

Medicines and Drugs

LESSON 1

The Role of Medicines

● Before You Read

On the lines below, describe a time when you have taken medicine. How did you take the medicine? How did the medicine affect your body? As you read, add more information to your description.

● Read to Learn

Types of Medicines

Medicines are drugs that are used to treat or prevent diseases or other conditions. **Drugs** are substances other than food that change the structure or function of the body or mind. All medicines are drugs, but not all drugs are medicines. If misused or abused, drugs can have devastating effects on the brain and body. Medicines are classified based on how they work in your body. These categories include:

- Medicines that help prevent disease.
- Medicines that fight pathogens.
- Medicines that relieve pain and other symptoms.
- Medicines that regulate the body's systems.



BIG Idea

Medicines are divided into classes and have different effects on different people.

Study Coach

Cluster Chart Draw a circle and label it "Medicines." Create four surrounding circles labeled "Prevent Disease," "Fight Pathogens," "Relieve Pain," and "Promote Health." As you read, fill in the chart with more details about the kinds of medicines discussed in the lesson.



Picture This

- 1. Analyze** Why are all medicines considered drugs, but not all drugs are medicines?
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READING CHECK

2. Explain How do vaccines prevent disease?



READING CHECK

3. Analyze Why is it important to finish all of the antibiotics in a prescription?

What types of medicines help prevent disease?

Vaccines prevent a person from contracting a specific disease. They contain weakened or dead *pathogens* that cause the disease. Your immune system will destroy these pathogens before they can make you sick. Memory cells recall how to make antibodies for the pathogen. If the body is exposed to this pathogen in the future, it will be able to fight the disease. In the United States, about 95 percent of children receive vaccines. The protection from certain vaccines fades over time. For example, the vaccines for tetanus must be given more than once. Flu vaccines must be renewed every year to fight new strains of the disease.

Antitoxins, like vaccines, prevent disease. They also help stop the effects of toxins. Antitoxins fight the bacteria that produce toxic substances. To make an antitoxin, an animal is injected with a small amount of a toxin. The animal's body makes antibodies for the toxin. These antibodies are then used to make an antitoxin. ✓

What types of medicine fight pathogens?

Antibiotics are a class of drug that destroy *bacteria*. Bacteria are tiny organisms that cause disease. Some antibiotics kill harmful bacteria in the body. Others stop the bacteria from reproducing. Antibiotics have saved many lives. However, some antibiotics can cause nausea or stomach pain. Others can cause allergic reactions in some people. Tell your doctor if you feel any negative side effects after taking antibiotics.

Bacteria can sometimes adapt to an antibiotic. This means that the drug can no longer kill the bacteria. When you do not finish taking a prescription, you do not kill all of the bacteria in your system. The bacteria that survive are more immune to the drug. Overuse of antibiotics can also create a resistance.

Antiviral drugs are used to treat some viral illnesses, such as the flu. These medicines suppress the virus, but they do not kill it. The virus remains in the infected person's body. Viruses can also develop a resistance to drugs. Fungi are another type of pathogen that can infect the body. Antifungals are used to suppress or kill fungus cells. Athlete's foot and ringworm are two types of fungal infection. ✓

What types of medications relieve pain?

Pain relievers, or *analgesics*, are the most commonly used medicines. Analgesics range from mild drugs such as aspirin to strong narcotics like morphine. Aspirin is used to relieve pain and reduce fever. Analgesics can also be used to fight *inflammation*, or redness, swelling, and pain.

Aspirin can cause stomach upset, dizziness and ringing in the ears. Aspirin can also cause Reye's syndrome in children. Reye's syndrome is a serious illness of the brain and liver. It can be life-threatening. Aspirin should not be given to anyone under the age of 20 unless directed by a health care professional. People who are sensitive to aspirin can take acetaminophen or ibuprofen instead.

Certain types of medicines that relieve pain can be addictive. These drugs are called narcotics. They require a doctor's prescription. Patients who use these drugs can become dependent on them. ✓

Managing Chronic Conditions

Some medications are used to treat chronic conditions. These medicines help maintain or restore health. They also help people with chronic diseases keep a high level of wellness.

How can medicines help people with allergies?

