THE IMMUNE SYSTEM AND DRUGS FOR INFECTIOUS DISEASES pdf

1: How Drug Abuse Can Weaken or Suppress the Immune System | Sunrise House

How Substance Abuse Increases the Risks of Infectious Diseases Why Drug Use Can Lead to an Infectious Disease: The chronic use of alcohol and nearly every drug of abuse taxes the system of an individual and potentially results in compromised immune system functioning.

This is the largest group of immune system diseases that comprises a variety of diseases that suppress the immune system. Often, the cause of immune deficiency conditions is an underlying chronic illness. The symptoms for immune deficiency conditions are the same as that of the underlying disease. SCID is an immune system disorder which is hereditary. Several types of recurrent infections are common in people suffering from SCID. Besides this, they are also prone to contract meningitis, pneumonia, measles, chickenpox, oral candida, cold sores, blood disorders, etc. The immune system diseases in children suffering from SCID, become evident in the first 3 months of birth. AIDS occurs in the later stages of progression of HIV, and causes the immune system of the body to collapse completely, after deteriorating slowly. AIDS is considered as a life-threatening, sexually transmitted disease, where it can be transmitted through physical contact, blood transfusion, sharing of needles, and the like. Chances of survival in AIDS patients are negligible, if diagnosed in later stages. The immune system related symptoms for AIDS range from the common cold and flu, to serious ones like pneumonia and cancer. Allergies can be defined as an aggravated immune system response to a normally harmless substance. There are a myriad allergens such as pollen grains, mold spores, latex rubber, and certain food items like peanuts or drugs like penicillin which can cause allergies. In many cases, there is more than one allergen responsible for inducing an allergic reaction. While allergy symptoms are often a mild consequence, medical intervention is advised to diagnose the underlying problem. Anaphylaxis is a serious and extreme form of allergies. In this condition, the allergen such as food, medication, or an insect bite, acts as a trigger and causes a series of physical discomforting symptoms in a person. Itchy rashes, a swollen throat, and a drop in blood pressure, are some of the common symptoms of anaphylaxis. Anaphylaxis may lead to an emergency situation if not diagnosed and treated on time. Asthma, a chronic lung disorder, is caused due to an inflammation of the air passage. Allergens, irritants or even stimulants such as physical activity can trigger the inflammation and induce variety of discomforts in a person. The symptoms of asthma include wheezing, coughing, shortness of breath, chest tightness, etc. Autoimmune diseases cause serious health hazards to an individual. Autoimmune diseases can be considered as an altogether different category of immune disorders. This syndrome affects all the major organs of the body, and halts their functioning. It damages the cells of the immune system and renders them ineffective against micro-organisms and other invaders. Those suffering from this go through recurrent infections. Common variable immunodeficiency syndrome is when there is a low count of antibodies in the body. This disorder is found mostly in adults. It may be present at the time of birth, where the symptoms do not surface until one enters their twenties. Symptoms include bacterial infections of the ears, sinuses, bronchi, and lungs. Painful swollen joints in the knee, ankle, elbow or wrist are also common symptoms. Some patients may report enlarged lymph nodes or the spleen. Hay fever is pretty similar to allergies, and is caused by airborne particulate like pollen, mold spores, or even animal dander. It is also called allergic rhinitis and affects over 35 million people in the US alone. The symptoms include, runny nose, watery eyes, sneezing etc. The symptoms remain for as long as you are in contact with the allergen. The allergen in this case is either food or contact with a certain plant. Wheals develop on the surface of the skin, as a reaction to the allergen. These wheals are often itchy and rounded, or flat topped. Apart from the itchy elevated skin, the other symptoms for hives include the swelling of the lips, tongue, and face. They are most prevalent among drug users and people with multiple sex partners. People with genital ulcers and a history of syphilis are also prone to HTLV. The mode of transmission of HTLV is through sexual contact, blood transfusion, or during pregnancy. Hyperimmunoglobulin E syndrome or Job syndrome is a group of a variety of immune disorders. This condition is characterized by a recurrent staphylococcus infection accompanied by skin rashes similar to eczema. It is a genetic disorder, where it can be dominant or recessive when passed on. People with dominant

hyper IgE syndrome are unable to lose their primary teeth and thus have two sets of these. Hyper IgM is a rare immunodeficiency disease. In this condition, the immune system fails to generate two types of antibodies, IgA and IgG. The cause of this disease is a defective gene in T-cells. Primary immunodeficiency diseases are a group of immune system diseases caused by genetic abnormalities. In this case, people are born with a faulty immune system. This is a special immunodeficiency in which the immune system fails to generate antibodies of type IgA. These antibodies protect the body against infections of the mucous membranes lining the mouth and digestive tract. Obviously, in their absence, the body is exposed to several infections of the mucous membrane. Skin allergies are similar to any other allergy, where only the immunological response is expressed through the skin. Skin allergies are again an aggravated response of the immune system to certain harmless substances. Skin allergies are characterized by red, itchy skin upon which lesions and wheals develop. The immune system does not produce enough antibodies to combat infections. Naturally, the body falls prey to a plethora of infections. The above list only takes some of the major immune disorders into consideration. Apart from these disorders, there are several genetic and acquired immunodeficiency diseases that affect millions of people all over the world. Since the immune system protects us from various infections and illnesses, special attempts are being made towards strengthening it.

