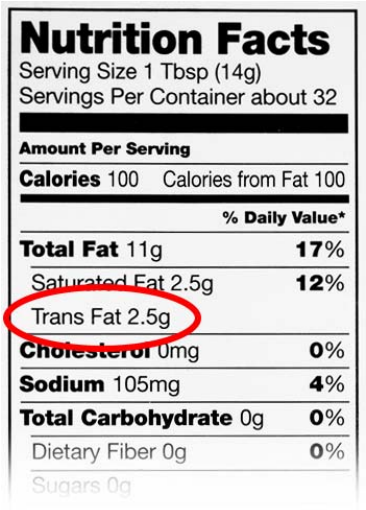
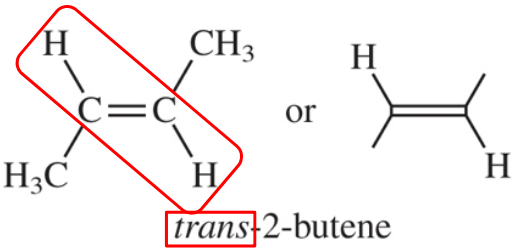
## *trans* fat

## *Trans* fats now banned by the FDA



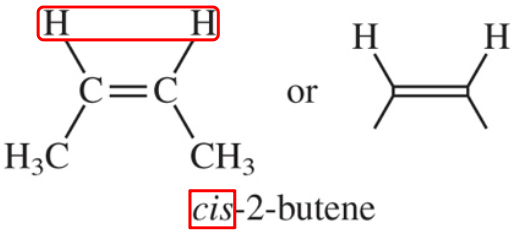


## "*trans*" designates the configuration of an organic molecule containing double bond




*trans*-2-butene

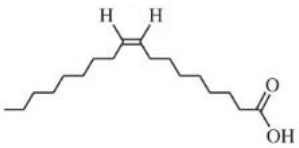
In the *trans* configuration, two H atoms are on the opposite side of the double bond.



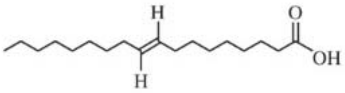

*cis*-2-butene

In the *cis* configuration, two H atoms are on the same side of the double bond.

## *trans* fat Vs. *cis* fat




*cis* fat




*trans* fat

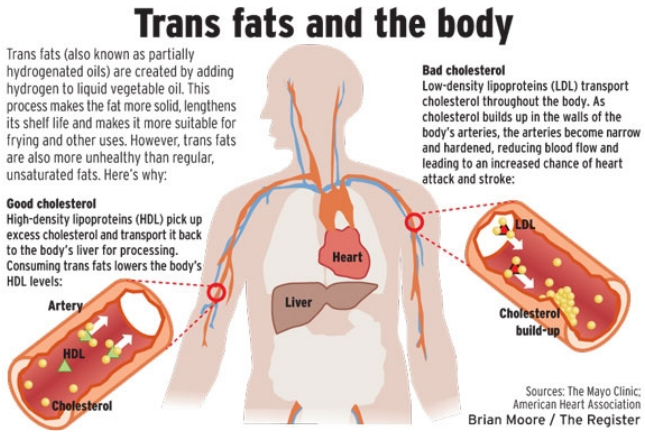
**_trans_ fat is a(n)_____.**

A. Saturated fat

B. Unsaturated fat

C. Not enough information

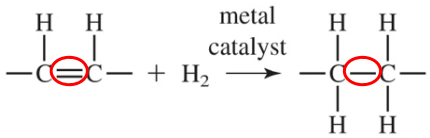
## *However, trans* fats are BAD for you

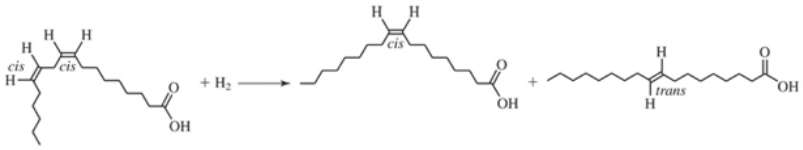



***Trans* fats** raise the level of LDL (bad) cholesterol in the blood. A high LDL increases your risk of developing heart disease, a leading cause of death in both men and women in the US.

