WHERE DOES OUR ENERGY COME FROM?

Energy

Energy

Energy from the sun makes plants grow

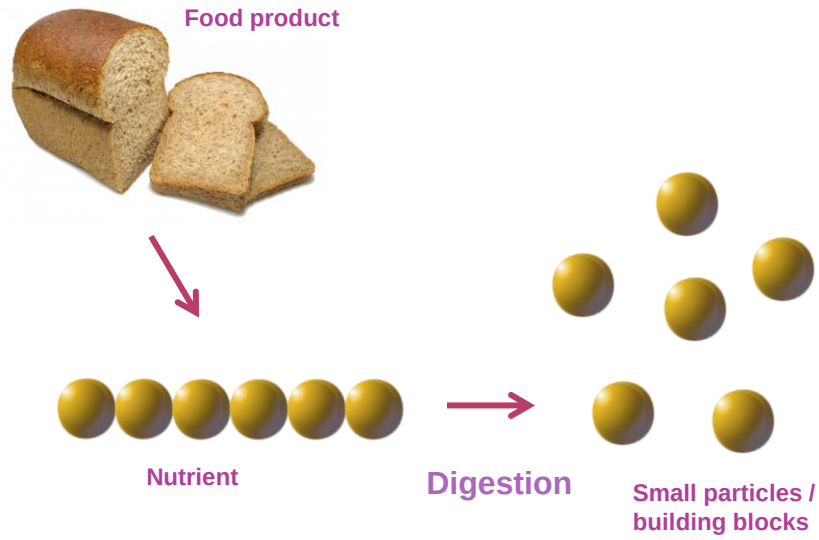
Our energy comes from plants and animals

FOOD & NUTRIENTS

Food / food product is what you eat

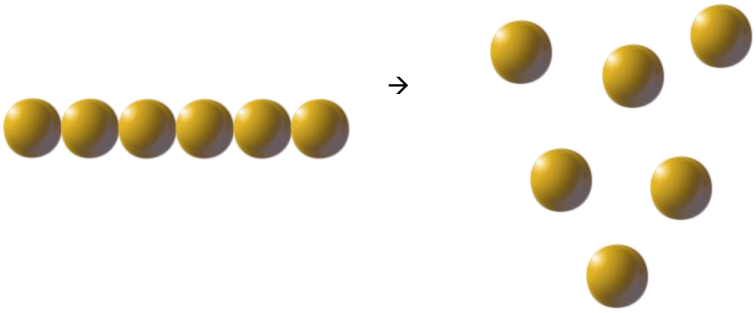
Nutrients are the *chemicals* inside

- Substances or building blocks



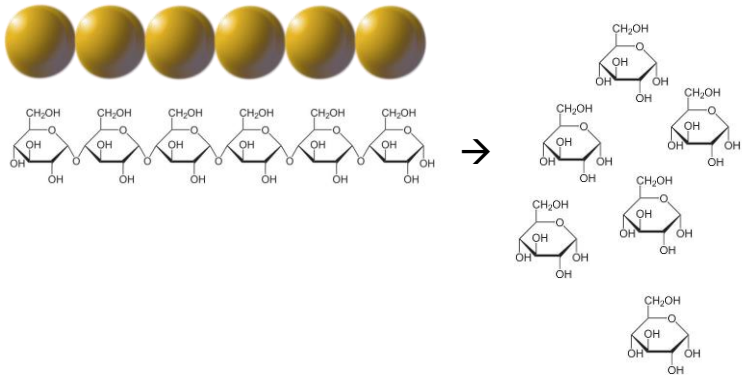
DIGESTION

- Breaking down nutrients into small particles that can be taken up into the bloodstream



EXAMPLE: STARCH

- Starch consist of a long chain of glucose particles



7 NUTRIENT GROUPS

1. Carbohydrates
2. Fats
3. Vitamins
4. Proteins
5. Minerals
6. Fibre
7. Water

3 need to be digested
3 don't need to be digested
1 can't be digested

WHY DO WE NEED NUTRIENTS?