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2: Immune System Research | NIH: National Institute of Allergy and Infectious Diseases

Higher doses of medications that weaken your immune system are more likely to increase your risk of getting a fungal infection. 5,11,13,14 Click on the sections below to see lists of corticosteroids and TNF inhibitors that can increase the chances of getting a fungal infection.

Your immune system is made up of special cells, tissues, and organs that work together to protect you. The lymph, or lymphatic, system is a major part of the immune system. They carry a clear fluid called lymph. Lymph contains tissue fluid, waste products, and immune system cells. Lymph nodes are small, bean-shaped clumps of immune system cells that are connected by lymphatic vessels. They contain white blood cells that trap viruses, bacteria, and other invaders, including cancer cells. White blood cells are the cells of the immune system. They are made in one of your lymph organs, the bone marrow. What can go wrong with your immune system? This is called primary immune deficiency. Get a disease that weakens your immune system. This is called acquired immune deficiency. This may happen with an allergic reaction. This is called autoimmune disease. Severe combined immunodeficiency SCID. This is an example of an immune deficiency that is present at birth. Children with SCID are missing important white blood cells. Temporary acquired immune deficiencies. These substances are called allergens. Having an allergic reaction is the most common example of an overactive immune system. Some conditions caused by an overactive immune system are: The response in your lungs can cause coughing, wheezing, and trouble breathing. An allergen causes an itchy rash known as atopic dermatitis. Sneezing, a runny nose, sniffling, and swelling of your nasal passages from indoor allergens like dust and pets or outdoor allergens like pollens or molds. The cause is unknown. Three common autoimmune diseases are: No one knows exactly what causes autoimmune diseases, but many factors seem to be involved.

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3: Disorders of the Immune System - Health Encyclopedia - University of Rochester Medical Center

Nathan's work on how the immune system kills bacteria and how the bacteria fight back attains a high point with his discovery of enzymes that help Mtbâ€"a tough disease with antimicrobial resistanceâ€"execute its defense mechanisms as well as inhibitors of these enzymes.

What is an autoimmune disease? An autoimmune disease is a condition in which your immune system mistakenly attacks your body. The immune system normally guards against germs like bacteria and viruses. When it senses these foreign invaders, it sends out an army of fighter cells to attack them. Normally, the immune system can tell the difference between foreign cells and your own cells. In an autoimmune disease, the immune system mistakes part of your body â€" like your joints or skin â€" as foreign. It releases proteins called autoantibodies that attack healthy cells. Some autoimmune diseases target only one organ. Type 1 diabetes damages the pancreas. Other diseases, like lupus, affect the whole body. Why does the immune system attack the body? Yet some people are more likely to get an autoimmune disease than others. Women get autoimmune diseases at a rate of about 2 to 1 compared to men â€" 6. Some autoimmune diseases are more common in certain ethnic groups. For example, lupus affects more African-American and Hispanic people than Caucasians. Certain autoimmune diseases, like multiple sclerosis and lupus, run in families. Not every family member will necessarily have the same disease, but they inherit a susceptibility to an autoimmune condition. Because the incidence of autoimmune diseases is rising, researchers suspect environmental factors like infections and exposures to chemicals or solvents might also be involved 2. Eating high-fat, high-sugar, and highly processed foods is linked to inflammation , which might set off an immune response. Another theory is called the hygiene hypothesis. The lack of exposure could make their immune system overreact to harmless substances 4. Diet, infections, and exposure to chemicals might be involved. There are more than 80 different autoimmune diseases 5. Here are 14 of the most common ones. Type 1 diabetes The pancreas produces the hormone insulin, which helps regulate blood sugar levels. In type 1 diabetes , the immune system attacks and destroys insulin-producing cells in the pancreas. High blood sugar can damage blood vessels, as well as organs like the heart, kidneys, eyes, and nerves. This attack causes redness, warmth, soreness, and stiffness in the joints. Unlike osteoarthritis , which affects people as they get older, RA can start as early as your 30s 6. Psoriasis causes skin cells to multiply too quickly. The extra cells build up and form red, scaly patches called scales or plaques on the skin. About 30 percent of people with psoriasis also develop swelling, stiffness, and pain in their joints 7. This form of the disease is called psoriatic arthritis. Multiple sclerosis Multiple sclerosis MS damages the myelin sheath â€" the protective coating that surrounds nerve cells. Damage to the myelin sheath affects the transmission of messages between your brain and body. This damage can lead to symptoms like numbness, weakness, balance issues, and trouble walking. The disease comes in several forms, which progress at different rates. About 50 percent of people with MS need help walking within 15 years after getting the disease 8. Systemic lupus erythematosus lupus Although doctors in the s first described lupus as a skin disease because of the rash it produces, it actually affects many organs, including the joints, kidneys, brain, and heart 9. Joint pain, fatigue, and rashes are among the most common symptoms. Inflammatory bowel disease Inflammatory bowel disease IBD is a term used to describe conditions that cause inflammation in the lining of the intestines. Ulcerative colitis affects only the lining of the large intestine colon and rectum. Having too little of these hormones can affect the way the body uses and stores carbohydrates and sugar. Symptoms include weakness, fatigue, weight loss, and low blood sugar. One common symptom of this disease is bulging eyes, called exophthalmos. Symptoms include weight gain, sensitivity to cold, fatigue, hair loss, and swelling of the thyroid goiter. Myasthenia gravis Myasthenia gravis affects nerves that help the brain control the muscles. The most common symptom is muscle weakness that gets worse with activity and improves with rest. Often muscles that control swallowing and facial movements are involved. Vasculitis Vasculitis happens when the immune system attacks blood vessels. The inflammation that results narrows the arteries and veins, allowing less blood to flow through them. Pernicious anemia This condition affects a protein called intrinsic factor that helps the intestines absorb vitamin B from food. Pernicious anemia is more

