• Turn in Long-term Behavior Change pt. 1
• Supplement & Ch. 5: Digestive System
• Intro to Nutrition
Digestive System
(Gastrointestinal Tract)
Basic Path of Food

- Mouth
- Pharynx
- Esophagus
- Stomach
- Small intestine
- Large intestine (a.k.a. colon)
- Rectum
- Anus
Digestion begins in the mouth

- Mechanical and chemical digestion
- Break-down of starch begins here
- Tongue shapes food into a bolus
Swallowing is complicated!

- Pharynx opens to esophagus AND trachea
- Trachea moves up so epiglottis blocks opening
Peristalsis moves food down the esophagus to the stomach.
Functions of the stomach

- Mix and store food
- Produce secretions that further break down food (gastric juice)
- Control passage of food to small intestine
• In stomach, bolus converted to chyme
• Digestion of proteins begins here
• Peristalsis moves chyme into the small intestine a little bit at a time
• 2-6 hours to empty a full stomach
H. pylori can cause an ulcer

*Helicobacter pylori*

Peptic ulcer caused by *Helicobacter pylori*
Small Intestine

- Primary site for nutrient absorption
- Inner lining VERY folded – lots of surface area
One fold of small intestine

A single villus

Villi
Artery
Vein
Microvilli
Capillaries
Cross-section of small intestine showing numerous villi which increase surface area for absorption
Accessory organs: the pancreas

Two types of secretions:

• Exocrine: digestive enzymes, secreted into small intestine

• Endocrine: hormones, released into blood stream (help regulate blood sugar)
Liver and gallbladder work together

- Liver secretes bile (used to break up fats in the chyme)
- Gallbladder stores bile and releases it to small intestine as needed
• If liver doesn’t break down all the cholesterol in bile, gallstones can develop
• Luckily, we can live without a gallbladder!
It’s a crappy job, but your large intestine has to do it…

• Water reabsorbed into blood stream
• Undigested, unabsorbed matter + bacteria = feces
The digestive system works with other organ systems to promote homeostasis.
Personal Nutrition

Essential Nutrients: Required but cannot be made by the body

- Water
- Proteins
- Carbs
- Fats
- Vitamins
- Minerals
Water

- >70% of blood, brain, & muscles
- Carries nutrients
- Regulates body temperature
- Lubricates joints
- Aids digestion
- Rids body of wastes

“Clear pee is happy pee”
Protein

- Framework for muscles, bones, blood, hair
- Complete Protein: Gives us all 9 Essential Amino Acids (EAA)
- Incomplete Protein: Missing at least one EAA
Carbohydrates

- Fuel!
- Simple carbs (sugar)
  - Small, easy to digest
- Complex carbs (grains, veggies)
  - Larger, more nutritious
- Fiber
  - Nondigestable
Sugar: How much is ok? Is too much dangerous?

- Recommended: No more than 6 tsp (~25g) for women, 9 tsp (~40g) for men
- Eating sugar releases dopamine (= sugar high, then crash!)
- Ups and downs can affect body’s ability to metabolize sugar (= diseases like diabetes)
- Evidence suggests sugar may be addictive!
- How much sugar does your food have?
Fats

- Carry soluble vitamins
- Protect organs
- Regulate body temperature
- Make up cell membranes and insulate neurons
Forms of Fat

• Saturated
  - Solid at room temp
  - ↑Heart disease risk

• Unsaturated
  - Liquid at room temp
  - ↑Cardiovascular health

• Hydrogenated & Trans Fats
  - Unsaturated fats that have been hydrogenated
  - REALLY BAD!!
Vitamins

- Organic substances
- Used to regulate growth, manufacture blood cells & hormones and much more
- Fat soluble: A, D, E, K
- All others are water soluble
Antioxidants

• Phytochemicals that remove oxygen free-radicals

• Ex: Vitamins E, C, and beta carotene

• Lowered cancer risk
Minerals

• Inorganic substances
• Help build bones & teeth, aid metabolism
Salt: How much is ok? Is too much dangerous?

- Recommended: American Heart Assn says no more than 1,500 mg/day
- Avg. American adult consumes 3,400 mg
- Applebee’s Appetizer Sampler Platter has 11,650 mg
- Increases risk of hypertension, reduces cognitive function
Trace Minerals: Minute, but crucial!

- Goiter caused by lack of iodine
Should you take vitamin & mineral supplements?

• Getting nutrients from food is better!
• Fat soluble vitamins and insoluble minerals can build up & become toxic
• Certain groups may need supplements