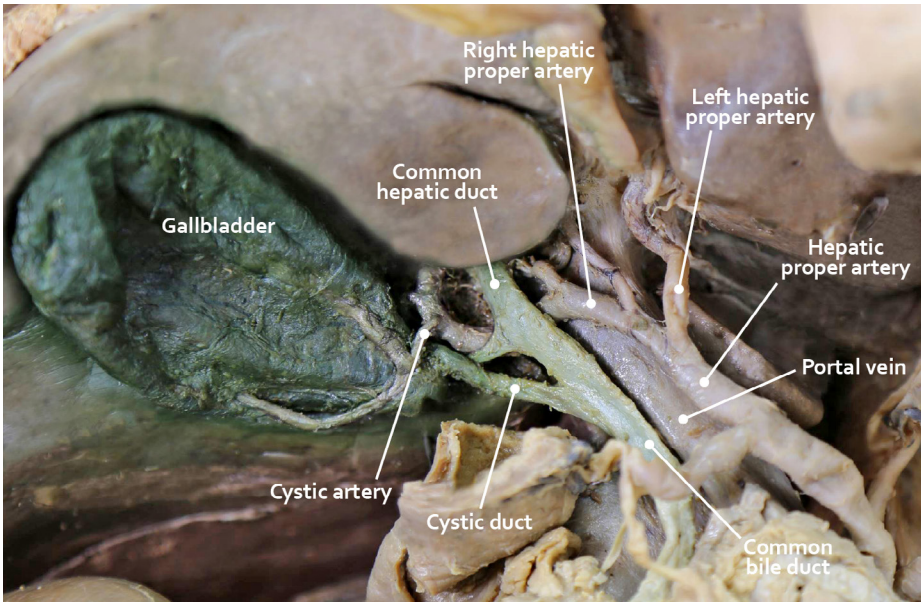

Contents of Hepatoduodenal Ligament
(B. Kathleen Alsup & Glenn M. Fox, University of Michigan Medical School, BlueLink)

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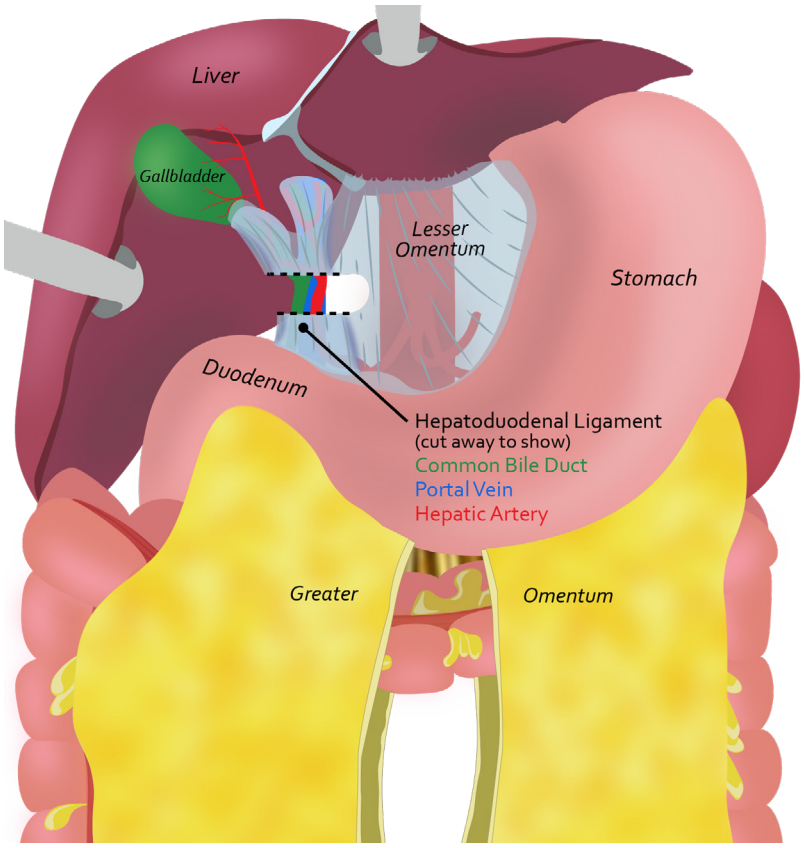