common in older adults. When gluten is in the intestine, the immune system attacks it and causes inflammation. Celiac disease affects about 1 percent of people in the United States The early symptoms of many autoimmune diseases are very similar, such as:

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4: Medications that Weaken Your Immune System and Fungal Infections| Fungal Diseases | CDC

The role of the immune system â€" a collection of structures and processes within the body â€" is to protect against disease or other potentially damaging foreign bodies.

Fortunately for most of us, the immune system is constantly on call to do battle with bugs that could put us out of commission. What the Immune System Does The immune pronounced: In most cases, the immune system does a great job of keeping people healthy and preventing infections. But sometimes, problems with the immune system can lead to illness and infection. Through a series of steps called the immune response, the immune system attacks organisms and substances that invade our systems and cause disease. The immune system is made up of a network of cells, tissues, and organs that work together to protect the body. About Cells The cells that are part of this defense system include white blood cells, also called leukocytes pronounced: They come in two basic types more on these below , which combine to seek out and destroy the organisms or substances that cause disease. Leukocytes are produced and stored in many locations throughout the body, including the thymus, spleen, and bone marrow. For this reason, they are called the lymphoid pronounced: There are also clumps of lymphoid tissue throughout the body, primarily in the form of lymph nodes, that house the leukocytes. The leukocytes circulate through the body between the organs and nodes by means of the lymphatic pronounced: You can think of the lymphatic vessels as a type of highway between the rest stops that are the lymphoid organs and lymph nodes. Leukocytes can also circulate through the blood vessels. In this way, the immune system works in a coordinated manner to monitor the body for germs or substances that might cause problems. There are two basic types of leukocytes: FAH-guh-sytes are cells that chew up invading organisms. LIM-fuh-sytes are cells that allow the body to remember and recognize previous invaders and help the body destroy them. A number of different cells are considered phagocytes. The most common type is the neutrophil pronounced: NOO-truh-fil , which primarily fights bacteria. So when doctors are worried about a bacterial infection, sometimes they order a blood test to see if a patient has an increased number of neutrophils triggered by the infection. Other types of phagocytes have their own jobs to make sure that the body responds appropriately to a specific type of invader. There are two kinds of lymphocytes: Lymphocytes start out in the bone marrow and either stay and mature there to become B cells or leave for the thymus gland, where they mature to become T cells. B lymphocytes and T lymphocytes have separate jobs to do: T cells are like the soldiers, destroying the invaders that the intelligence system has identified. A foreign substance that invades the body is called an antigen pronounced: When an antigen is detected, several types of cells work together to recognize and respond to it. These cells trigger the B lymphocytes to produce antibodies pronounced: Antibodies are specialized proteins that lock onto specific antigens. Antibodies and antigens fit together like a key and a lock. This is also why we use immunizations to prevent certain diseases. Although antibodies can recognize an antigen and lock onto it, they are not capable of destroying it without help. That is the job of the T cells. The T cells are part of the system that destroys antigens that have been tagged by antibodies or cells that have been infected or somehow changed. There are actually T cells that are called "killer cells. Antibodies can also neutralize toxins poisonous or damaging substances produced by different organisms. Lastly, antibodies can activate a group of proteins called complement that are also part of the immune system. Complement assists in killing bacteria, viruses, or infected cells. All of these specialized cells and parts of the immune system offer the body protection against disease. This protection is called immunity. Immunity Humans have three types of immunity â€" innate, adaptive, and passive: Innate Immunity Everyone is born with innate or natural immunity, a type of general protection that humans have. Innate immunity also includes the external barriers of the body, like the skin and mucous membranes like those that line the nose, throat, and gastrointestinal tract , which are our first line of defense in preventing diseases from entering the body. If this outer defensive wall is broken like if you get a cut , the skin attempts to heal the break quickly and special immune cells on the skin attack invading germs. Adaptive Immunity We also have a second kind of protection called adaptive or active immunity. This type of immunity develops throughout our lives. Adaptive immunity involves the lymphocytes as in the process described above and develops as children and

