Medical Mystery
Midgut - Overview

- **Parts:** Duodenum (distal half), jejunum, ileum, appendix, cecum, colon (2/3rds)
- **Arterial supply:** superior mesenteric artery (also celiac trunk, foregut)
  - Jejunal, ileal, middle colic, right colic, ileocolic (appendicular)
- **Venous drainage:** superior and inferior mesenteric veins to portal vein
- **Innervation:** autonomies
- **Lymphatic drainage:** organ nodes
Jejunum versus Ileum

Jejunum

Ileum

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Jejunum versus Ileum

Upper Jejunum

Upper Ileum

Lower Ileum

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## Differences Between the Jejunum and Ileum

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Jejunum</th>
<th>Ileum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caliber</td>
<td>2-4 cm</td>
<td>2-3 cm</td>
</tr>
<tr>
<td>Wall</td>
<td>Thick and heavy</td>
<td>Thin and light</td>
</tr>
<tr>
<td>Vascularity</td>
<td>Greater</td>
<td>Lesser</td>
</tr>
<tr>
<td>Arcades</td>
<td>A few large loops</td>
<td>Many short loops</td>
</tr>
<tr>
<td>Vasa recta</td>
<td>Long</td>
<td>Short</td>
</tr>
<tr>
<td>Fat in mesentery</td>
<td>Less</td>
<td>More</td>
</tr>
<tr>
<td>Circular folds (plicae circulares)</td>
<td>Large, tall, closely packed</td>
<td>Sparse, low; absent distally</td>
</tr>
<tr>
<td>Lymphoid nodules (Peyer’s patches)</td>
<td>Few</td>
<td>Many</td>
</tr>
</tbody>
</table>
Hindgut (Colored green)
Hindgut - Overview

- **Parts:** Colon (distal 1/3\(^{rd}\)), rectum, anus
- **Arterial supply:** inferior mesenteric artery (SMA, midgut)
  - Left colic, sigmoidal, superior rectal, marginal artery (of Drummond)
- **Venous drainage:** inferior and superior mesenteric veins to portal vein
- **Innervation:** autonomies
- **Lymphatic drainage:** organ nodes
Ileocecal Junction and Vermiform Appendix
GI Barium Imaging

An oblique view showing barium in the ileum and caecum filling the appendix which points rostrally.

Surface projection of the caecum and appendix.
Where’s Appendix?

Variations of Appendix position

Vermiform Appendix
Barium Study of the Colon
Rectum

- Sigmoid colon
- Rectosigmoid junction
- Middle transverse rectal fold
- Superior transverse rectal fold
- Rectum
- Levator ani
- Inferior transverse rectal fold
- Anorectal line
- Inf. part of anal canal
- Pectinate line
- Anus
Superior Mesenteric Artery

- Transverse colon
- Inferior pancreaticoduodenal artery
- Superior mesenteric artery
- Jejunum
- Jejunal arteries
- Vasa recta
- Anterior cecal artery
- Appendicular artery
- Posterior cecal artery
- Appendix
- Ileum
- Ileal arteries

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Inferior Mesenteric Artery

- Transverse colon
- Descending colon
- Ascending branch of left colic artery
- Descending branch of left colic artery
- Left colic artery
- Abdominal aorta
- Duodenum
- Inferior mesenteric artery
- Superior rectal artery
- Rectum
- Sigmoid arteries
- Sigmoid colon
Marginal Artery of Drummond

Arterial Supply of the Large Intestine
Case

- Male patient brought to the ED
- Chief complaint
  - Abdominal cramping
  - Body-wracking chills
- Symptoms
  - Dull pain in the upper right quadrant of the abdomen
  - Vomiting and diarrhea for 3-4 hours
Patient called his clueless buddy (whose wife has a poor opinion of the patient)

The clueless buddy said “Why are you calling me? I teach the thorax, not the abdomen!”

The clueless buddy had an idea...

• Send over a pulmonary physician!
• The pulmonary physician saved the day
  • Laid the patient on the patient’s lab bench (really!)
  • Performed a physical exam of the abdomen (with a disclaimer)
    • Landmarks checked?
    • Located McBurney’s point, pushed hard and ran
    • Patient’s response?
• White 49-year-old male walked into the ED at 3 PM

• 8 physicians and surgeons, and 3 third-year medical students, sequentially pushed McBurney’s point on the patient over the next 7 hours

• With each physical exam, would sensitivity to pushing change? Why?

• What change would you expect in peripheral white blood cell (WBC) count?
• At 9:45 PM, the ED nurse who checked-in the patient at 3 PM visited the patient before her shift ended at 10 PM

• “You don’t look very comfortable. When did you last receive pain medication?”

• “When I had a vasectomy, in 1989!”
• The Chief of Trauma Surgery drew the unlucky straw to take-on the patient
• The surgeon wanted to perform an open-abdomen approach but the recovery period is a couple of weeks
• The patient wanted to return to running in 4 days…
• Stalemate
A compromise is reached

Laparoscopic surgery will allow return to running in 4 days

Laparoscopy will be performed, ... provided that consent is obtained to perform an upper GI barium study to rule out gallbladder disease (do you recall why?)

What consent means is the patient will drink 1.5 liters of barium!
Laparoscopy

- Laparo: G, flank, loins; improperly, the abdomen in general
- skopeō: G, to view
• At nearly 11 PM, the surgeon was tired (what about the patient?)

• The surgeon abducted the patient and personally drove the gurney (a separate story) to Radiology for spiral CT, with contrast

• The patient requested high-resolution (512 x 512 pixels), serial thin-section (0.5 cm slice thickness) imaging (for holograms)

• The radiology technician complied!
• CT (barium and iodine) revealed normal biliary and vascular anatomy, respectively
• Laparoscopy was acceptable to all
• The surgeon again drove the gurney (yet another story), this time to the Operating Room

• The patient, however, refused entry through the operating room door, by grabbing the door and holding on, until he signed his IRB protocol for surplus tissue

• The surgeon mumbled something before abandoning the patient

• The patient has no recollection after that time
• The patient awoke from anesthesia at about midnight, with a stupid smile on his face, according to his wife (who has worse adjectives to describe him than his clueless buddy’s wife)

• The patient is awakened hourly (1 AM, 2 AM, 3 AM, 4 AM, 5 AM) to monitor vital signs – excellent sleep-deprivation experiment!
• When awakened the sixth time, at 6 AM (another story), the patient was really awake so he walked the hospital for an hour and a half
• The nurse responsible for the patient chased him down in a different unit in the hospital and said “You are so out of here! Go home!”
• There was a slight problem, however
The patient’s wife, clueless buddy, and others took every belonging from the patient, everything!

The patient called his wife at 8 AM to ask for forgiveness and a ride home.

His wife showed up at 10 AM.

The timing was close because the patient was scheduled to speak at the annual Body Donor Memorial Service, at 11 AM, which he did.
• Later that day, the patient returned to work to collect his appendix from Pathology and carry it to his laboratory.

• The patient ran on day 4 after surgery.
The end