Functions of the Digestive System

1. Digestion (mechanical & chemical)
2. Motility
3. Secretion
4. Absorption
5. Excretion
Structure of the Gastrointestinal (GI) Tract

Mouth

Explain the structure of the mouth and its components, including the teeth, gums, and oral cavity.
Mouth

• Mechanical & chemical digestion occur here
Stomach

- J-shaped organ
- Storage
- Digestion
- Production of chyme

Gastric Glands

In addition to regulation of blood glucose, the pancreas also has a role in digestion through the secretion of 4 classes of digestive enzymes:

1. amylase
2. proteolytic
3. lipase
4. nucleases
**Liver & Gall bladder**

Liver produces bile

Gall bladder stores bile

Bile – mixture of ions, cholesterol, bile pigments, bile salts, and water

**Fat emulsification**

- Bile salts become incorporated into fat droplets, and in combination with intestinal motility break down the fat droplet into smaller droplets.

**TABLE 15.3: Review of Accessory Structures of the Digestive System**

<table>
<thead>
<tr>
<th>Structure</th>
<th>Secretions/Functions</th>
<th>Site of Action of Chemical Secretions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salivary glands (sublingual, submandibular, parotid)</td>
<td>Secrete saliva, a liquid that moistens food and contains an enzyme (amylase) for digesting carbohydrates</td>
<td>Mouth</td>
</tr>
<tr>
<td>Pancreas</td>
<td>Digestive secretions include bicarbonate ions that neutralize acidic chyme and enzymes that digest carbohydrates, proteins, fats, and nucleic acids</td>
<td>Small intestine</td>
</tr>
<tr>
<td>Liver</td>
<td>Digestive function is to produce bile, a liquid that emulsifies fats, making chemical digestion easier and facilitating absorption</td>
<td>Small intestine</td>
</tr>
<tr>
<td>Gallbladder</td>
<td>Stores bile and releases it into small intestine</td>
<td>Small intestine</td>
</tr>
</tbody>
</table>
Small Intestine

- duodenum: receives chyme from stomach and secretions from pancreas and liver
- jejunum: region of most digestion and nutrient absorption
- ileum: absorption continues

Carbohydrate digestion & absorption

(a) Carbohydrate digestion
- Polysaccharide
- Disaccharide
- Monosaccharide
- Glucose
- Fructose
- To liver
Protein digestion & absorption

Fat digestion & absorption
Table 15.4 Examples of Neural Controls on Digestive Activity

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sight of food, thought of food, presence of food in mouth</td>
<td>Release of saliva from salivary glands</td>
</tr>
<tr>
<td>Chewing food</td>
<td>Release of gastric juice (enzymes from stomach and ICD) and mucus from cells of stomach lining</td>
</tr>
<tr>
<td>Presence of acidic chyme in small intestine</td>
<td>Release of enzymes from small intestine; release of bile from gallbladder into small intestine; increased motility in small intestine</td>
</tr>
</tbody>
</table>

Table 15.5 Examples of Hormonal Control on Digestive Activity

<table>
<thead>
<tr>
<th>Stimulus</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glade</td>
<td>Increase of stomach for food presence of gastric hormone presence</td>
</tr>
<tr>
<td>Intestinal phase</td>
<td>Presence of acidic chyme in small intestine; release of enzymes from small intestine; release of bile from gallbladder into small intestine; increased motility in small intestine</td>
</tr>
<tr>
<td>Bowel</td>
<td>Release of enzymes from small intestine; release of bile from gallbladder into small intestine; increased motility in small intestine</td>
</tr>
</tbody>
</table>