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CLASS NOTES		

30.2 Food and Nutrition

Food and Energy Molecules in food contain chemical energy that cells use to

- 1) Produce Energy (ATP).
- 2) Supplies raw materials cells need to build and repair tissues.

The energy in food is measured in dietary Calories. *One Calorie is equal to 1000 calories.*

A calorie is the amount of heat needed to raise the temperature of 1 gram of water by 1 degree Celsius.

A healthy diet provides the body with raw materials to build and repair body tissues and make enzymes, lipids, and DNA.

Nutrients

Nutrients are substances in food that supply the body with energy and raw materials needed for growth, repair, and maintenance. The nutrients that the body needs are:

Water, carbohydrates, fats, proteins, vitamins, and minerals.

Many of the body's processes take place in water. Water makes up a large part of blood and other body fluids.

Carbohydrates

are formed from glucose (a monosaccharide) as a basic unit.

are the body's main source of energy. Complex carbohydrates, such as starches, must be broken down into simple sugars to be used for energy.

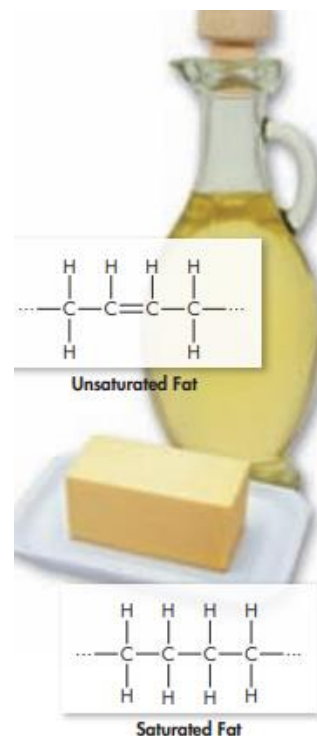
Fats

are formed from **fatty acids and glycerol**.

Fats help the body absorb fat-soluble vitamins and are a part of cell membranes, nerve cells, and certain hormones.

When there are only single bonds between the carbon atoms in the fatty acids, each carbon atom has the maximum number of hydrogen atoms and the fat is said to be **saturated**. Most saturated fats, such as butter, are solids at room temperature.

Unsaturated fats have one or more double bonds between carbon atoms, which reduce the number of hydrogen atoms in their fatty acids. Unsaturated fats are usually liquids at room temperature. Because many vegetable oils contain more than one double bond, they are called **polyunsaturated**.



Food manufacturers often modify unsaturated fats in vegetable oils by adding hydrogen to them. These processed fats are called trans fats. **Trans fats** are solid at room temperature and have a longer shelf life than unsaturated fats. However, recent studies suggest that trans fats may be associated with serious health concerns, including heart disease.




Proteins

are formed from **amino acids**.

Supply raw materials for growth and repair of structures such as skin and muscle. Many enzymes and hormones are proteins.

Vitamins

are organic molecules that the body needs in very small amounts. They are needed to help the body perform chemical reactions.

Vitamins		
Vitamin	Sources	Function
A (retinol)	Yellow, orange, and dark-green vegetables; fortified dairy products	Important for growth of skin cells; important for night vision
D (calciferol)	Fish oils, eggs; made by skin when exposed to sunlight; added to dairy products	Promotes bone growth; increases calcium and phosphorus absorption
E (tocopherol)	Green leafy vegetables, seeds, vegetable oils	Antioxidant; prevents cellular damage
K	 Green leafy vegetables; made by bacteria that live in human intestine	Needed for normal blood clotting
B ₁ (thiamine)	Whole grains, pork, legumes, milk	Metabolism of carbohydrates
B ₂ (riboflavin)	Dairy products, meats, vegetables, whole grains	Growth; energy metabolism
Niacin	Liver, milk, whole grains, nuts, meats, legumes	Important in energy metabolism
B ₆ (pyridoxine)	Whole grains, meats, vegetables	Important for amino acid metabolism
Pantothenic acid	Meats, dairy products, whole grains	Needed for energy metabolism
Folic acid	 Legumes, nuts, green leafy vegetables, oranges, broccoli, peas, fortified grains	Involved in nucleic acid metabolism; prevents neural-tube defects
B ₁₂ (cyanocobalamin)	Meats, eggs, dairy products, enriched cereals	Involved in nucleic acid metabolism; maturation of red blood cells
C (ascorbic acid)	 Citrus fruits, tomatoes, red or green peppers, broccoli, cabbage, strawberries	Maintains cartilage and bone; antioxidant; improves iron absorption; important for healthy gums and wound healing
Biotin	Legumes, vegetables, meat	Coenzyme in synthesis of fat; glycogen formation; amino acid metabolism
Choline	Egg yolk, liver, grains, legumes	Part of phospholipids and neurotransmitters

Minerals are inorganic nutrients the body needs in small amounts. Examples of minerals include calcium and iron.

Important Minerals		
Mineral	Sources	Function
Calcium	Dairy products, salmon, kale, tofu, collard greens, legumes	Bone and tooth formation; blood clotting; nerve and muscle function
Phosphorus	Dairy products, meats, poultry, grains	Bone and tooth formation; acid-base balance
Iron	Meats, eggs, legumes, whole grains, green leafy vegetables, dried fruit	Component of hemoglobin and of electron carriers used in energy metabolism
Chlorine	Table salt, processed foods	Acid-base balance; formation of gastric juice
Sodium	Table salt, processed foods	Acid-base balance; water balance; nerve and muscle function
Potassium	Meats, dairy products, fruits and vegetables, grains	Acid-base balance; water balance; nerve and muscle function
Magnesium	Whole grains, green leafy vegetables	Activation of enzymes in protein synthesis
Fluorine	Fluoridated drinking water, tea, seafood	Maintenance of bone and tooth structure
Iodine	Seafood, dairy products, iodized salt	Component of thyroid hormones
Zinc	Meats, seafood, grains	Component of certain digestive enzymes

Nutrition and a Balanced Diet

A balanced diet provides nutrients in adequate amounts and enough energy for a person to maintain a healthful weight. **Food labels** provide general information about nutrition as well as specific information about a food.