FOUR layers of generalized GI tract (p 885)
- **serosa**: serous membrane, [if lacking serosa, adventitia present]
  1. **muscularis externa**: circular and longitudinal muscle, myenteric plexus controls peristalsis
  2. (stimulated by parasympathetic, inhibited by sympathetic)
  3. **submucosa**: large blood vessels, lymphatics, some exocrine glands
  4. **mucosa**: mucous membrane, lamina propria, simple columnar epithelium (can contain mucous glands (duodenum only), lymph nodes (ileum only))

mesenteries: sandwich of peritoneum. folds of mesentery: lesser and greater omentum

**SMALL INTESTINE**: 3-5 m long. (p 905) Draw diagram of proximal digestion, distal absorption.
- lacteal lymphatic vessels drain lymph from villi, contain chylomicrons (juice, little, unit).
- microvilli (brush border) line, yield surface area of tennis court for small intestine. (pp 115-116)

**Duodenum**: (2 + 10) curves around head of pancreas, acid neutralized here, mix in digestive enz.
- Brunner’s glands: submucosal mucous glands, rich in HCO₃⁻, diagnostic of duodenum.
- ampulla of Vater (combined bile and pancreatic ducts) empties through the duodenal papilla, controlled: sphincter of Oddi, retroperitoneal

**Jejunum**: (empty) suspended by mesentery, 1.5 m long, digestion and absorption occur

**Ileum** (means twisted) last 2 m, primarily absorption
- ileocecal valve, flap
- plicae circulares: [folds, circular shelf-like folds carrying intestinal villi]
- Peyer’s Patches: lymphatic tissue embedded in wall, diagnostic of ileum

**PhySOLOGY OF DIGESTION**: page 923:

<table>
<thead>
<tr>
<th>food stuff</th>
<th>first site</th>
<th>agents</th>
<th>products</th>
</tr>
</thead>
<tbody>
<tr>
<td>carbohydrate</td>
<td>mouth</td>
<td>amylase</td>
<td>maltose</td>
</tr>
<tr>
<td>protein</td>
<td>stomach</td>
<td>pepsin &amp; HCl</td>
<td>peptides</td>
</tr>
<tr>
<td>fats</td>
<td>duodenum</td>
<td>lipase &amp; bile salts</td>
<td>fatty acids &amp; glycerol</td>
</tr>
</tbody>
</table>

**colon**: (p 918) functions to resorb water.
- Entrance through ileocecal valve (no villi or plica circulares)
- taenia coli (ribbon) longitudinal smooth muscle is in **three strips**
- haustra (draw up) tania draw up wall to form pockets

**portions**: cecum blind end, vermiform appendix attached
- ascending colon hepatic flexure (gas pains here and in splenic flexure)
- transverse colon splenic flexure
- descending colon
- sigmoid colon
- rectum lined with stratified squamous
- anus double sphincters, inside smooth, outside skeletal muscle

“Need to go?” Inner sphincter dilates. Can recontract, urge subsides

**Hormonal regulation**: (p. 915-916)

<table>
<thead>
<tr>
<th>hormone</th>
<th>site</th>
<th>effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>gastrin</td>
<td>distention of stomach, vagus</td>
<td>stomach wall</td>
</tr>
<tr>
<td>secretin</td>
<td>acid in duodenum</td>
<td>duodenum</td>
</tr>
<tr>
<td>cholecystokinin</td>
<td>fatty acids in duodenum</td>
<td>duodenum</td>
</tr>
</tbody>
</table>