adults are exposed to diseases or immunized against diseases through vaccination. Passive Immunity Passive immunity is "borrowed" from another source and it lasts for a short time. This can help protect the infant against infection during the early years of childhood. Some people never seem to get infections, whereas others seem to be sick all the time. As people get older, they usually become immune to more germs as the immune system comes into contact with more and more of them. Sometimes a person is born with an immunodeficiency â€" these are called primary immunodeficiencies. Although primary immunodeficiencies are conditions that a person is born with, symptoms of the disorder sometimes may not show up until later in life. Immunodeficiencies also can be acquired through infection or produced by drugs. These are sometimes called secondary immunodeficiencies. Immunodeficiencies can affect B lymphocytes, T lymphocytes, or phagocytes. People with IgA deficiency tend to have allergies or get more colds and other respiratory infections, but the condition is usually not severe. Acquired or secondary immunodeficiencies usually develop after a person has a disease, although they can also be the result of malnutrition, burns, or other medical problems. Certain medicines also can cause problems with the functioning of the immune system. Acquired secondary immunodeficiencies include: This disease slowly and steadily destroys the immune system. It is caused by HIV, a virus which wipes out certain types of lymphocytes called T-helper cells. Without T-helper cells, the immune system is unable to defend the body against normally harmless organisms, which can cause life-threatening infections in people who have AIDS. Newborns can get HIV infection from their mothers while in the uterus, during the birth process, or during breastfeeding. Teens and adults can get HIV infection by having unprotected sexual intercourse with an infected person or from sharing contaminated needles for drugs, steroids, or tattoos. Immunodeficiencies caused by medications. Some medicines suppress the immune system. One of the drawbacks of chemotherapy treatment for cancer, for example, is that it not only attacks cancer cells, but other fast-growing, healthy cells, including those found in the bone marrow and other parts of the immune system. In addition, people with autoimmune disorders or who have had organ transplants may need to take immunosuppressant medications. Some autoimmune diseases include: Lupus is a chronic disease marked by muscle and joint pain and inflammation. The abnormal immune response may also involve attacks on the kidneys and other organs. Scleroderma is a chronic autoimmune disease that can lead to inflammation and damage of the skin, joints, and internal organs. Ankylosing spondylitis is a disease that involves inflammation of the spine and joints, causing stiffness and pain. Juvenile dermatomyositis is a disorder marked by inflammation and damage of the skin and muscles. Allergic Disorders Allergic disorders happen when the immune system overreacts when exposued to antigens in the environment. The substances that provoke such attacks are called allergens. The immune response can cause symptoms such as swelling, watery eyes, and sneezing, and even a life-threatening reaction called anaphylaxis. Taking medications called antihistamines can relieve most symptoms. Asthma , a respiratory disorder that can cause breathing problems, frequently involves an allergic response by the lungs. If the lungs are oversensitive to certain allergens like pollen, molds, animal dander, or dust mites , it can trigger breathing tubes in the lungs to become narrowed and swollen, leading to reduced airflow and making it hard for a teen to breathe. Eczema is an itchy rash also known as atopic dermatitis. Although atopic dermatitis is not necessarily caused by an allergic reaction, it more often happens in kids and teens who have allergies, hay fever, or asthma or who have a family history of these conditions. Allergies of several types can happen in teens. Environmental allergies to dust mites, for example , seasonal allergies such as hay fever , drug allergies reactions to specific medications or drugs , food allergies such as to nuts , and allergies to toxins bee stings, for example are the common conditions people usually refer to as allergies. Cancers of the Immune System Cancer happens when cells grow out of control. This can also happen with the cells of the immune system. Leukemia , which involves abnormal overgrowth of leukocytes, is the most common childhood cancer. Lymphoma involves the lymphoid tissues and is also one of the more common childhood cancers. With current medications most cases of both types of cancer in kids and teens are curable.

THE IMMUNE SYSTEM AND DRUGS FOR INFECTIOUS DISEASES pdf

5: Immunosuppression - Wikipedia

The immune system is a network of cells, tissues, and organs that work together to protect the body from infection.