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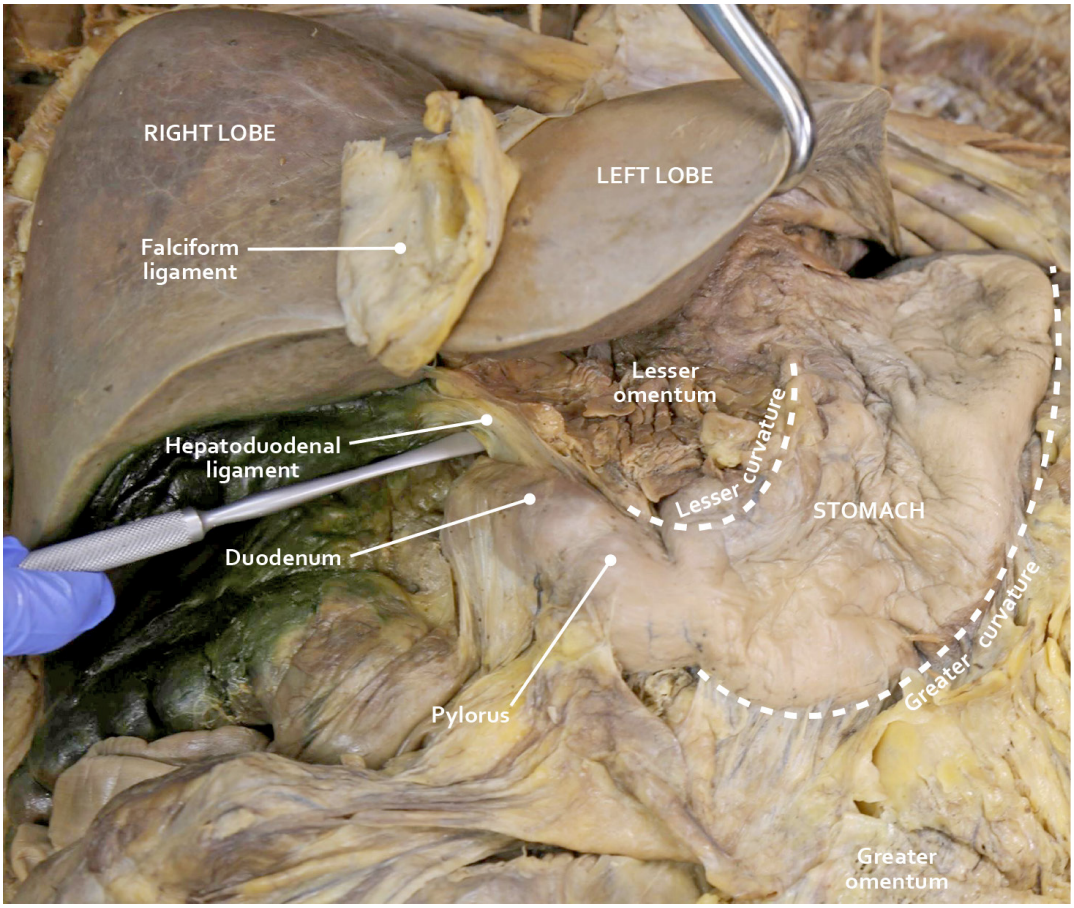
Foregut Organs