- Energy (respiration)
- To make new cells
- To stay healthy

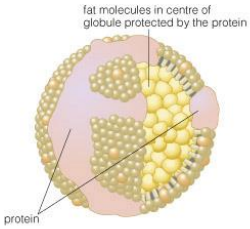
$C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O$ + energy

Glucose

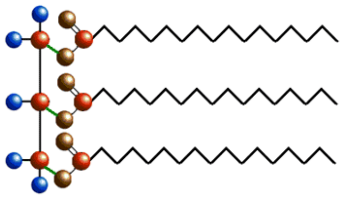
1. CARBOHYDRATES

- Monosaccharides: Glucose
- Disaccharides: Maltose, lactose
- Polysaccharides:
  - Made by plants: **Starch**
  - Made by animals and by us **Glycogen**
  - Cell walls of plants **Cellulose**
    (a spiraling chain, hard to break down)

2. FATS



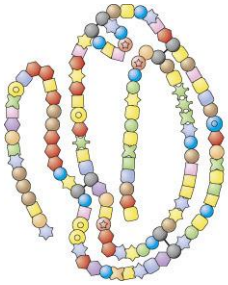
- Do not dissolve in water
- Fats are combined with proteins
- Twice as much energy as carbohydrates



Glycerol 3 Fatty acids

3. PROTEINS

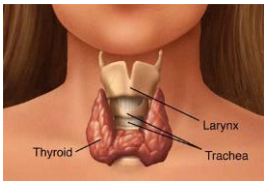
- Made up from chains of amino acids
- Most amino acids are made by our cells
- Essential amino acids cannot be made by our bodies



4. MINERAL SALTS

- Soluble
- Only small amounts

- Calcium: structure of bones, teeth
- Iron: red blood cells (hemoglobin
- Iodine: hormones made by our thyroid gland



5. VITAMINS

- The majority cannot be made by our body

- Without enough of each vitamin, deficiency diseases occur

- For example:

Vitamin A → Night-blindness

Vitamin C → Scurvy

6. WATER

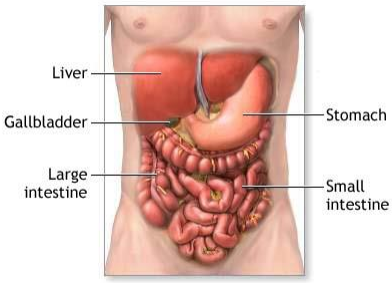
- 70% of our body mass

- Functions:
  - Dissolve other substances
  - Transportation
  - Substrate for reactions
  - Cool the body

7. FIBRE (CARBOHYDRATE)

Not digestable

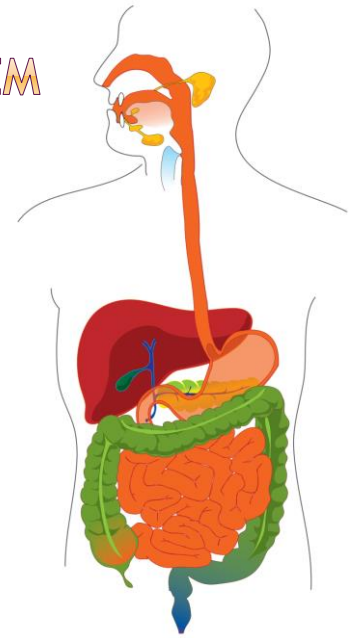
- Helps the movement along the canal
- Encourages bacteria to grow (large intestine)



Textbook 3.3 + 3.4

BREAK IT DOWN!
&
ORGANIZING DIGESTION

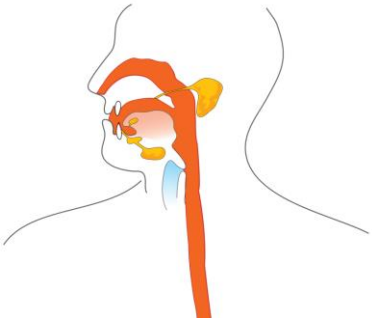
THE DIGESTIVE SYSTEM



- Food is ingested
- Digestion:
  Enzymes break down the food
- Egestion / elimination