Antihistamines can reduce the symptoms caused by allergies. Antihistamines work by blocking the chemicals that cause an allergic response. People with allergies to peanuts or bee stings can have very severe symptoms. An allergic reaction can lead to death. Some people with severe allergies may carry a single dose of epinephrine. This drug can slow down or stop an allergic reaction.

What are body-regulating medicines?

Some medicines change body chemistry to treat illness. People with diabetes use insulin to control the amount of sugar in their blood. People with asthma can take medicines to control their symptoms and prevent attacks. They can also use inhalers during an asthma attack. Others take medicines to regulate blood pressure or irregular heartbeat. ✓



READING CHECK

4. Describe What are the effects of analgesics?



READING CHECK

5. Describe What are two reasons a person would take a body-regulating medicine?



Think it Over

- 6. Describe** How can medication help people with mental illness?

Picture This

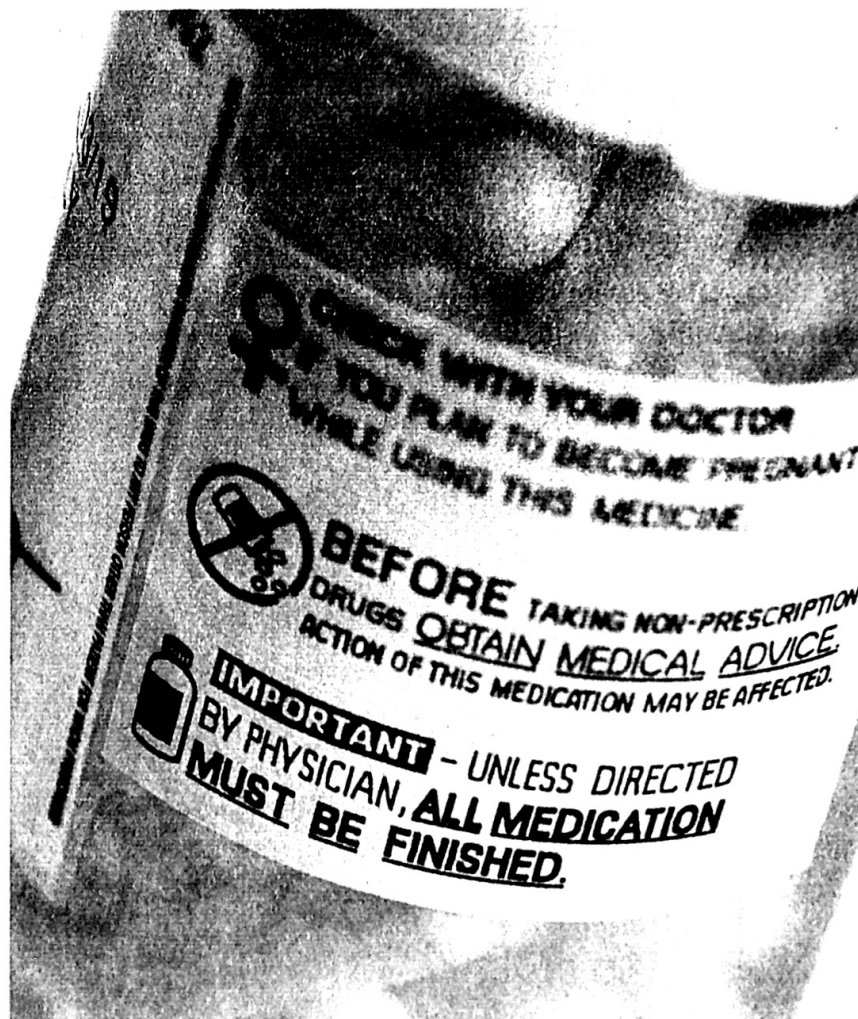
- 7. Analyze** Why is it important to read the label before taking a medicine?

What are antidepressant and antipsychotic medicines?

Some medicines can help people who suffer from mental illnesses. These medicines help regulate the chemistry of the brain. They can help people with mental illnesses live healthy lives. People with depression, mood disorders, and other disorders can be helped with drug treatments.

What medicines are available to treat cancer?