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Foregut Organs

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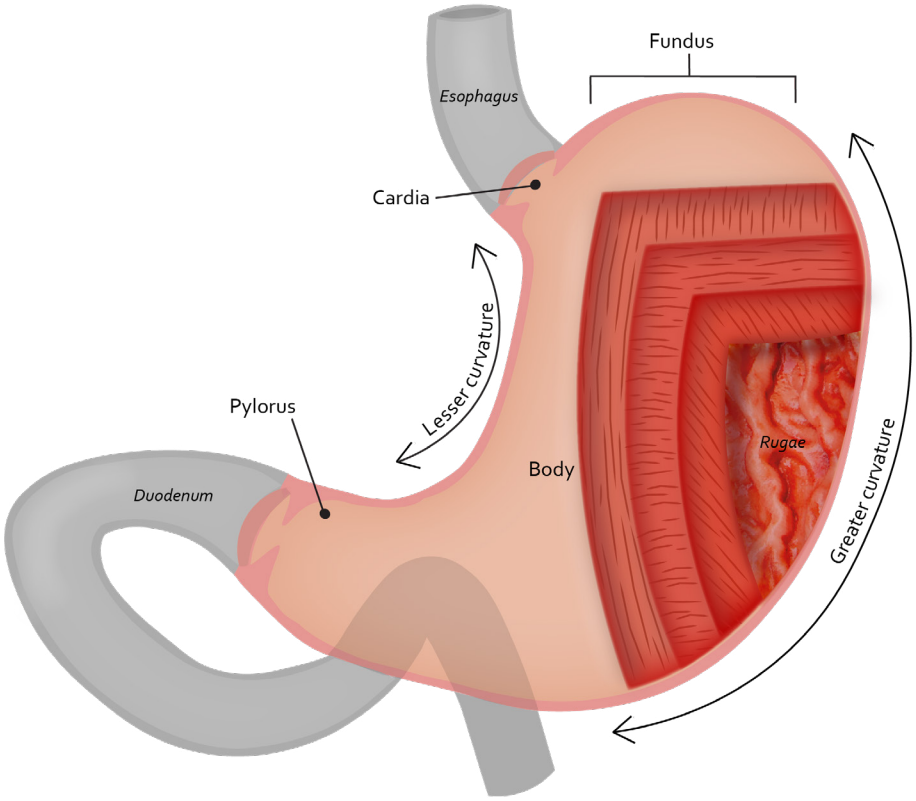

Stomach:

- Cardia
- Fundus
- Body
- Greater & lesser curvatures
- Pylorus
- Anterior & posterior surfaces

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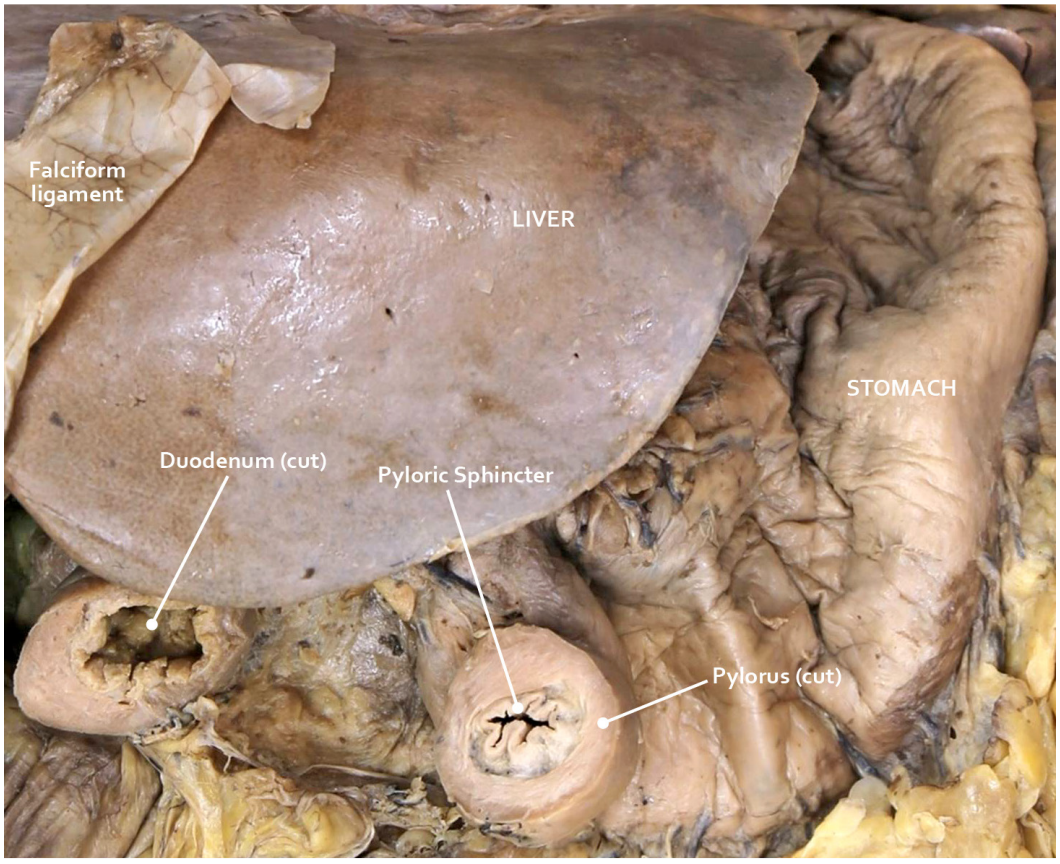
Anatomy of the Stomach