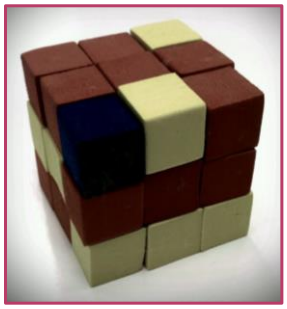
THE MOUTH AND INGESTION

- Saliva
- Mechanical digestion
- Chemical digestion



MECHANICAL DIGESTION

Increasing the surface area



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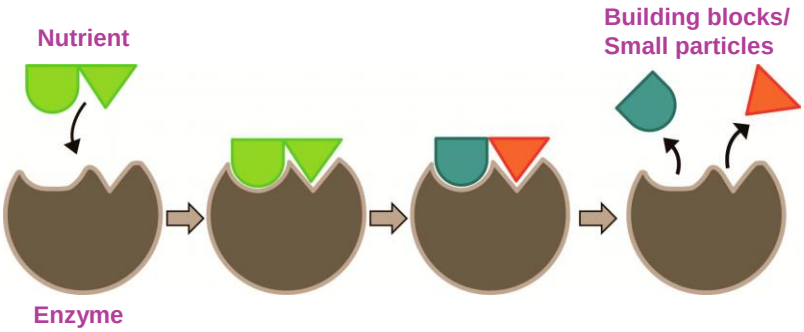
MECHANICAL DIGESTION

Increasing the surface area

ENZYMES: CHEMICAL DIGESTION

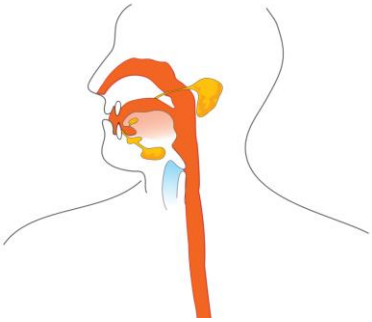
- Protein
- Specific shape



THE MOUTH AND INGESTION

- Saliva
  - Mucus
  - Enzyme: amylase
    - Starch → Sugar

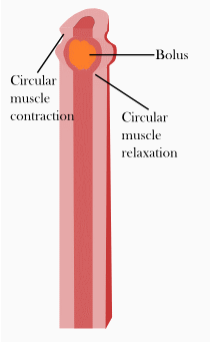
- Mechanical digestion
- Chemical digestion



