

condition. For example, an antitoxin is given to a person who has been exposed to a toxin but who does not have adequate immunity to combat the toxin-producing bacteria. An example is a landscaper who received a puncture wound while mowing lawns. Because *Clostridium tetani* live in soil and a puncture wound could conceivably allow the soil and bacteria into his body, he is at risk of developing a life-threatening tetanus infection. He should be administered the tetanus vaccine booster, but this will not provide immediate protection against the invasion. For that, he may receive a tetanus immune globulin (Baytet, HyperTET S/D) injection to provide immediate neutralization of the tetanus toxin (tetanospasmin) in his system with antibodies specific to the toxin.

Antifungal Medications

Antifungal medications treat fungal infections such as tinea pedis (commonly known as athlete's foot) or candidiasis (yeast infection). Fungi can live on the skin or inside the body. Unlike bacteria, fungi can be single-cell organisms or multicellular organisms with a complex structure. The human body can usually fight off fungal infections. Patients whose immune system is compromised by the human immunodeficiency virus (HIV), other microbes, or medical treatments are especially vulnerable to fungal infections.

Topical antifungal medications such as ketoconazole (Extina, Nizoral) and miconazole (Desenex, Micatin) can treat fungal infections on the skin such as athlete's foot. If the infection is in the oral and GI mucosa (a condition known as thrush), the medication nystatin (Mycostatin) is used because it is not absorbed but coats the mouth and stomach. If the fungi are growing in the body, or if skin infections are worsening, systemic antifungal medications such as fluconazole (Diflucan), itraconazole (Sporanox), and ketoconazole (Nizoral) are given to combat the infection. These systemic medications can be given orally or as an injection. Amphotericin B (Fungizone) is an IV medication reserved for potentially life-threatening fungal infections such as histoplasmosis, which can affect the lungs and other organs. The side effects of Fungizone are very serious and can affect the kidney, liver, blood counts, and electrolytes.

Medications that Fight Viruses

Viruses are microorganisms that require a host to reproduce themselves. Hosts can be humans, plants, or animals. Viruses, which are smaller than other microorganisms, insert their genetic material into this host and take over the host's cells to use them as a breeding facility. AIDS, cytomegalovirus (CMV) infection, rabies, smallpox, chickenpox, shingles, influenza, the common cold, and herpes are all caused by viruses. Even some types of cancer have been linked to viruses. The human body reacts to most viruses by developing antibodies to fight the invading microorganisms naturally. When the body needs help to fight off a viral infection, antiviral and antiretroviral medications are used. The choice is based on the type of virus infecting the patient.

Antiviral Medications

Antiviral therapy is the use of medications to inhibit the reproduction of a virus. Antiviral therapy is difficult because viruses replicate (reproduce) and mutate rapidly. Unlike antibiotics that kill the invader, antiviral drugs eliminate the materials that the virus needs to reproduce and flourish. This can be done in several ways. The virus can be blocked from entering the host cell, thus preventing the implantation of the virus DNA. Some antiviral medications target the enzymes and proteins the virus needs to replicate and function properly. Another way the virus is stopped is by strengthening the host's ability to fight the infections. Antiviral medications such as acyclovir (Acivir, Acivirax, Cyclovir, Herpex, Zovirax, and Zovir) are used to treat the viruses that cause herpes, chickenpox, and shingles. Zanamivir (Relenza) and oseltamivir (Tamiflu) are used to treat influenza type A and B. Also used to treat influenza type A is amantadine (Symmetrel). Relenza is an inhaled medication, whereas Tamiflu is an oral medication. CMV infection of the eye associated with AIDS and the smallpox virus can be treated with cidofovir. Ribavirin (Virazole) is used in fighting the hepatitis C virus and respiratory syncytial virus (RSV).

Antiretroviral Medications

Antiretroviral medications refer specifically to a group of medications used to fight retroviruses such as HIV. Retroviruses are different in that they have an RNA blueprint. The name implies that they use RNA to synthesize DNA, which is the opposite of the normal process. This allows genetic material from a retrovirus to become a permanent part of the genes of an infected cell. This embedding of the retrovirus into the genetic material makes it difficult to combat. HIV specifically attacks the assembling T4, or CD4, cells. Because these cells are the body's defensive soldiers, the host is rendered powerless to fight