Some medicines can be used to treat cancer. These medicines reduce rapid cell growth and help stop the spread of cancer cells. Chemotherapy is a treatment that uses chemicals to kill cancer cells. The body's immune system can also be used to fight cancer cells. Many cancer treatments can also destroy healthy cells. This results in serious side effects. Other medications can help treat the side effects.



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Taking Medications

Medicines can be delivered to the body in many ways:

- **Oral medicines** are taken by mouth. They can be tablets, capsules, or liquids. These medicines pass from the digestive system into the bloodstream.
- **Topical medicines** are applied to the skin. Transdermal skin patches deliver a medicine through the skin.
- **Inhaled medicines** are delivered in a fine mist or powder.
- **Injected medicines** are delivered through a shot. They go directly into the bloodstream. ✓

Reactions to Medicines

The effect a medicine has on the body depends on many factors. Medicines can have a variety of side effects. **Side effects** are reactions to medicine other than the one intended. Some side effects may be mild, such as drowsiness. Others may be more severe and can even cause death.

What are medicine interactions?

The effects of a medicine can change if it is mixed with another medicine or food. Types of medicine interactions include the following:

- When medicines work together in a positive way, it is known as an **additive interaction**. For example, a muscle relaxant can treat joint pain. An anti-inflammatory will further reduce the pain by easing swelling.
- Sometimes two or more medicines interact and produce a greater effect than when they are taken alone. This is known as a **synergistic effect**.
- The effects of a medicine can be cancelled or reduced by another medicine. This type of interaction is known as an **antagonistic interaction**.

What are tolerance and withdrawal?

After a period of time, the body can become used to the effect of a medicine. This is known as tolerance. The body will require larger doses of the medicine to produce the same effect. Sometimes the body will require less of a substance to produce an effect. This is known as reverse tolerance.

Withdrawal can occur when a person stops taking some medicines. Withdrawal may cause nervousness, insomnia, headaches, vomiting, chills, and cramps. These symptoms gradually ease after time. Talk to your health care provider if you experience withdrawal. ✓



READING CHECK

- 8. Identify** What are four ways that medicines can be taken?



READING CHECK

- 9. Explain** What is tolerance?

BIG Idea

Medicines are only safe if they are used for the intended purpose and according to the directions on the label.

Study Coach

T-Chart Make a two-column chart like the one below. Label one column "Prescriptions" and label the other column "OTCs." As you read, fill in the first column with information about prescription medicines. Fill in the second column with information about over-the-counter (OTC) medicines.

Prescriptions	OTCs



READING CHECK

- Analyze** Why should you talk to a health care provider before taking any supplements?

● Before You Read

When you use a medicine, how do you know that you are using it correctly or safely? On the lines below, list some of the ways you can tell if a medicine is safe or appropriate. As you read, add additional information.

● Read to Learn

Standards for Medicine

All new medicines in the United States must meet standards set by the Food and Drug Administration (FDA). Before a new drug can be approved, it must be tested to make sure that it is safe and effective. The FDA requires that companies complete at least three clinical trials for a drug. During a clinical trial, the drug is tested on human volunteers. Sometimes people with serious illnesses are allowed to use a drug that has not been through clinical trials. These drugs are referred to as *experimental* drugs. Experimental drugs must be proven to be safe before they can be used.

The FDA does not regulate herbal and dietary supplements. Supplements do not go through the same trials or meet the same requirements for safety. Supplements also do not need to be proven effective. Some companies that make herbal supplements claim that their products are "natural." This claim leads people to believe that the supplements are safe. Even supplements made from natural ingredients can have harmful side effects. Never take a supplement without telling your health care provider first.

What are prescription medicines?

Prescription medicines can be dispensed only with the approval of a licensed health care provider. A doctor must provide written instructions with the medicine. The medicine must be dispensed by a licensed pharmacist. Prescription medicines provide only enough of a drug needed to treat your condition. If you need more medicine, your health care provider must approve a refill. A prescription medicine should be taken only by the person whose name appears on the label.

What are over-the-counter (OTC) medicines?