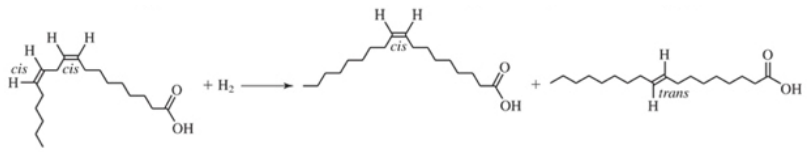
## Most *Trans* fats come from artificial sources

Most ***trans* fats** are created in an industrial process called **hydrogenation** that adds hydrogen to liquid vegetable oils to make them into a solid fat.



## Most *Trans* fats come from artificial sources



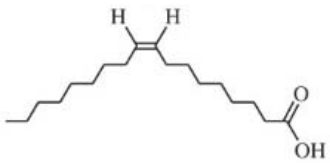

**oil** **Partially hydrogenated oils**

"**Partially hydrogenated oils**" in processed food are the primary dietary source for *trans* fats.

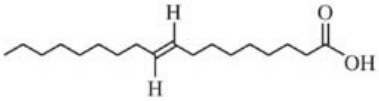
They are used to extending the shelf life of processed food.

The problem is **they shorten our shelf lives**.

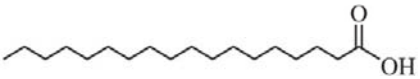
## *Why trans* fats are bad for us?



a *cis* fatty acid



a *trans* fatty acid



**Saturated fatty acid**

# Foods High in Trans Fats

French fries

Cheeseburger

Pies

Chicken nuggets

Vanaspati ghee

Donuts




**Unsaturated fat**

**Saturated fat**

***trans* fat**

## What are Carbohydrates?

**Carbohydrates** are compounds containing carbon (C), hydrogen (H), and oxygen (O).

In carbohydrates, H and O are always present in a 2:1 ratio just like water ($H_2O$).

**General formula of carbohydrate:**

$$C_m(H_2O)_n$$

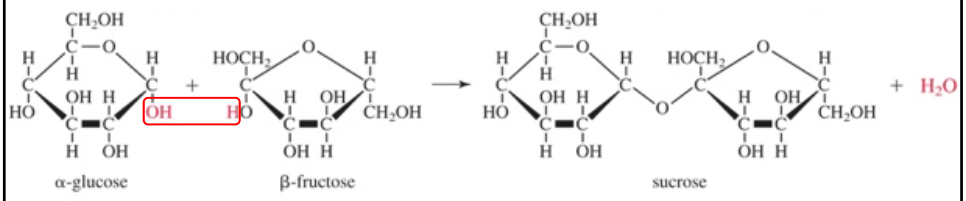
**carbo hydrate**

**carbon** **water**

## Common dietary carbohydrates

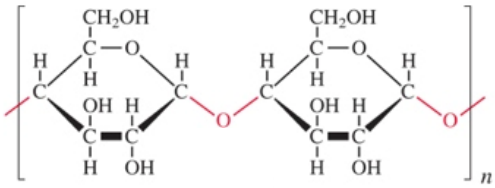
$$C_m(H_2O)_n$$

| Type of carbohydrate | Formula | Examples |
|---|---|---|
| Monosaccharide ("single sugar") | $C_6H_{12}O_6$ | glucose, fructose |
| Disaccharide ("double sugar") | $C_{12}H_{22}O_{11}$ | Sucrose (table sugar), lactose |
| Polysaccharide ("many sugar") | $(C_6H_{12}O_6)_n$ | Starch |