Stomach in Situ
(B. Kathleen Alsup & Glenn M. Fox, University of Michigan Medical School, BlueLink)

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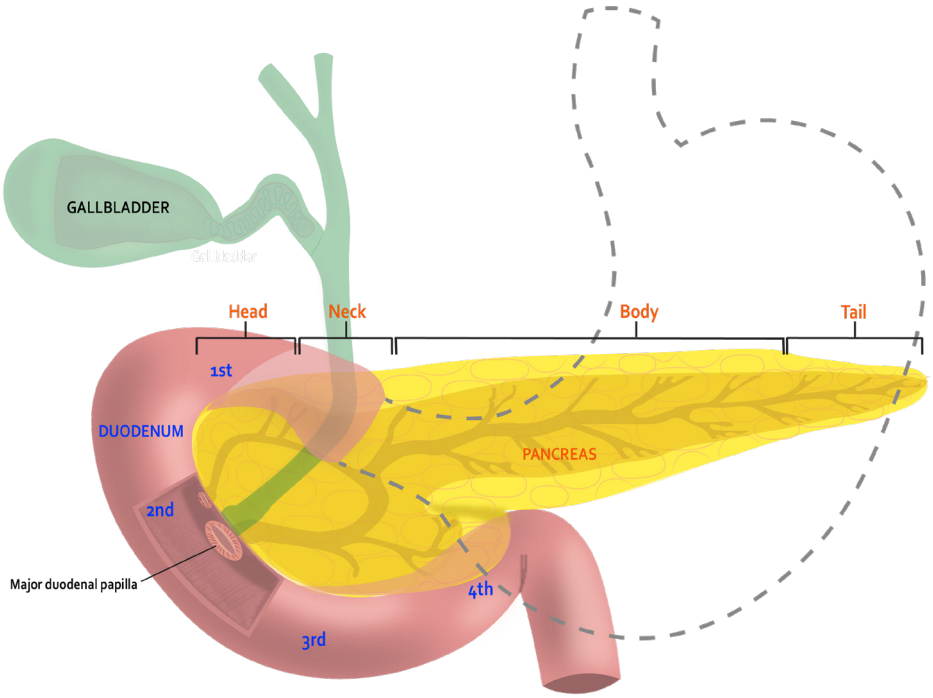
Duodenum:

