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Review Article on Antibiotics

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ABSTRACT: The term "antibiotic," coined in 1942, describes any substance produced by a microorganism, and subsequently by chemical synthesis, that is antagonistic to the growth of other microorganisms. There is a wide variety of antibiotics, all of which work as bactericidal or bacteriostatic medicines. Citizens of the world's developed societies live healthier, longer lives because of them. They are used to treat and prevent human and animal diseases. The controversy is about whether or not their use in animal husbandry is a driving force for the development of antibiotic resistance and, if the answer is yes, does that have important, negative human health implications? A major agricultural development enabled by antibiotics is the widespread presence of concentrated animal feeding operations.

Definition

An antibiotic is a type of antimicrobial substance active against bacteria. It is the most important type of antibacterial agent for fighting bacterial infections, and antibiotic medications are widely used in the treatment and prevention of such infections. They may either kill or inhibit the growth of bacteria.

Types of Antibiotics

The discovery of the first true antibiotic—penicillin—in 1928 was one of the most life-changing events of the 20th century. Before its discovery, when bacterial infections developed, there wasn't much doctors could do. People died from illnesses and injuries that are highly curable today. Now, there are more than 100 antibiotics to fight the war against bacterial infections. Here is a look at common antibiotic names and the types of antibiotics your doctor may prescribe.

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- The discovery of the first true antibiotic—penicillin—in 1928 was one of the most life-changing events of the 20th century. Before its discovery, when bacterial infections developed, there wasn't much doctors could do. People died from illnesses and injuries that are highly curable today. Now, there are more than 100 antibiotics to fight the war against bacterial infections. Here is a look at common antibiotic names and the types of antibiotics your doctor may prescribe.

1 Penicillins

The first penicillin gave rise to an entire class of antibiotics known as penicillins. Penicillins are derived from a specific mold (a type of fungi)—Penicillium. They are widely useful antibiotics that are often a doctor's first choice for several types of infections. This includes skin, respiratory, ear, STDs (sexually transmitted diseases), and dental infections. They are highly effective against familiar organisms, such as staph and strep. Rashes and allergic reactions are common with penicillins. Other common side effects include diarrhea, nausea, and abdominal pain. Examples of penicillins include:

- Amoxicillin
- Ampicillin
- Penicillin G
- Penicillin V

2 Cephalosporins

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Cephalosporins are related to penicillins. They both belong to a larger class called beta lactams. Like penicillins, cephalosporins originally came from a fungus—Cephalosporium. There are five generations of cephalosporins. Each generation covers different types of bacteria. As a result, the class can treat a variety of infections, from strep throat and skin infections to very serious infections like meningitis. Because they are related to penicillins, some people with penicillin allergies may also react to cephalosporins. Other common side effects include diarrhea, nausea, heartburn, and abdominal pain. Examples of cephalosporins include:

- Cefixime
- Cefpodoxime
- Cefuroxime
- Cephalexin

3 Macrolides

Macrolides are a completely different class of antibiotics from the beta lactams. But they effectively treat many of the same infections. This includes respiratory, ear, skin, and sexually transmitted infections. So, they are very useful for people with allergies to beta lactams. They are also useful when bacteria develop resistance to beta-lactam antibiotics. However, macrolides have a lot of drug interactions. Be sure your doctor and pharmacist know about all your medications when you take a macrolide. Common side effects include nausea, vomiting, stomach pain, and diarrhea. Examples of macrolides include:

- Azithromycin ('Z-pak')
- Clarithromycin
- Erythromycin

4 Fluoroquinolones (broad-spectrum antibiotics)

Fluoroquinolones—or quinolones—are active against a very wide variety of bacteria. This makes them useful for treating infections when other antibiotics have failed. They are also an alternative when people have allergies to other antibiotics. They can treat anything from eye infections to pneumonia to skin, sinus, joint, urinary or gynecologic infections and many more. However, this class can be a problem for people with certain heart conditions and with some other medicines. Be sure your doctor and pharmacist know your complete medical history. Common side effects include stomach upset or pain, diarrhea, headache and drowsiness. Examples of fluoroquinolones include:

- Ciprofloxacin
- Levofloxacin
- Moxifloxacin

5 Sulfonamides

Derived from the chemical sulfanilamide, 'sulfa drugs' have been around about as long as penicillin. Technically, sulfonamides don't kill bacteria the way other antibiotics do. Instead, they are bacteriostatic—they stop bacterial growth and

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your immune system does the rest. They are very good topical treatments for burns and vaginal or eye infections. They can also treat UTIs (urinary tract infections) and traveler's diarrhea. However, resistance is common with this class. Common side effects include diarrhea, nausea, rash, and sun sensitivity. Allergies are also common with the group. Examples of sulfonamides include:

- Sulfacetamide
- Sulfadiazine
- Sulfamethoxazole-Trimethoprim

6 Tetracycline

These antibiotics come from a species of bacteria called Streptomyces. It seems odd that a bacterium could produce an antibiotic that kills other bacteria, but it's true. Tetracyclines are bacteriostatic, like the sulfonamides. They treat various infections, such as respiratory, skin and genital infections. They also treat unusual infections, including Lyme disease, malaria, anthrax, cholera, and plague. They have noninfectious uses as well, such as treating rosacea. Common side effects include stomach pain or upset, sun sensitivity, and yeast infections. Examples of tetracyclines include:

- Doxycycline
- Minocycline
- Tetracycline

7 Other Types of Antibiotics

Doctors have several other antibiotic choices if none of these classes will work. You will find some of them only in a hospital. Others just don't fit into the main groups, but are very useful. This includes antibiotics like clindamycin, metronidazole (Flagyl) and nitrofurantoin (Furadantin, Macrodantin). Each antibiotic, whether in a defined class or not, has different dosing requirements. You need to take some on an empty stomach and others with food. Ask your doctor or pharmacist about the best way to take an antibiotic. With all antibiotics, it's important to finish the entire course your doctor prescribes. This ensures adequate treatment and prevents antibiotic resistance.

Advantages of antibiotics

Antibiotics can slow the growth of and kill many types of infection.

In some cases, such as before surgery, **antibiotics** can prevent infection from occurring.

Antibiotics are fast-acting; some will begin working within a few hours.

They are easy to take: Most **antibiotics** are oral medications.

- **Disadvantages of antibiotics**

If you take **antibiotics** often, your body can build a resistance to **antibiotic** drugs, which could cause **antibiotics** to become less effective.

The longer the course of treatment for an **antibiotic**, the more damage that can be done to the body's immune system.

METHODOLOGY

Classic **method** for detecting the presence of **antibiotics** is the use of microbiological assays that employ **antibiotic**-sensitive species of bacteria to determine whether specific **antibiotics** are present in a given sample and, with limited sensitivity, their concentration.

CONCLUSION

Antibiotics are an essential tool of medical use in common medical procedures, such as transplantation and chemotherapy. However, over the years, bacteria have acquired resistance to **antibiotics**. Resistant bacteria can be transmitted from animals to humans through the food chain or by direct contact.

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