ANTIBACTERIAL DRUGS

This broad classification of drugs comprises agents that are similar to the antibiotics (p.86) in function but dissimilar in origin. The original antibiotics were derived from living organisms, for example, moulds and fungi. Antibacterials were developed from chemicals. The sulphonamides were the first drugs to be given for the treatment of bacterial infections and provided the mainstay of the treatment of infection before penicillin (the first antibiotic) became generally available. Increasing bacterial resistance and the development of antibiotics that are more effective and less toxic have reduced the use of sulphonamides.

Why they are used

Sulphonamides are less commonly used these days, and co-trimoxazole is reserved for rare cases of pneumonia in immunocompromised patients.

Trimethoprim is used for chest and urinary tract infections. The drug used to be combined with sulfamethoxazole as co-trimoxazole, but because of the side effects of sulfamethoxazole, trimethoprim on its own is usually preferred now.

Antibacterials used for tuberculosis are discussed on p.90. Others, sometimes classified as antimicrobials, include metronidazole, prescribed for a variety of genital infections and for some serious infections of the abdomen, pelvic region, heart, and central nervous system. Other antibacterials are used to treat urinary infections. These include nitrofurantoin and drugs in the quinolone group (see facing page) such as nalidixic acid, which can be used to cure or prevent recurrent infections. The quinolones are effective against a broad spectrum of bacteria. More potent relatives of nalidixic acid include norfloxacin, which is used to treat urinary tract infections, and ciprofloxacin, levofloxacin, and ofloxacin. These are all also used to treat many serious bacterial infections.

How they work

Most antibacterials function by preventing growth and multiplication of bacteria (see also Action of antibiotics, p.86, and Action of sulphonamides, above).

How they affect you

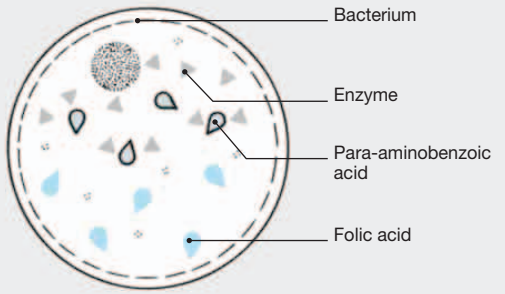
Antibacterials usually take several days to eliminate bacteria. During this time your doctor may recommend additional medication to alleviate pain and fever. Possible side effects of sulphonamides include loss of appetite, nausea, a rash, and drowsiness.

Risks and special precautions

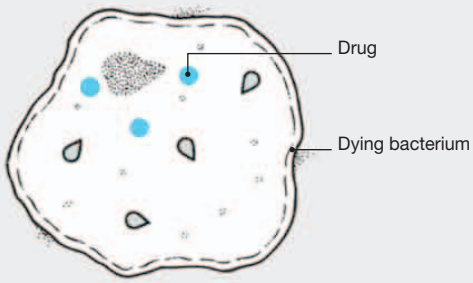
Like antibiotics, most antibacterials can cause allergic reactions in susceptible people. Possible symptoms that should always be brought to your doctor's attention include rashes and fever. If such symptoms occur, a change to another drug is likely to be necessary. Treatment with sulphonamides carries a number of serious, but uncommon risks. Some drugs in this group can cause crystals to form in the kidneys, a risk that can be reduced by drinking adequate amounts of fluid during prolonged treatment. Because sulphonamides may also occasionally damage the liver, they are not usually prescribed for people with impaired liver function. These drugs are also less frequently used in children because there is a theoretical risk of damage to the developing joints.

ACTION OF SULPHONAMIDES AND TRIMETHOPRIM

Before drug treatment
Folic acid, a chemical that is necessary for the growth of bacteria, is produced within bacterial cells by enzymes that act on a chemical called para-aminobenzoic acid.



After drug treatment
Sulphonamides and trimethoprim interfere with the action of the enzymes, and with the production of folic acid. The bacterium is therefore unable to function properly and dies.



DRUG TREATMENT FOR LEPROSY

Leprosy, also known as Hansen's disease, is a bacterial infection caused by *Mycobacterium leprae*. It is rare in the United Kingdom, but relatively common in parts of Africa, Asia, and Latin America.

The disease progresses slowly, first affecting the peripheral nerves and causing loss of sensation in the hands and feet. This leads to frequent unnoticed injuries or burns and consequent scarring. Later, the nerves of the face may also be affected.

Treatment uses three drugs together to prevent the development of resistance. Usually, dapsone, rifampicin, and clofazimine will be given for at least 2 years. If one of these cannot be used, then a second line drug (ofloxacin, minocycline, or clarithromycin) might be substituted. Complications during treatment sometimes require the use of prednisolone, aspirin, chloroquine, or even thalidomide.

COMMON DRUGS

Quinolones
Ciprofloxacin ✻
Levofloxacin ✻
Moxifloxacin
Nalidixic acid
Norfloxacin
Ofloxacin

Sulphonamides
Co-trimoxazole ✻
Sulfadiazine

Other drugs
Clofazimine
Dapsone
Daptomycin
Linezolid
Metronidazole ✻
Nitrofurantoin
Thalidomide ✻
Tinidazole
Trimethoprim ✻

✻ See Part 3