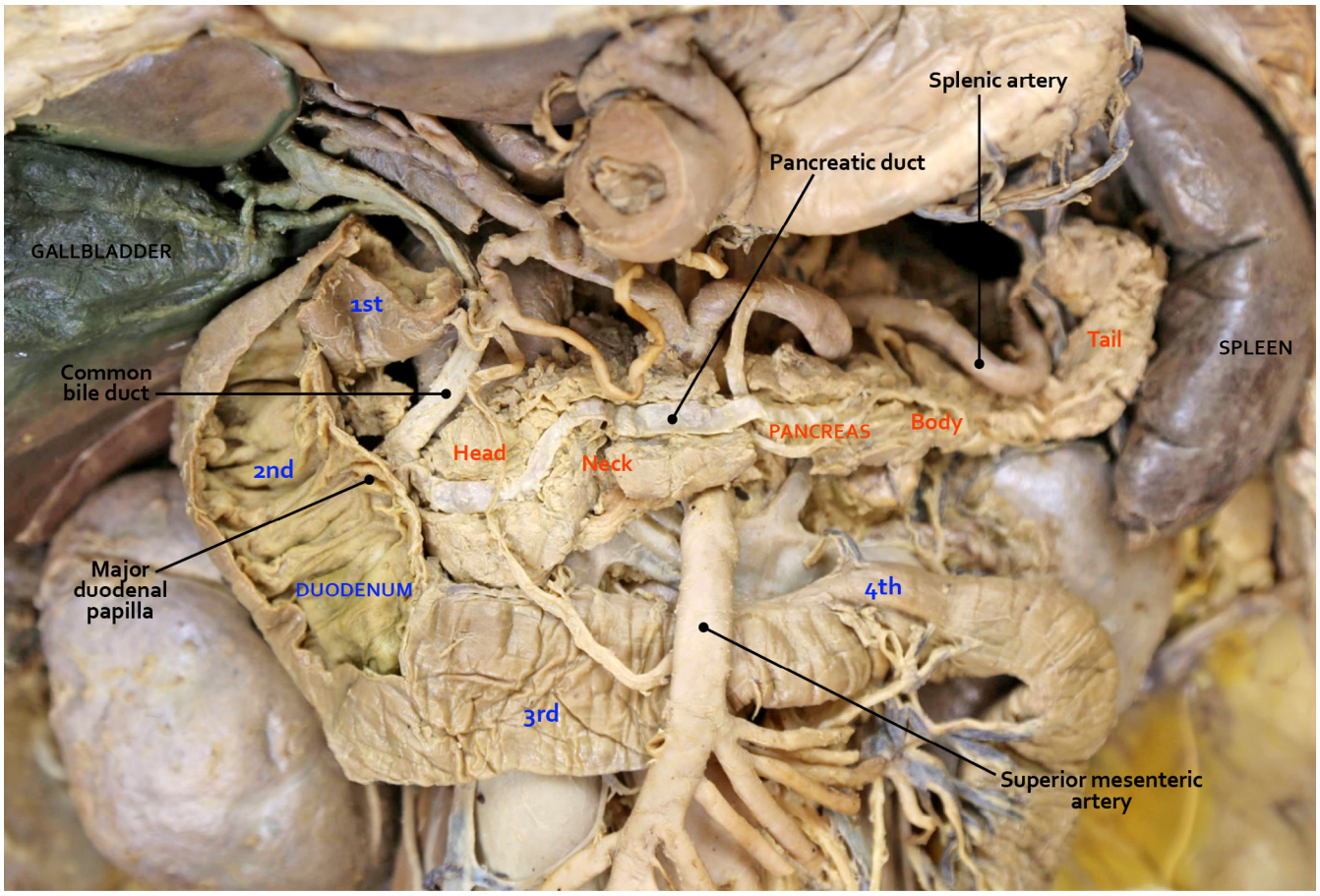
- ◯ First part
- ◯ Second part
  - Major duodenal papilla (opening of common bile duct to second part of duodenum)
- ◯ Third part
- ◯ Fourth part

Pancreas:

- ◯ Head
- ◯ Neck
- ◯ Body
- ◯ Tail

Spleen ◯





Duodenum & Pancreas
(B. Kathleen Alsup & Glenn M. Fox, University of Michigan Medical School, BlueLink)

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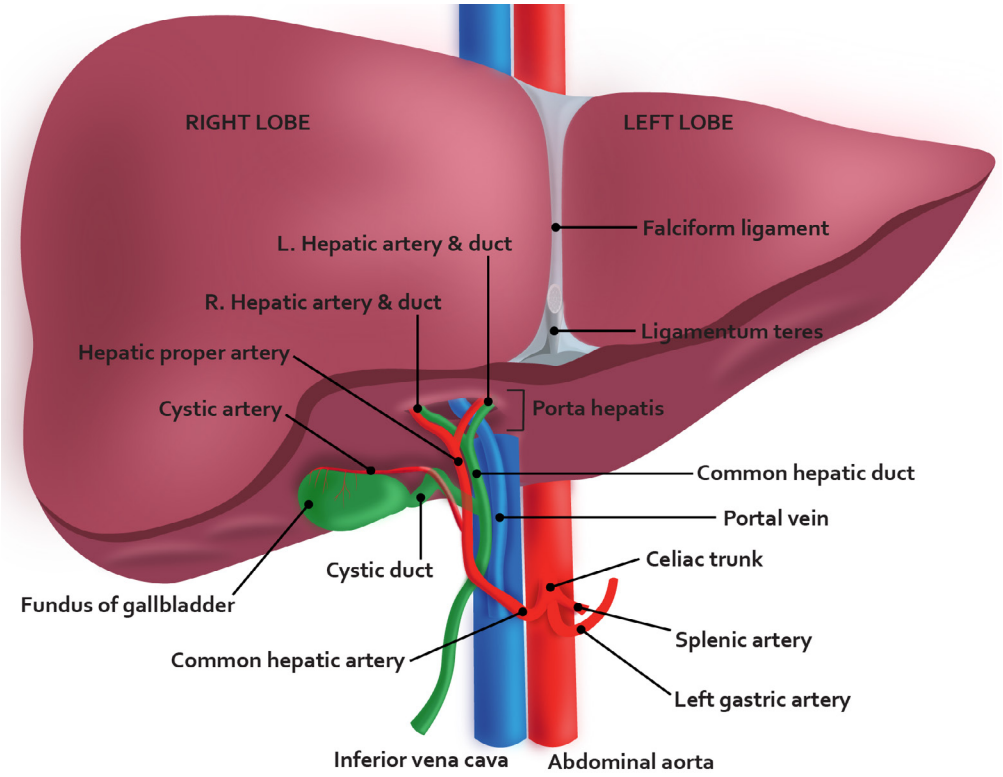
Liver:

