

Food components

Rabin Gyawali

North Carolina A&T State University

Jan 10, 2012

Introduction

- Elements or compounds essential for human growth
- Water, carbohydrate, protein, lipids, vitamins and minerals
- Each type of nutrient has a specific purpose and meets a specific need

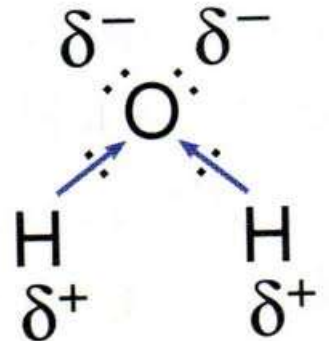
Water

- Essential nutrient (60%)
- Transport nutrients & waste product, help in chemical reaction
- Recommended : 2-3 liters (2000 kcalories)

Role of water

Food preservation and shelf life of food

- Water activity (less bacteria if A_w is less than 0.85)
- Freezing and drying
- Sugar and salt as preservatives



Carbohydrate

- Source of energy
- Compounds composed of carbon, hydrogen, & oxygen
- Types: simple (sugars) and complex (starches and fibers) carbohydrates

Carbohydrates

1. Simple carbohydrates
 - Monosaccharide's- single sugar
 - Disaccharides- composed of pairs of monosaccharides
2. Complex carbohydrates
 - polysaccharides- chains of monosachharides

Simple carbohydrates

Monosaccharides

- Glucose
- Fructose
- Galactose

Disaccharides

- Maltose (glucose+glucose)
- Sucrose (glucose+fructose)
- Lactose (glucose + galactose)

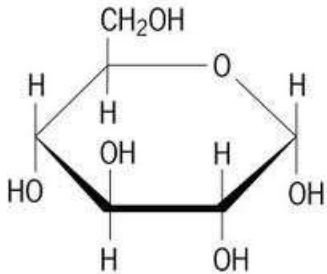
Simple carbohydrates

Simple carbohydrates are found in foods such as fruits, milk, and vegetables

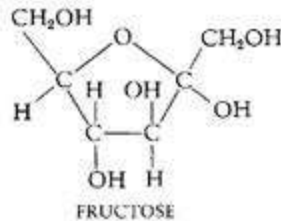
Cake, candy, and other refined sugar products are simple sugars which also provide energy but lack vitamins, minerals, and fiber



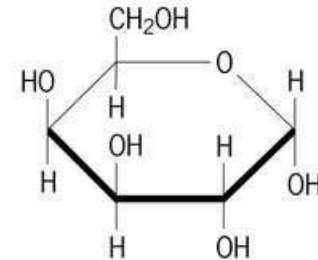
Simple carbohydrate



Glucose

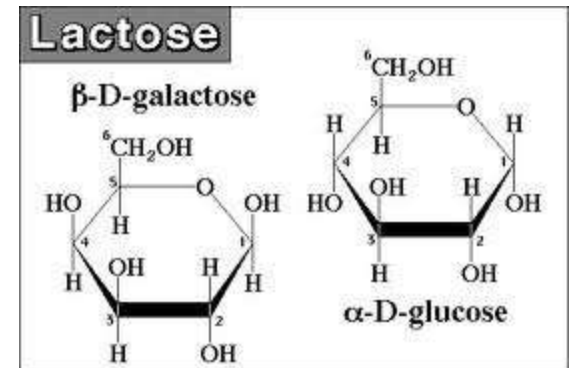
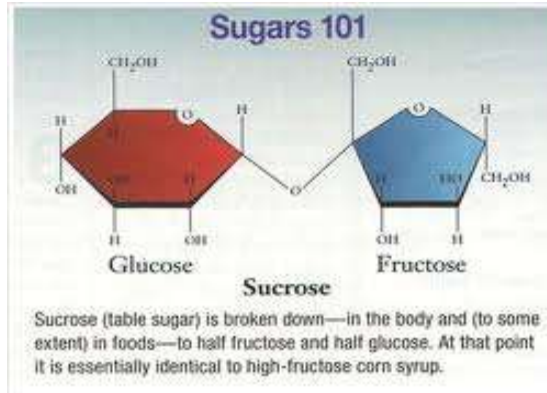
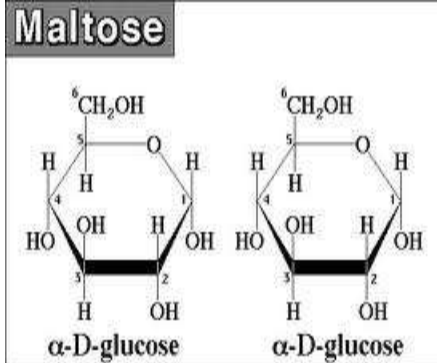


