Chapter 16

ENRICHMENT

Use with Section 2

• Other Organic Compounds

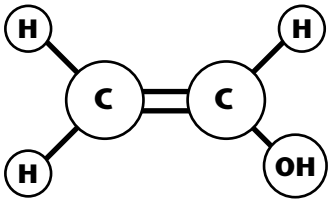
Ethyl Alcohol

For hundreds of years, alcohol—because of its ability to dissolve salts and other water-soluble substances—has had a strong impact on science and other areas. Alcohol can also dissolve many organic materials, including oils, waxes, etc., which don't dissolve in water. More recently, however, drinking alcohol—whose chemical name is ethyl alcohol or ethanol—has become one of the most abused drugs.

When ethyl alcohol is ingested, the stomach attempts to break it down into simpler components. Two by-products of this process are CO_2 and H_2O. The CO_2 is transported through the blood by hemoglobin to the lungs, where it is exchanged with oxygen. A particular stomach (and liver) enzyme, cytochrome 450, helps the body break down, or metabolize, alcohol. The amount of this enzyme in each person can vary significantly. When too much alcohol is consumed, much of the alcohol passes to the liver, which attempts to metabolize it. Some by-products of this process are highly toxic and can kill cells, leading to cirrhosis, brain damage, and cancer. Any excess alcohol then is passed and circulated in the bloodstream at a rate that depends on a person's weight. (The greater the weight or mass, the greater the rate.) The exceptionally small alcohol molecules diffuse quickly into cell membranes—without actually changing the cell membrane—and have both immediate and long-term effects on cell processes by interfering with protein functions within the cells.

1. One of the first major brain areas that alcohol affects is the complex, higher-function center of the brain that controls processes such as thinking and neuron (or nerve cell) transmissions. Explain in your own words how alcohol could affect your body's ability to perform simple functions such as walking, driving, or reacting.

2. Consider the following facts about alcohol: alcohol avoids fat areas of the body; women genetically have a higher percentage of fat than men; men have more cytochrome 450 than women; each person has a particular weight; and certain races genetically have fewer alcohol-metabolizing components in their bodies. Is it accurate to state that the same amount of alcohol affects different people in the exact same way? Support your answer with facts from above.



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