- Left lobe
- Right lobe
  - Caudate lobe
  - Quadrate lobe
  - Hepatic veins
  - Hepatic portal vein
  - Porta hepatis

Biliary Tree:

- Right & left hepatic ducts
- Common hepatic duct
- (Common) bile duct
- Gallbladder
  - Cystic duct
  - Fundus of gallbladder



Anterior View of Liver & Biliary Tree

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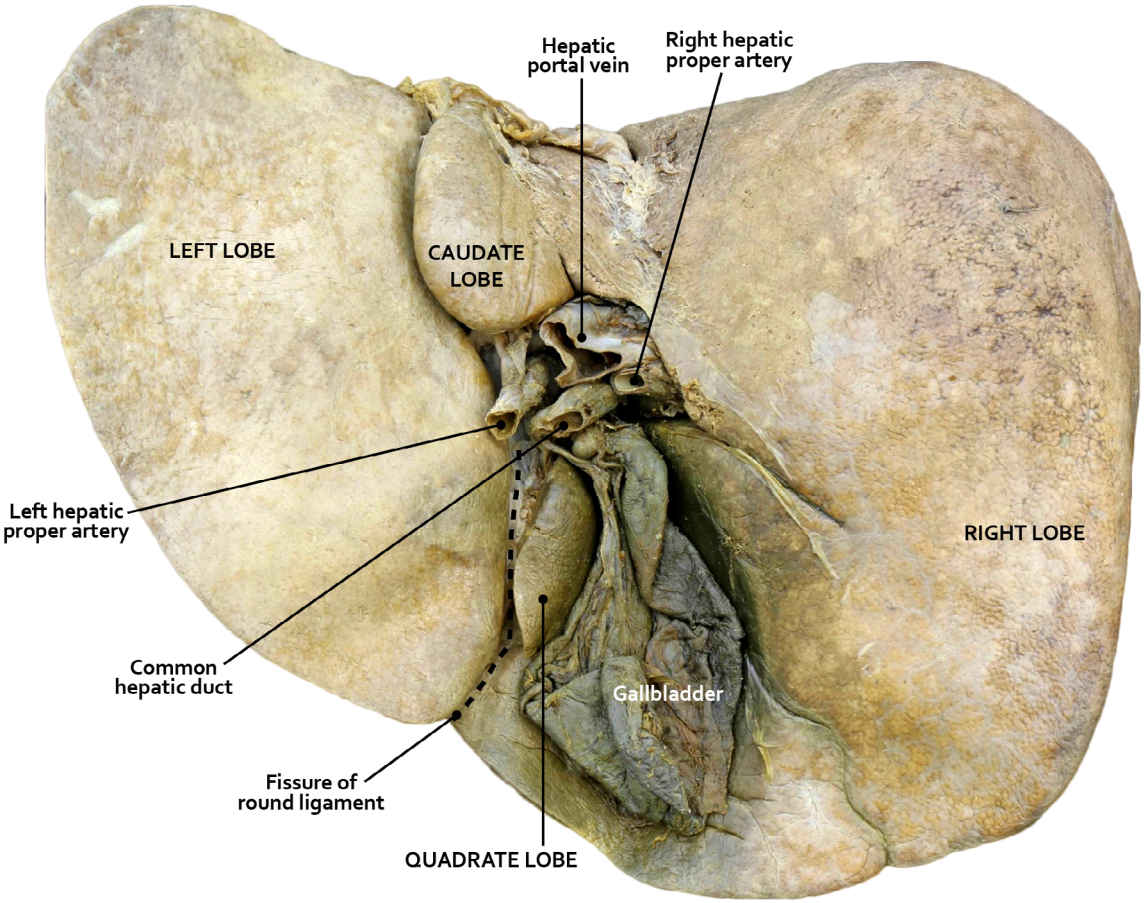