Fructose



Galactose

Chemical formula : $C_6H_{12}O_6$



Complex carbohydrates

- Glycogen
- Starch (amylose & amylopectin)



Amylose



Amylopectin



Glycogen

Complex carbohydrates

Complex carbohydrates provide vitamins, minerals, and fiber

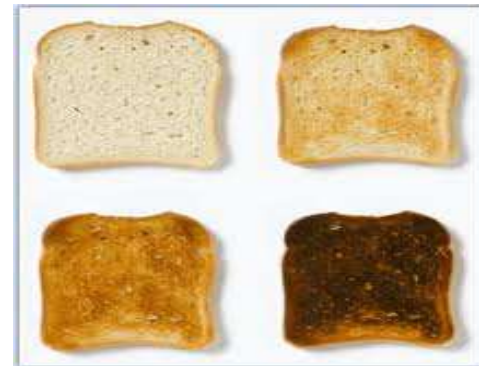


Foods such as breads, legumes, rice, pasta, and starchy vegetables contain complex carbohydrates

ADAM

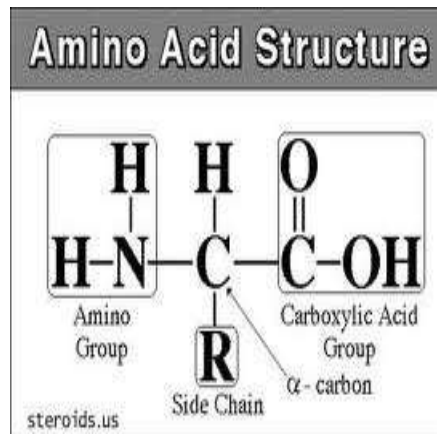
Role of carbohydrates

- Fermentation
- Preservatives
- Thickeners, stabilizers, gelling agents, sweeteners
- Give brown colors to baked goods (browning reaction)