HIV stands for human immunodeficiency virus. It is the virus that can lead to acquired immunodeficiency syndrome or AIDS if not treated. So once you get HIV, you have it for life. Untreated, HIV reduces the number of CD4 cells T cells in the body, making the person more likely to get other infections or infection-related cancers. These opportunistic infections or cancers take advantage of a very weak immune system and signal that the person has AIDS, the last stage of HIV infection. No effective cure currently exists, but with proper medical care, HIV can be controlled. If it stays undetectable, they can live long, healthy lives and have effectively no risk of transmitting HIV to an HIV-negative partner through sex. Today, someone diagnosed with HIV and treated before the disease is far advanced can live nearly as long as someone who does not have HIV. Where did HIV come from? Scientists identified a type of chimpanzee in Central Africa as the source of HIV infection in humans. They believe that the chimpanzee version of the immunodeficiency virus called simian immunodeficiency virus, or SIV most likely was transmitted to humans and mutated into HIV when humans hunted these chimpanzees for meat and came into contact with their infected blood. Studies show that HIV may have jumped from apes to humans as far back as the late s. Over decades, the virus slowly spread across Africa and later into other parts of the world. We know that the virus has existed in the United States since at least the mid to late s. What are the stages of HIV? Medicine to treat HIV, known as antiretroviral therapy ART , helps people at all stages of the disease if taken as prescribed. Treatment can slow or prevent progression from one stage to the next. Acute HIV infection Within 2 to 4 weeks after infection with HIV, people may experience a flu-like illness, which may last for a few weeks. When people have acute HIV infection, they have a large amount of virus in their blood and are very contagious. If you think you have been exposed to HIV through sex or drug use and you have flu-like symptoms, seek medical care and ask for a test to diagnose acute infection. During this phase, HIV is still active but reproduces at very low levels. People may not have any symptoms or get sick during this time. As this happens, the person may begin to have symptoms as the virus levels increase in the body, and the person moves into Stage 3. People with AIDS have such badly damaged immune systems that they get an increasing number of severe illnesses, called opportunistic illnesses. Without treatment, people with AIDS typically survive about 3 years. Common symptoms of AIDS include chills, fever, sweats, swollen lymph glands, weakness, and weight loss. People with AIDS can have a high viral load and be very infectious. The only way to know for sure whether you have HIV is to get tested. Knowing your status is important because it helps you make healthy decisions to prevent getting or transmitting HIV. Some people may experience a flu-like illness within 2 to 4 weeks after infection Stage 1 HIV infection. But some people may not feel sick during this stage. Flu-like symptoms include fever, chills, rash, night sweats, muscle aches, sore throat, fatigue, swollen lymph nodes, or mouth ulcers. These symptoms can last anywhere from a few days to several weeks. During this time, HIV infection may not show up on an HIV test, but people who have it are highly infectious and can spread the infection to others. Each of these symptoms can be caused by other illnesses. But if you have these symptoms after a potential exposure to HIV, see a health care provider and tell them about your risk. You can also use a home testing kit, available for purchase in most pharmacies and online. Is there a cure for HIV? No effective cure currently exists for HIV. But with proper medical care, HIV can be controlled.

THE IMMUNE SYSTEM AND DRUGS FOR INFECTIOUS DISEASES pdf

6: Infectious Diseases: How Substance Abuse Increases the Risks

The immune system is a network of cells, tissues, and organs that work together to defend the body against disease, infection and viruses. If this system is damaged, reduced or does not work as efficiently as it should, a person will become sick with illness from infections or viruses.

Fungi live outdoors in soil, on plants, trees, and other vegetation. They are also on many indoor surfaces and on your skin. However, there may be some ways for you to lower your chances of getting a serious fungal infection. Learn about fungal infections. There are different types of fungal infections. Learning about them can help you and your healthcare provider recognize the symptoms early, which may prevent serious illness. Get additional medical care if necessary. Fungal infections often resemble other illnesses. Visiting your healthcare provider may help with faster diagnosis and may prevent serious illness. Protect yourself from the environment. While using these medications, there may be some ways to lower your chances of getting a serious fungal infection by trying to avoid disease-causing fungi in the environment. Try to avoid areas with a lot of dust like construction or excavation sites. Stay inside during dust storms. Stay away from areas with bird and bat droppings. This includes places like chicken coops and caves. Wear gloves when handling materials such as soil, moss, or manure. Wear shoes, long pants, and a long-sleeved shirt when doing outdoor activities such as gardening, yard work, or visiting wooded areas. Clinical use of anti-TNF therapy and increased risk of infections. Drug, healthcare and patient safety ;5: Increased risk of coccidioidomycosis in patients treated with tumor necrosis factor alpha antagonists. Coccidioidomycosis in rheumatology patients: Annals of the New York Academy of Sciences ; Invasive fungal infection in Chinese patients with systemic lupus erythematosus. Risk factors for Cryptococcus gattii infection, British Columbia, Canada. Emerg Infect Dis ; Invasive fungal infections in the era of biologics. Clinics in chest medicine ; Endemic fungal infections in patients receiving tumour necrosis factor-alpha inhibitor therapy. Pneumocystis jirovecii colonization in patients with systemic autoimmune diseases: Mori S, Sugimoto M. Occurrence and risk factors of oral candidiasis treated with oral antifungals in seniors using inhaled steroids. Journal of clinical epidemiology ; Fungal infections in immunocompromised travelers. Clinical Infectious Diseases ; Risk stratification for invasive aspergillosis in immunocompromised patients. Review of Infectious Diseases ; Strategies for safe living after solid organ transplantation. American Journal of Transplantation ;13 Suppl 4:

7: Autoimmune Diseases | Autoimmune Disease Symptoms | MedlinePlus

HIV (human immunodeficiency virus) infection/AIDS (acquired immunodeficiency syndrome) is a disease that slowly and steadily destroys the immune system. It is caused by HIV, a virus that wipes out certain types of lymphocytes called T-helper cells.