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Postero-Inferior Liver
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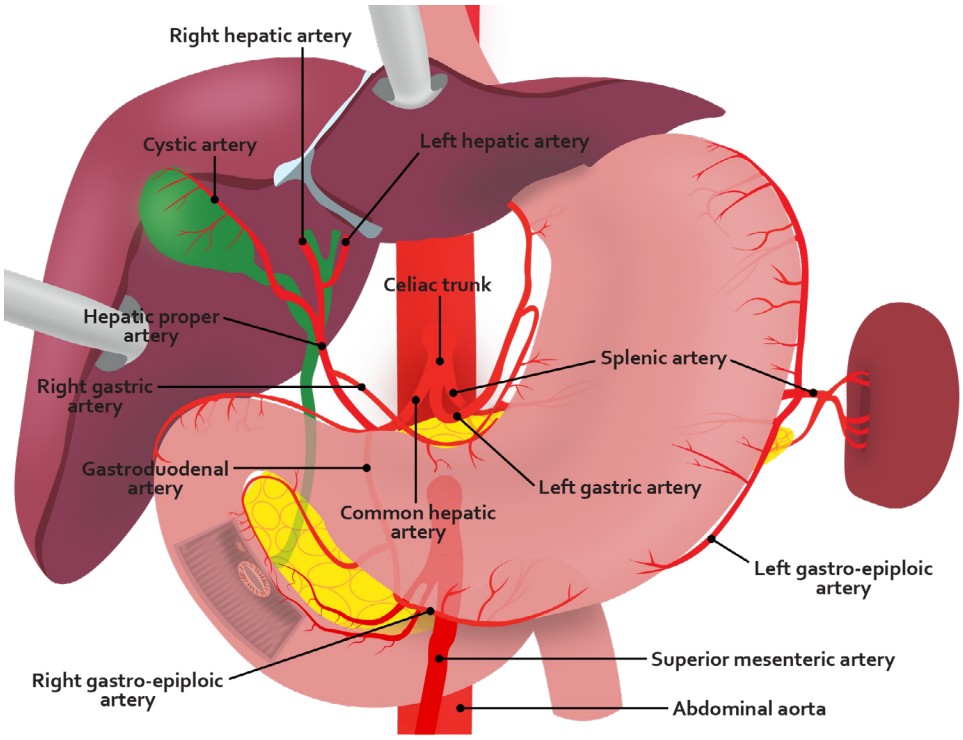
Arteries:

- Abdominal aorta
- Celiac trunk
  - Left gastric
  - Common hepatic
    - Gastroduodenal
      - Right gastroepiploic
    - Right gastric
    - Hepatic proper
      - Right hepatic
        - Cystic
      - Left hepatic
  - Splenic
    - Left gastroepiploic