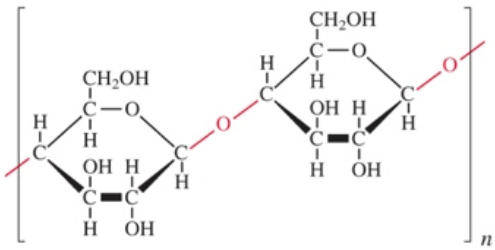



**Two monosaccharides** **A disaccharide**

# Polysaccharides

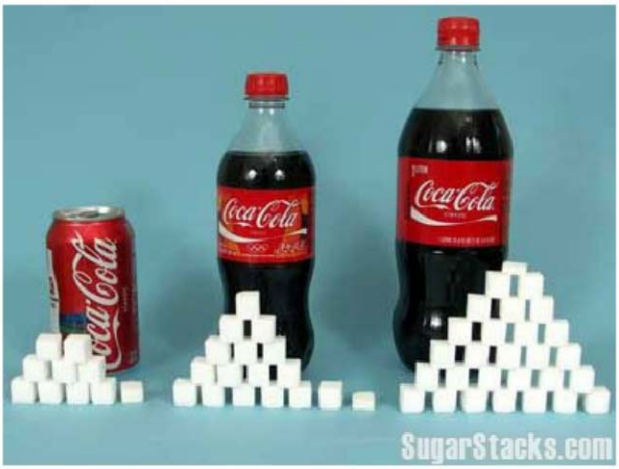


**(a)** starch



**(b)** cellulose

## Sugar in Soda




39g 65g 108g

## Sweetness Value of Natural and Synthetic Sweeteners



Table 11.3 Approximate Relative Sweetness Values

| NATURAL SWEETENERS | | | | | |
|---|---|---|---|---|---|
| lactose | maltose | glucose | honey | sucrose | fructose |
| 16 | 32.5 | 74.3 | 97 | 100 | 173 |



Table 11.4 Approximate Relative Sweetness Values

| SYNTHETIC SWEETENERS | | | | |
|---|---|---|---|---|
| acesulfame potassium | aspartame | neotame | saccharin | sucralose |
| 200 | 200 | 7,000–13,000 | 300 | 600 |