Over-the-counter (OTC) medicines are medicines you can buy without a doctor's prescription. The FDA considers these medicines to be safe. However, all medicines can cause harm if they are not used correctly. Certain types of OTC medicines contain controlled substances. These medicines must be kept behind the pharmacy counter. For example, some cold medicines contain pseudoephedrine. This substance can be used to make illegal drugs. 🚫

What information is found on medicine labels?

The FDA requires all medicines to have labels. These labels must give information on how to use the medicine safely. Prescription medicine labels must include the doctor's name and the patient's name. They must also provide the pharmacy's name and address, the date the prescription was filled, the prescription number, and whether refills are allowed. All labels contain instructions for taking the medicine.

Medicine Misuse

Taking medicines when you do not need them or without following the instructions on the label is dangerous.

Using a medicine in ways other than the intended use is known as **medicine misuse**. Medicine misuse can have serious health consequences. Examples of medicine misuse are:

- Failing to follow a medicine's instructions.
- Taking another person's medicine.
- Taking too much or too little of a medicine.
- Taking a medicine for a longer or shorter period than prescribed or recommended.
- Discontinuing use of a medicine without informing your health care professional.
- Mixing medicines without the approval of your health care provider.



READING CHECK

- 2. Compare and Contrast** How are prescription medicines and OTC medicines different? How are they similar?
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-



Think it Over

- 3. Explain** Why is it dangerous to take a medicine that was not prescribed for you?
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Over-The-Counter Medicine

Active Ingredient:

Ingredient that treats condition, including amount per unit.

Inactive Ingredients:

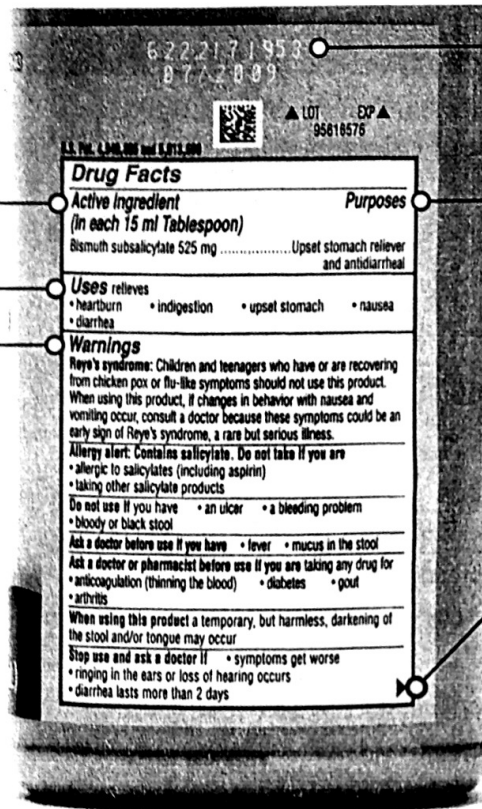
Substances added to the product that do not help treat the condition, such as flavor and color.

Uses:

Conditions or symptoms treated by the product.

Warnings:

Side effects, interactions, when to talk to a doctor, when not to take the product, keep out of reach of children.



Expiration Date:

The date you should no longer use the medicine.

Purpose:

Product category and what the product is supposed to do.

Other Information:

Some information may be printed on the opposite side of the label. This information may include how to take the medicine, and information about certain ingredients.

Picture This

- 4. Identify** Which part of a medicine label describes the possible side effects of the medicine?



READING CHECK

- 5. Explain** How is medicine abuse different from medicine misuse?

What is medicine abuse?

Taking medications for non-medical reasons is **medicine abuse**. Some teens may think prescription and OTC medicines are safer than illegal drugs. However, abusing any medicine is dangerous and illegal.

- Avoid using drugs to lose weight or stay awake. A healthy diet and exercise are the safest way to maintain a healthy weight. Get plenty of sleep and manage your time wisely so that you can study effectively.
- Avoid using drugs to fit in. "Pill parties" are gatherings where teens mix whatever OTC and prescription drugs they can find. Mixing medicines, drugs, or alcohol can cause death.
- Avoid taking any medicine that was prescribed to someone else. It is illegal and unsafe.

One danger of medicine misuse is drug overdose. **Drug overdose** is a strong, sometimes fatal reaction to taking too much of a drug. Teens can also become addicted to a medicine. Never use a medicine other than how it is intended. ⚠