Foregut Arterial Supply

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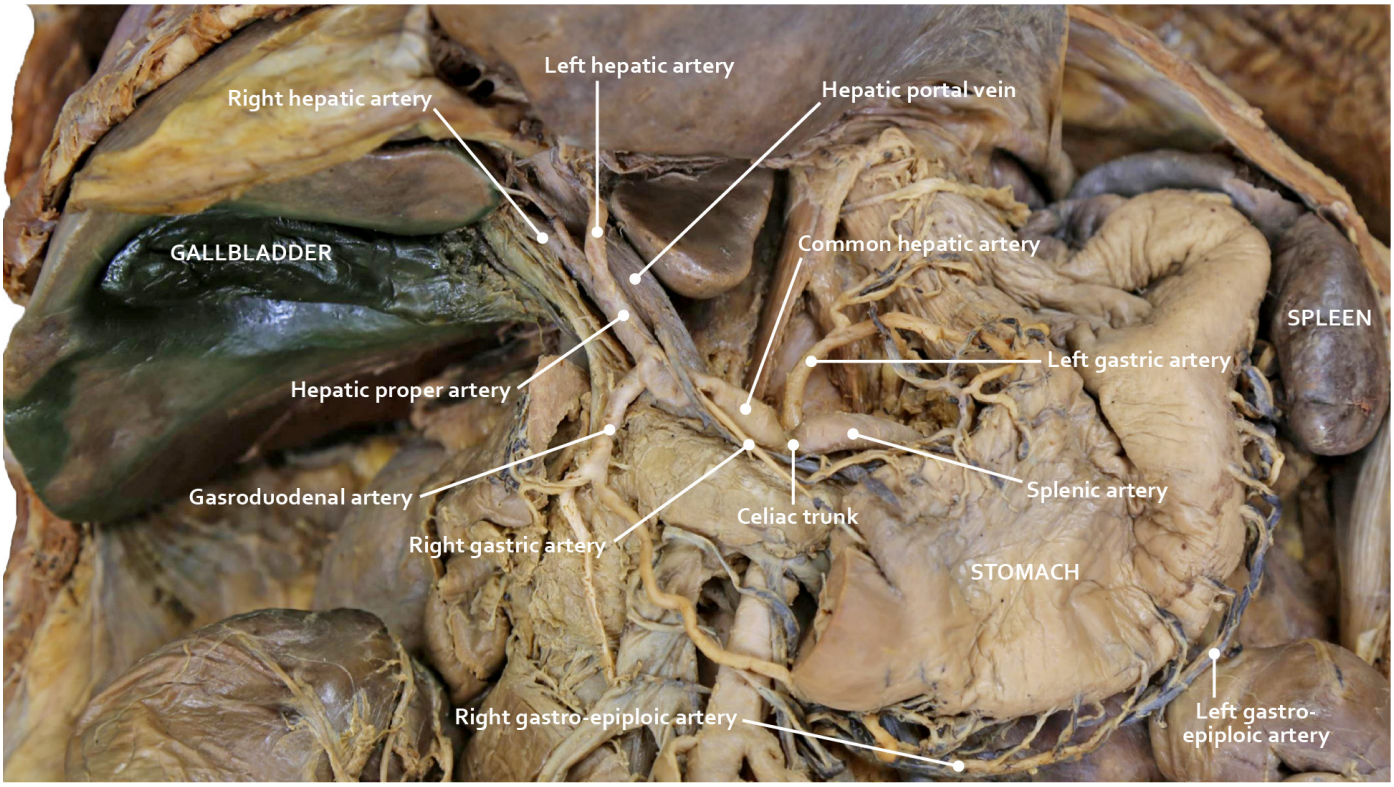

Foregut Vasculature

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Foregut Innervation:

- Celiac ganglion on either side of the celiac artery (trunk)
- **Sympathetic** nervous system: **T5-T12** (greater & lesser splanchnic nerves)
- **Parasympathetic** nervous system: **vagus nerve**
- Referred pain of the foregut organs is felt in the epigastric region

> - Distribution of postganglionic (sympathetic) or preganglionic (parasympathetic) nerve fibers is via arteries
> - **Sympathetics:** inhibitory to gut muscles
> - **Parasympathetics:** motor to gut muscles; in stomach = acid secretion

Questions for the Foregut Lab:

1) Name the ligament which is derived from the ventral mesentery and attaches the liver to the anterior abdominal wall.

2) Name the opening in the abdomen that connects the greater peritoneal sac to the lesser peritoneal sac.

3) Name the anatomical structures that are found within the hepatoduodenal ligament.

4) The bile and pancreas digestive enzymes are drained in to which part of duodenum? What is the name of the opening in the duodenum for these secretions?

5) In which region of the anterior abdominal wall is referred pain from the foregut organs felt?

RESOURCES

Websites:

Clinical Anatomy | Entrada

Recommended Textbooks:

Gray's Anatomy for Students
By: Drake, Vogl, Mitchell
Elsevier Inc. Churchill Livingstone
ISBN 978-0-7020-5131-9

** OR **

Essential Clinical Anatomy
By: Moore and Agur
Lippincott Williams & Wilkins
ISBN 0-7817-6274-X

One of the Following Atlases:

Gray's Atlas of Anatomy
By: Drake, Vogl, Tibbits, Richardson, Mitchell
Elsevier
ISBN 978-1-4557-4802-0

Atlas of Anatomy
By: Gilroy, MacPherson, Ross
Thieme
ISBN 978-1-60406-062-1

Atlas of Human Anatomy
By: Frank Netter
Icon Learning Systems
ISBN 1-929007-11-6

Before We Are Born
By: Moore and Persaud
Saunders
IBSN 978-1-4160-3705-7

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