Transport of Substances Around the Body

Circulatory Systems

Vascular system:
- Heart
- Arteries (red)
- Capillaries
- Veins (blue)

The Circulatory System
Circulatory Systems

Vascular system:
- Portal vein
- Hepatic vein

Circulatory Systems

Lymphatic system:
- Lymph
- Thoracic duct

Circulatory System Details

Key:
- Arteries
- Capillaries
- Veins
- Lymph vessels

Fig. 3-11, p. 84
Passage of Nutrients into Cells

Simple Diffusion

Facilitated Diffusion
Active Transport

Regulation of the Digestive Processes

Regulation

Hormones:
- Gastrin
- Secretin
- Cholecystokinin (CCK)
- Gastric-inhibitory peptide (GIP)
**How does the stomach maintain a pH between 1.5 and 1.7?**

Entrance of food into the stomach stimulates the production of gastrin.

Gastrin stimulates production of HCl.

HCl lowers the pH of stomach contents.

pH of 1.5 shuts down the production of gastrin.

**How does the pylorus know when to close?**

The pylorus relaxes; a small amount of chyme passes through.

The pylorus closes when in contact with acid.

Bicarbonate is released from the pancreas to neutralize the acid.

The pylorus relaxes.

**How does the pancreas know how much bicarbonate to make?**

Chyme in the intestine stimulates production of secretin.

*Secretin* stimulates the pancreas to produce bicarbonate.

The presence of bicarbonate in the intestine shuts down secretin production.
How does the gallbladder know when to squirt bile into GI tract?

Fat in the intestine stimulates production of cholecystokinin. This causes contraction of the gallbladder. The gallbladder releases bile into the intestine, emulsifying fat. Emulsification of fat shuts down the hormone production.

How does the Intestine Know When to Slow Down for Fat Digestion?

Gastric inhibitory peptide inhibits gastric secretions. Cholecystokinin and gastric-inhibitory peptide slow down GI tract motility. Slowing down the process of digestion allows the reactions of fat digestion to go to completion.