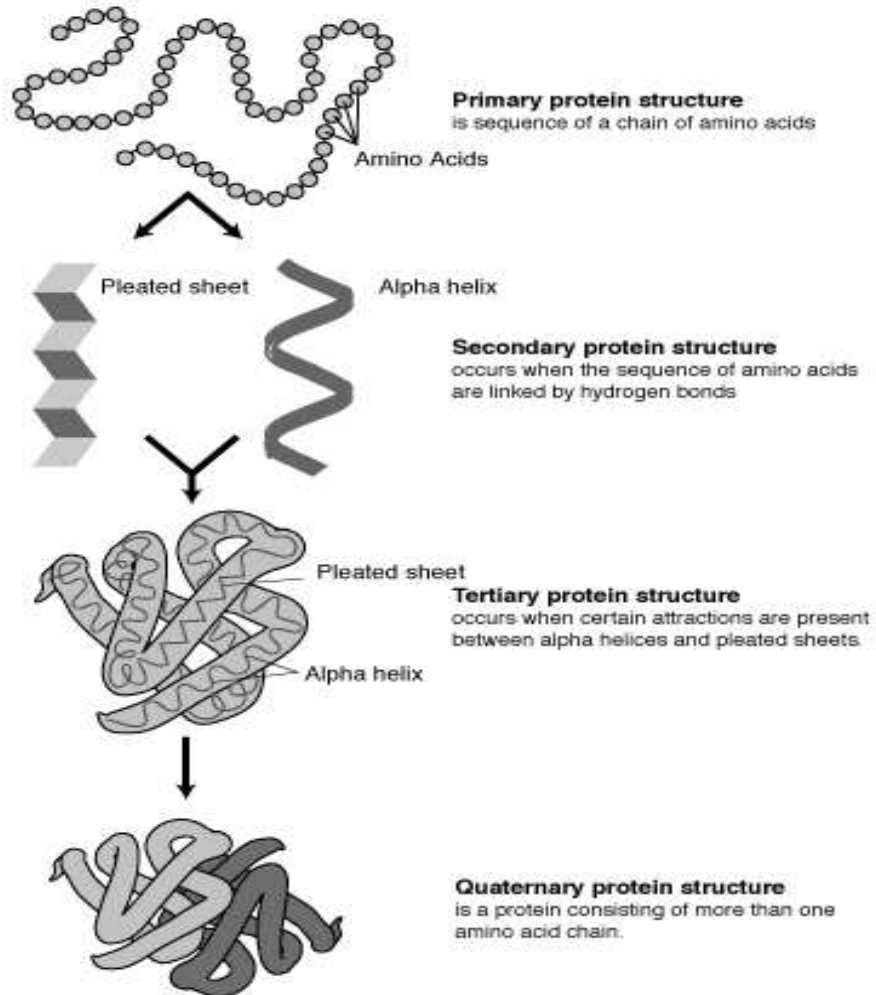


Protein: Amino acids

- Contain carbon, hydrogen, nitrogen, and oxygen
- 20 different amino acids

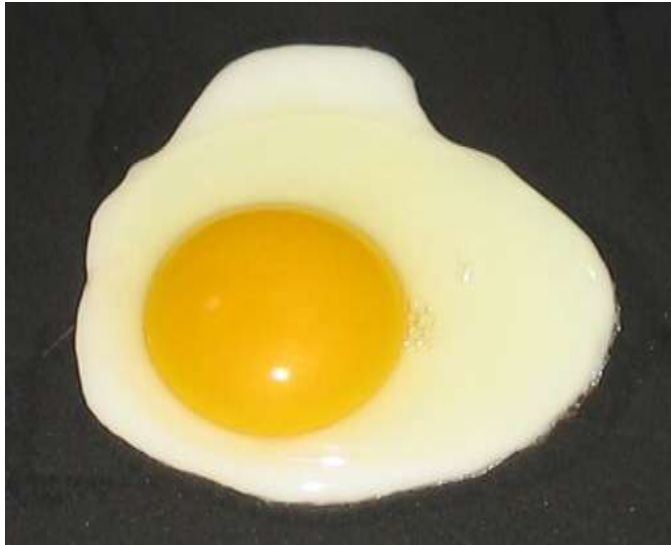


Structure of protein

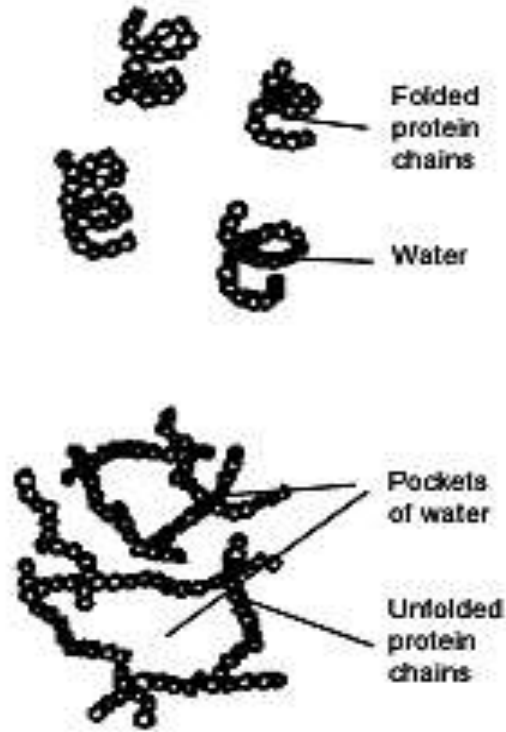


Reactions and properties of proteins

- Water binding capacity
- Denaturation/coagulation
- Hydrolysis of peptides and proteins –catalyzed by proteolytic enzymes
- Maillard browning



Denaturation



Coagulation

Lipids

- Fats and oils (triglycerides) –major components of lipids
- Sources may be animal or vegetable
- Enjoyed in the diet due to its flavor, texture and aroma
- Carry fat soluble vitamins (A,D,E & K).