Research Frontiers Complications arise when the immune system does not function properly. Some issues are less pervasive, such as pollen allergy, while others are extensive, such as genetic disorders that wipe out the presence or function of an entire set of immune cells. Temporary immune deficiency can be caused by a variety of sources that weaken the immune system. Common infections, including influenza and mononucleosis, can suppress the immune system. When immune cells are the target of infection, severe immune suppression can occur. For example, HIV specifically infects T cells, and their elimination allows for secondary infections by other pathogens. Patients receiving chemotherapy, bone marrow transplants, or immunosuppressive drugs experience weakened immune systems until immune cell levels are restored. Pregnancy also suppresses the maternal immune system, increasing susceptibility to infections by common microbes. Primary immune deficiency diseases PIDDs are inherited genetic disorders and tend to cause chronic susceptibility to infection. There are over PIDDs, and almost all are considered rare affecting fewer than , people in the United States. They may result from altered immune signaling molecules or the complete absence of mature immune cells. For instance, X-linked severe combined immunodeficiency SCID is caused by a mutation in a signaling receptor gene, rendering immune cells insensitive to multiple cytokines. Without the growth and activation signals delivered by cytokines, immune cell subsets, particularly T and natural killer cells, fail to develop normally. Read more about PIDDs. Hypersensitivity reactions are divided into four classes. Overproduction of these antibodies activates immune cells like basophils and mast cells, which respond by releasing inflammatory chemicals like histamine. Class IV reactions are caused by T cells, which may either directly cause damage themselves or activate macrophages and eosinophils that damage host cells. Read more about Food Allergy. Autoimmune Diseases Autoimmune diseases occur when self-tolerance is broken. Self-tolerance breaks when adaptive immune cells that recognize host cells persist unchecked. B cells may produce antibodies targeting host cells, and active T cells may recognize self-antigen. This amplifies when they recruit and activate other immune cells. Autoimmunity is either organ-specific or systemic, meaning it affects the whole body. However, systemic lupus erythematosus, commonly called lupus, can result from antibodies that recognize antigens expressed by nearly all healthy cells. Autoimmune diseases have a strong genetic component, and with advances in gene sequencing tools, researchers have a better understanding of what may contribute to specific diseases. Read more about Autoimmune Diseases. Sepsis Sepsis may refer to an infection of the bloodstream, or it can refer to a systemic inflammatory state caused by the uncontrolled, broad release of cytokines that quickly activate immune cells throughout the body. Sepsis is an extremely serious condition and is typically triggered by an infection. However, the damage itself is caused by cytokines the adverse response is sometimes referred to as a "cytokine storm". The systemic release of cytokines may lead to loss of blood pressure, resulting in septic shock and possible multi-organ failure. Sepsis Factsheet Cancer Some forms of cancer are directly caused by the uncontrolled growth of immune cells. Leukemia is cancer caused by white blood cells, which is another term for immune cells. Lymphoma is cancer caused by lymphocytes, which is another term for adaptive B or T cells. Myeloma is cancer caused by plasma cells, which are mature B cells. Unrestricted growth of any of these cell types causes cancer. In addition, an emerging concept is that cancer progression may partially result from the ability of cancer cells to avoid immune detection. The immune system is capable of removing infectious pathogens and dangerous host cells like tumors. Cancer researchers are studying how the tumor microenvironment may allow cancer cells to evade immune cells. Immune evasion may result from the abundance of suppressive, regulatory immune cells, excessive inhibitory cytokines, and other features that are not well understood. Content last reviewed on January 17,

8: Prevention and Treatment - What You Need to Know About Infectious Disease - NCBI Bookshelf

People who take drugs that suppress the immune system are less likely to develop Parkinson's disease, according to a study from Washington University School of Medicine in St. Louis.