**Now, Can you offer an explanation for this observation?**


**Which of the following is made of protein?**

A. hair

B. skin

C. muscle

D. A and C

E. A, B & C

**Protein is a biological polymer.**
**The monomer in protein is____.**

A. glucose

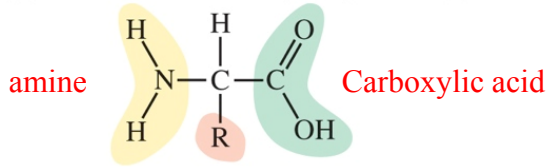
B. amino acid

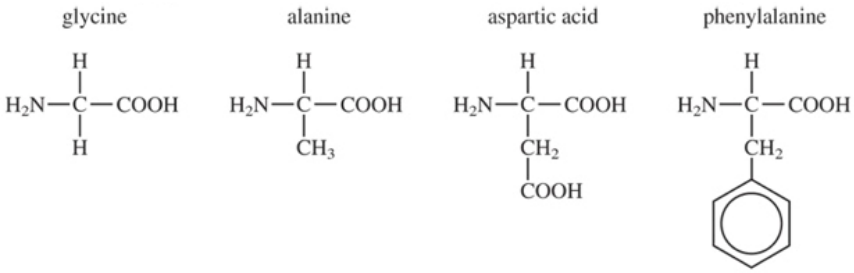
C. nucleotide

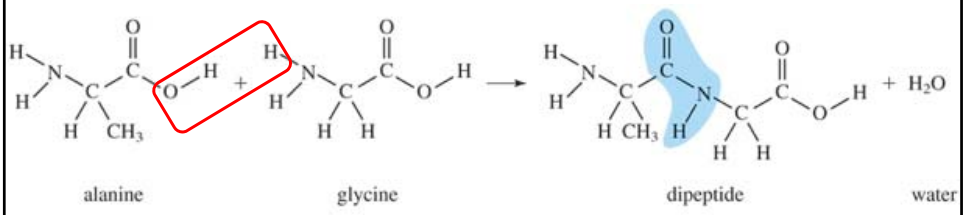
D. hydrocarbon

## Generic structure of an Amino Acid

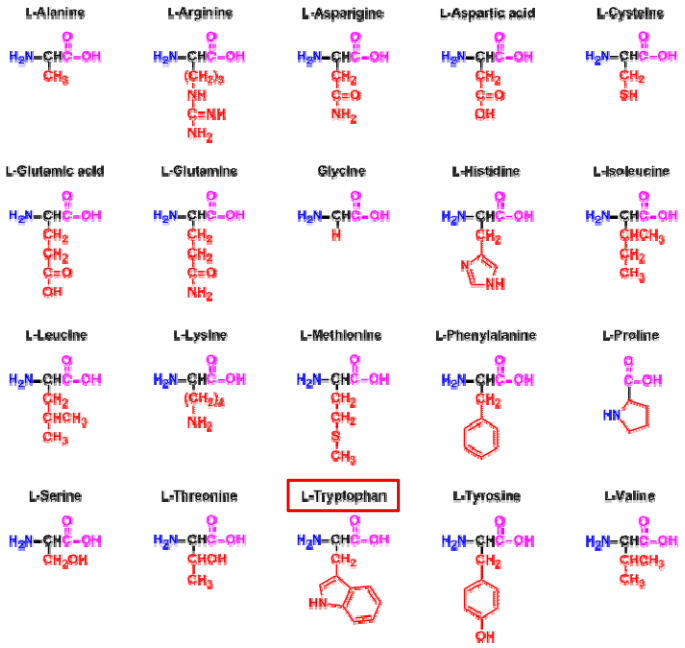







**20 naturally occurring amino acids**



## the Essential Amino Acids:
## amino acids our body cannot make



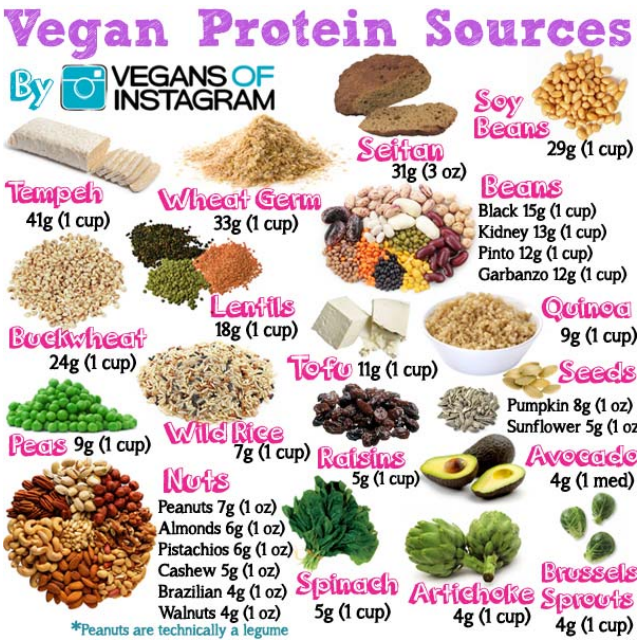
Table 11.5 The Essential Amino Acids

| | | |
|---|---|---|
| histidine | lysine | threonine |
| isoleucine | methionine | tryptophan |
| leucine | phenylalanine | valine |

## Two Types of Proteins

- **Complete proteins:**
- Come from **animal sources**
- Contains all the 9 essential amino acids
- Sources:
- Meat, fish, poultry, milk, yogurt, eggs

- **Incomplete proteins:**
- Come from **plant sources**
- Does not contain all the essential amino acids
- Sources: grains, pastas, peas, beans, nuts and seeds




# Macronutrients: fat, carbohydrate and protein



**Nutrition Facts**

Serving Size 1 oz
(28 grams or about 30 whole nuts)

**Amount Per Serving**

**Calories** 170 — Calories from Fat 140

| | % Daily Value* |
|---|---|
| **Total Fat** 15g | 23% |
| Saturated Fat 1.5g | 8% |
| Trans Fat 0g | |
| Polyunsaturated Fat 5g | |
| Monounsaturated Fat 8g | |
| **Cholesterol** 0mg | 0% |
| **Sodium** 50mg | 2% |
| **Potassium** 200mg | 6% |
| **Total Carbohydrate** 5g | 2% |
| Dietary Fiber 3g | 12% |
| Sugars 1g | |
| **Protein** 6g | |
| **Vitamin A** | 0% |
| **Vitamin C** | 0% |
| **Calcium** | 4% |
| **Iron** | 6% |

*Percent Daily Values are based on a 2,000 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 | 30mg | 300mg |
| Sodium | Less than | 2,400mg | 2,400mg |
| Total Carbohydrates | | 300g | 375g |
| Dietary Fiber | | 25g | 30g |

# Micronutrients: Vitamin and Minerals



**Nutrition Facts**

Serving Size 1 oz
(28 grams or about 30 whole nuts)

**Amount Per Serving**

**Calories** 170 — Calories from Fat 140

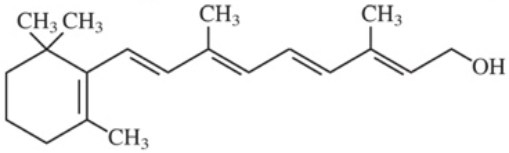
| | % Daily Value* |
|---|---|
| **Total Fat** 15g | 23% |
| Saturated Fat 1.5g | 8% |
| Trans Fat 0g | |
| Polyunsaturated Fat 5g | |
| Monounsaturated Fat 8g | |
| **Cholesterol** 0mg | 0% |
| **Sodium** 50mg | 2% |
| **Potassium** 200mg | 6% |
| **Total Carbohydrate** 5g | 2% |
| Dietary Fiber 3g | 12% |
| Sugars 1g | |
| **Protein** 6g | |
| **Vitamin A** | 0% |
| **Vitamin C** | 0% |
| **Calcium** | 4% |
| **Iron** | 6% |