PERISTALSIS

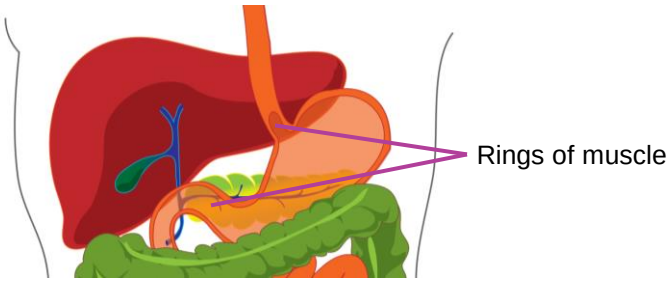
- The food travels down

- A wave of circular muscle contraction



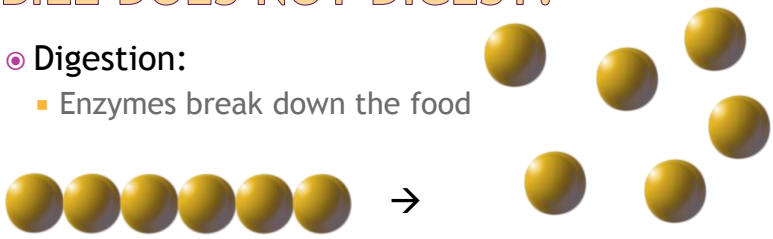
DIGESTION IN THE STOMACH

- Stomach: gastric juice
  - Acidic: gastric acid
  - Enzymes: protein

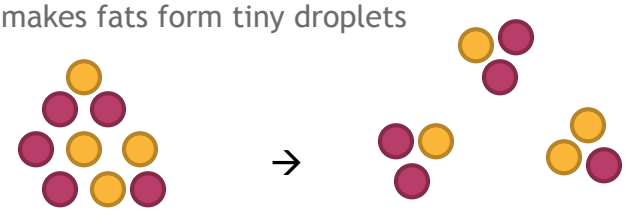


BILE DOES NOT DIGEST!

- Digestion:
  - Enzymes break down the food



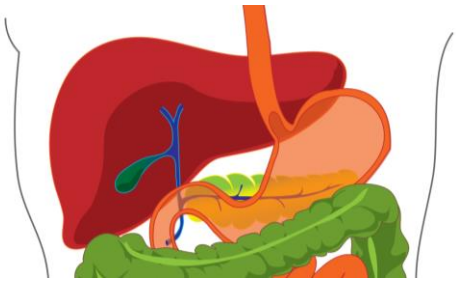
- Emulsification:
  - Bile makes fats form tiny droplets



DIGESTION IN THE DUODENUM (1)

- Liver: Produces bile
  (stored in gall bladder)

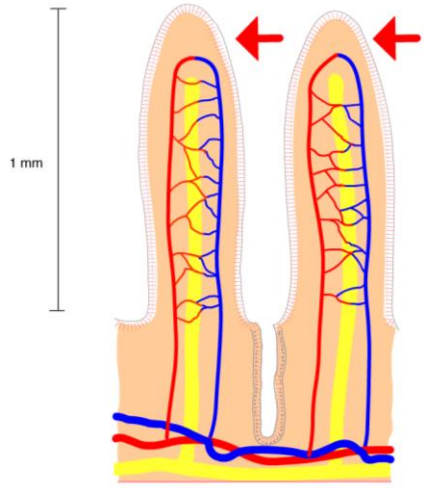
- Pancreas: pancreatic juice
  - Alkaline
  - Enzymes: Protein, fat and carbohydrates



ABSORPTION IN THE SMALL INTESTINE

- Massive surface area
  - Folded
  - Villi

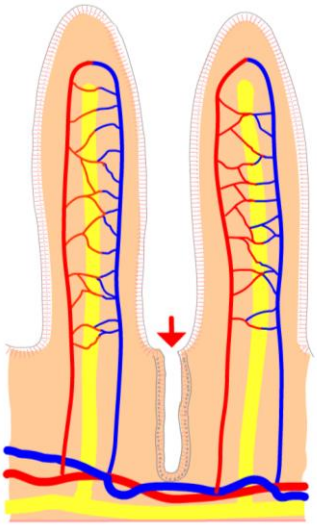
- Absorption of nutrients



DIGESTION IN THE SMALL INTESTINE

- Intestinal fluid
- Glands in the wall

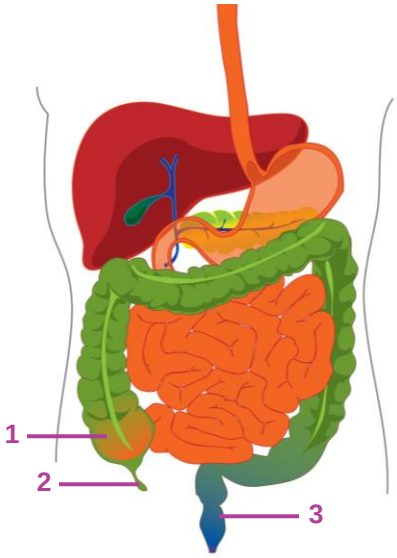
- Digestion of proteins and carbohydrates



LARGE INTESTINE (COLON)

- Absorption of water

  - Cecum
  - Appendix
  - Rectum



- Good bacteria
  - Digestion of cellulose → some vitamins (K and B)

DIGESTIVE SYSTEM