Fatty acids

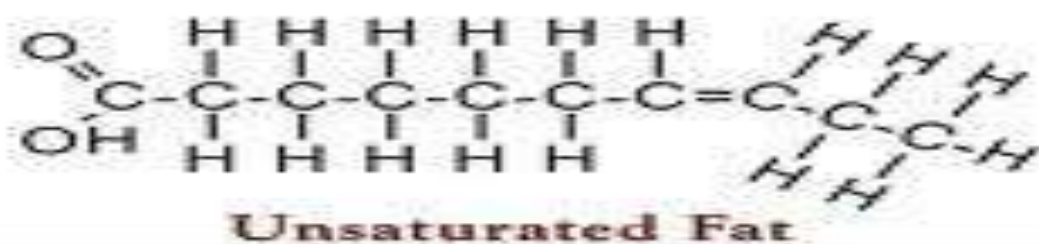
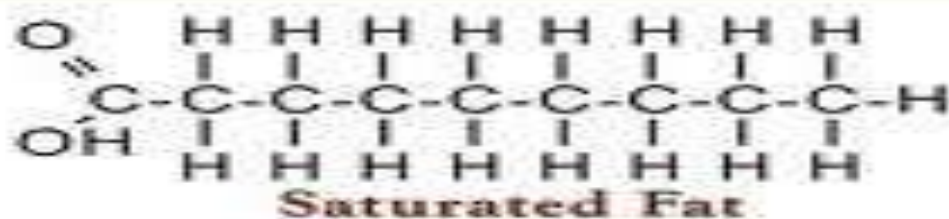
- Chain of carbon atoms with hydrogens attached
- 18 carbon fatty acids is common in our foods

Saturated : Most animal fats

Monounsaturated: olive, canola oils

Polyunsaturated: sunflower, corn, soybean oils,
flaxseed, walnuts

Chemical Structure Of Fatty Acids



Role of lipids

- Energy and health
- Add or modify flavor, texture
- Contribute tenderness
- Fats also carry the fat-soluble vitamins A,D,E and K.

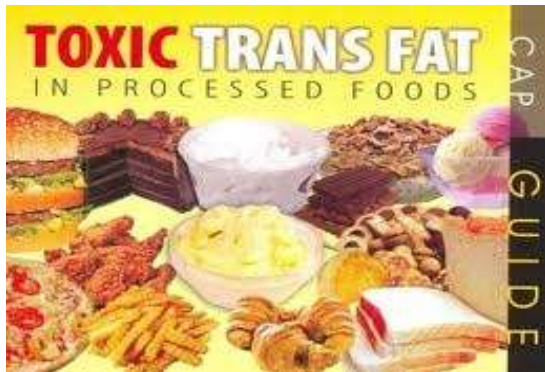
Types of Fats in foods



Saturated fats (meat, butter, lard)



Unsaturated fats (vegetable fats)



Trans fats (baked goods- crackers, cookies, doughnuts, fries, fast-food)



Nutrition Facts

Servings Size 1 oz (28g/about 14 chips)
Servings Per Container About 10.5

Amount Per Serving	
Calories 150	Calories from Fat 70
	% Daily Value*
Total Fat 7g	11%
Saturated Fat 1g	5%
<i>Trans. Fat</i> 0g	
Polyunsaturated 1g	
Monounsaturated 6g	
Cholesterol 0mg	0%
Sodium 135mg	5%
Total Carbohydrate 17g	6%
Dietary Fiber 2g	8%
Sugars 0g	
Protein 2g	
Vitamin A 0%	Vitamin C 10%
Calcium 0%	Iron 2%

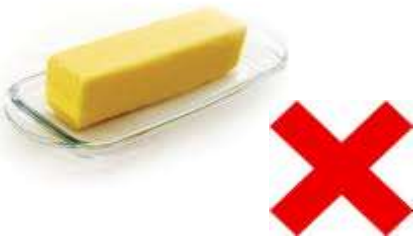
*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrate 4 • Protein 4

Ingredients: Potatoes, vegetable oil (may contain one or more of the following: sunflower and/or safflower oil), and salt.

Can You Identify the Good and Bad ?



Healthier food choice



Thank you !