Hepatitis B and C Tobacco Research indicates a clear relationship between chronic abuse of tobacco products and decreased immune system functioning. Chronic tobacco abuse is associated with: Decreased antibody formation in both animals and humans Decreased lymphocyte proliferation in both animals and humans Decreased availability of antioxidants in heavy smokers Increased infection susceptibility to nearly every bacterial and viral infection tested Extreme susceptibility to respiratory infections as would be expected Opioids Opioid drugs all originate from substances derived from the poppy plant. Their primary medicinal use is to control chronic pain. As a side effect, many of these drugs produce significant feelings of euphoria and are high potential candidates for abuse and the development of physical dependence. It has long been established that chronic use of opioid drugs , such as morphine, heroin, Vicodin, OxyContin, tramadol, etc. Research suggests that morphine, the prototypical opioid drug, suppresses the activity of the different types of white blood cells that are important in fighting off infections. This suggests that individuals who chronically abuse opioid drugs are susceptible to any number of infectious diseases and will most likely experience respiratory infections like colds and influenza due to a combination of the drugs inhibiting respiration and suppressing the immune system , cardiovascular infections, and issues with the liver and kidneys. It is also probably safe to assume that not all opioid drugs have similar effects on the immune system; however, the specific effects on immune system functioning of each opioid drug are not well known. Currently, it is probably safest to assume that opioid drugs in general suppress immune system functioning. When taken in large doses over lengthy periods of time, drugs that combine opioids with medications like acetaminophen, such as tramadol, can suppress the immune system and result in liver toxicity, which further suppresses the ability to fight infection. Marijuana There are a number of animal models that suggest that chronic use of cannabis products may be associated with decreased immune system functioning; however, these findings are less clear in adult humans. However, it is safe to conclude that children and adolescents who use cannabis products regularly most likely do experience suppressed immune system functioning. Cocaine As with other drugs, chronic use of cocaine affects the immune system and leads to an increased susceptibility to develop infections. One interesting aspect of cocaine abuse is its suppression of the thymus gland that produces T lymphocytes, which attack foreign cells. Chronic cocaine abuse appears to hinder the ability of certain groups of the cells to develop and also increases the rate of the number of the cells that undergo programmed cell death prematurely apoptosis. The more cocaine one uses, the more cells die off. Issues with Injecting Drugs and Other Risky Behaviors While the majority of research indicates that chronic abuse of any class of drugs results in decreased immune system functioning and an increased susceptibility to develop a number of different issues, there are various other methods by which individuals with substance use disorders increase their susceptibility to the risk of contracting infections. Drugs that are commonly injected include morphine, heroin, methamphetamine, and cocaine. Injection of these drugs and sharing needles accounts for a significant proportion of cases of HIV per year and is also a major factor in the spread of hepatitis C, which is a serious and potentially fatal disease of the liver. Obviously, needle sharing as a result of drug abuse is a major factor in the spread of these serious infectious diseases. In addition, the use of many of these drugs increases the likelihood that individuals will engage in risky behaviors, such as unprotected sex. This can result in a number of sexually transmitted diseases, the spread of HIV, and the spread of diseases like hepatitis B and C. Chronic drug abusers engage in a number of other behaviors that open them up to the risk of developing infection. Oftentimes, these individuals neglect aspects of their personal hygiene and nutrition. They often engage in bingeing behaviors that result in a number of different stresses on bodily systems and also lead to increased susceptibility to infections and diseases. Individuals who abuse multiple drugs multiply their risk factors significantly. Individuals with chronic substance use disorders very often have comorbid co-occurring psychological or psychiatric disorders, such as depression, anxiety disorders, and personality disorders. People

with these mental health issues are also known to be particularly susceptible to infections and diseases of all types. Thus, individuals with substance use disorders typically have increased chances of catching an infectious disease through a number of different pathways.

THE IMMUNE SYSTEM AND DRUGS FOR INFECTIOUS DISEASES pdf

9: Immune System Diseases: List of Immune System Disorders

Without the right nutrients, our immune systems cannot defeat diseases caused by bacteria, viruses, parasites, and other microorganisms. Radiotherapy Since bone marrow produces white blood cells, which include the immune system cells that defend the body against infectious disease, the body's immune system is less able to protect itself from.

Some are simple steps that individuals can take; others are national or global methods of detection, prevention, and treatment. All are critical to keeping communities, nations, and global populations healthy and secure. Vaccines and Medicines Medicines have existed in human society probably as long as sickness itself. However, with the advent of the modern pharmaceutical industry, biochemical approaches to preventing and treating disease have acquired a new level of prominence in the evolving relationship between microbes and their human hosts. Vaccines A vaccine is a biological preparation that improves immunity to a particular disease. A vaccine typically contains an agent that resembles a disease-causing microorganism and is often made from weakened or killed forms of the microbe or its toxins. Because vaccines are widely used in the United States, many once-common diseasesâ€”polio, measles, diphtheria, whooping cough, mumps, tetanus, and certain forms of meningitisâ€”are now rare or well controlled. Vaccinated people produce antibodies that neutralize a disease-causing virus or bacterium. They are much less likely to become infected and transmit those germs to others. The higher the proportion of vaccinated people in a community, the lower the likelihood that a susceptible person will come into contact with an infectious individualâ€”leading to greater herd immunity. In the past, thimerosal, a preservative that contains mercury, was used in some vaccines and other products. Use of this product became the subject of controversy, with some arguing that the substance caused autism in children. Extensive, independent research has presented no convincing evidence of harm associated with the low levels of thimerosal present in vaccines. Since , thimerosal has not been routinely used as a preservative in recommended childhood vaccines. Antibiotics and Antivirals Antibiotics are powerful medicines that fight bacterial infections. Used properly, antibiotics can save lives. But growing antibiotic resistance is curbing the effectiveness of these drugs. Taking an antibiotic as directed, even after symptoms disappear, is key to curing an infection and preventing the development of resistant bacteria. There are several different classes of drugs in the antiviral family, and each is used for specific kinds of viral infections. Unlike antibacterial drugs, which may cover a wide spectrum of pathogens, antiviral medications are used to treat a narrower range of organisms. Antiviral drugs are now available to treat a number of viruses, including influenza, HIV, herpes, and hepatitis B. Like bacteria, viruses mutate over time and develop resistance to antiviral drugs. New Treatments Modern medicine needs new kinds of antibiotics and antivirals to treat drug-resistant infections. But the pipeline of new drugs is drying up. For example, nearly 40 years elapsed between introduction of the two newest molecular classes of antibiotics: Major pharmaceutical companies have limited interest in dedicating resources to the antibiotics market because these short-course drugs are not as profitable as drugs that treat chronic conditions and lifestyle-related ailments, such as high blood pressure or high cholesterol. Antibiotic research and development is also expensive, risky, and time consuming. Return on that investment can be unpredictable, considering that resistance to antibiotics develops over time, eventually making them less effective. New antiviral drugs are also in short supply. These medicines have been much more difficult to develop than antibacterial drugs because antivirals can damage host cells where the viruses reside. Today, there are more antiviral drugs for HIV than for any other viral disease, transforming an infection that was once considered a death sentence into a manageable chronic condition. But novel drugs are needed to combat other epidemic viral infections, such as influenza and hepatitis B and C. Several programs have been developed to stimulate research and development of new vaccines and medicines. Department of Health and Human Services recently formed the Biomedical Advanced Research and Development Authority, which provides an integrated, systematic approach to the development and purchase of the vaccines, drugs, therapies, and diagnostic tools necessary for public health medical emergencies. The Cures Acceleration Network provision of the Patient Protection and Affordable Care Act, signed into law by President Obama in March , is designed to move research discoveries through to safe and effective therapies