*Percent Daily Values are based on a 2,000 calorie diet. Your Daily Values may be higher or lower depending on your calorie needs:

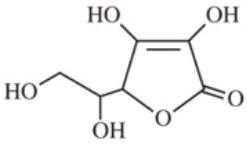
| | Calories: | 2,000 | 2,500 |
|---|---|---|---|
| Total Fat | Less than | 65g | 80g |
| Sat Fat | Less than | 20g | 25g |
| Cholesterol | Less than | 30mg | 300mg |
| Sodium | Less than | 2,400mg | 2,400mg |
| Total Carbohydrates | | 300g | 375g |
| Dietary Fiber | | 25g | 30g |

**Nutrients that are needed in miniscule amounts but essential.**

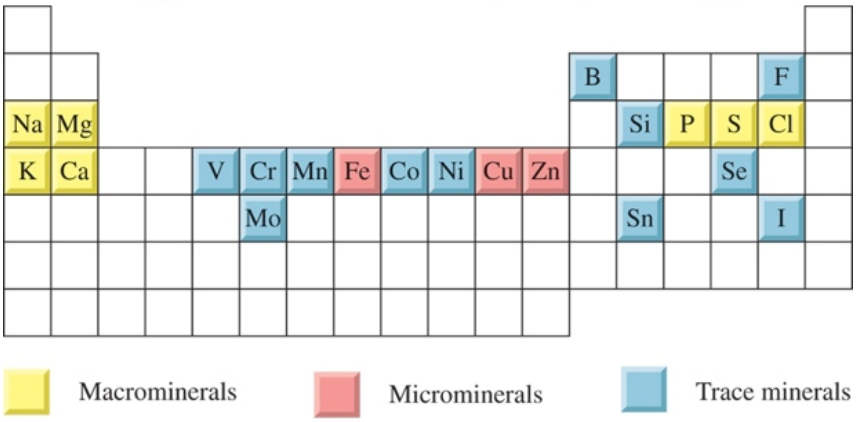





vitamin A, a lipid-soluble vitamin




vitamin C, a water-soluble vitamin




**Minerals are present in the body as <u>ions</u> and <u>ionic compounds</u>.**

**Metal minerals exist in the body as cations: $Na^+$, $K^+$, $Ca^{2+}$, $Mg^{2+}$**

**Nonmetal minerals are present in the body as anions: $Cl^-$, $PO_4^{3-}$**

MOUNTAIN BERRY BLAST®

MIXED BERRY FLAVORED + OTHER NATURAL FLAVORS

**Nutrition Facts**

12 fl oz (360 mL)
Servings Per Container about 2.5

**Calories**
80

| Amount/Serving | %DV* | Amount/Serving | %DV* |
|---|---|---|---|
| **Total Fat** 0g | 0% | **Total Carb** 21g | 7% |
| **Sodium** 150mg | 6% | **Sugars** 21g | |
| **Potassium** 35mg | 1% | **Protein** 0g | |
| Niacin | 15% | Vitamin B6 | 15% |
| Vitamin B12 | 15% | Magnesium | † |

† Not a significant source of calories from fat, saturated fat, trans fat, cholesterol, dietary fiber, vitamin A, vitamin C, calcium and iron.

*Percent Daily Values are based on a 2,000 calorie diet.

WATER, HIGH FRUCTOSE CORN SYRUP, LESS THAN 0.5% OF: CITRIC ACID, SALT AND MAGNESIUM CHLORIDE AND CALCIUM CHLORIDE AND MONO-POTASSIUM PHOSPHATE (ELECTROLYTE SOURCES), NATURAL FLAVORS, MODIFIED FOOD STARCH, CALCIUM DISODIUM EDTA (TO PROTECT COLOR), MEDIUM CHAIN TRIGLYCERIDES, SUCROSE ACETATE ISOBUTYRATE, VITAMIN B3 (NIACINAMIDE), VITAMIN B6 (PYRIDOXINE HYDROCHLORIDE), VITAMIN B12, BLUE 1.