by awarding grants through the National Institutes of Health to biotech companies, universities, and patient advocacy groups. And nonprofit organizations dedicated to accelerating the discovery and clinical development of new therapies to treat infectious diseases are bringing together philanthropists, medical research foundations, industry leaders, and other key stakeholders to forge effective collaborations. Microbe Awareness Daily habits provide some of the strongest defenses against infectious diseases. Among the sensible actions you can take: Keep immunizations up to date. Wash your hands often. Washing with regular soap and rinsing with running water, followed by thorough drying, is considered the most important way to prevent disease transmission. Routine consumer use of residue-producing antibacterial products, such as those containing the chemical triclosan, have not been proven to confer health benefits and may actually contribute to antibiotic resistance. Prepare and handle food carefully. Use antibiotics only for infections caused by bacteria. Viral infections cannot be treated with antibiotics. Your doctor may prescribe an antiviral medication if your condition warrants it. Report to your doctor any rapidly worsening infection or any infection that does not get better after taking a course of antibiotics, if prescribed. Be careful around all wild animals and unfamiliar domestic animals. After any animal bite, cleanse the wound with soap and water and consult a clinician for further evaluation. Enjoy wild animals with your eyes, not by touching them. Avoid insect bites whenever possible by using insect repellent and wearing long-sleeved shirts, long pants, and a hat outdoors. Protect yourself by using safe sex practices. You and your partner should be tested for sexually transmitted diseases, including HIV, if there has been any risk of exposure. Consistently and correctly use condoms when having sex with a partner of unknown status. Avoid sex with an injecting drug user. Stay alert to disease threats when traveling or visiting underdeveloped countries. Seek advice from a reliable source, such as the WHO or the CDC, if you are going to areas of moderate-to-high disease risk. Acquire healthy habits such as eating well, getting enough sleep, exercising, and avoiding tobacco and illegal drug use. Government Policies Keeping our nation safe from disease outbreaks depends on effective and well-coordinated programs that monitor public health. What are some of the key efforts at work in the United States? Public Health Capacity The mission of public health is to safeguard and improve the health of the community as a whole. Effectively responding to infectious disease threats therefore requires a robust public health system. In the United States, public health surveillance for infectious diseases is conducted through a variety of agencies. Health care providers and others report cases of notifiable infectious diseases as defined by local and state health codes to state health departments. State health department officials, in turn, verify disease reports, monitor disease incidence, identify possible outbreaks, and forward their findings to the CDC. Department of Agriculture, and the U. Department of Defense, independently gather and analyze information for disease surveillance. Public health advocates have called for improved surveillance to better monitor infectious diseases across the country. Syndromic surveillanceâ€”the near- or real-time monitoring of nonspecific pre-diagnostic signs of disease outbreaksâ€”is an innovative surveillance method that is being explored by some cities and states with assistance from the federal government as a means of providing early warning of infectious disease outbreaks. Syndromic surveillance rests on the idea that, following large-scale exposure to infectious disease in an epidemic or bioterrorist attack, people will first develop symptoms, stay away from work or school, and attempt to treat themselves before seeing a doctor. These systems therefore monitor school and work absenteeism, sales of over-the-counter medications, illness-related calls, and other patterns that suggest an outbreak. However, most surveillance still focuses on tracking reported infections. Food Safety Foodborne diseases are largely preventableâ€”but the goal requires vigilance in every step from the farm to the table. Good agricultural and manufacturing practices can reduce the spread of microbes among animals and prevent contamination of foods. Monitoring the entire food production process can pinpoint hazards and control points where contamination can be prevented, limited, or eliminated. First developed by NASA to ensure that the food eaten by astronauts was safe, HACCP safety principles are now being applied to a widening range of foods, including meat, poultry, seafood, fruit juices, and other products. In recent years the U. Advocates have recommended that all food safety activities be consolidated into a single federal agency with a unified mission. International Cooperation National borders offer trivial impediment to infectious disease threats. Therefore, many of the strategies described above must be implemented worldwide, not just nationally, in

order to have a true impact. Global Surveillance Just as national surveillance is critical to controlling outbreaks within a nation, global surveillance is a critical component to responding to infectious disease worldwide. These require WHO member states to report certain diseases and outbreaks that may represent public health emergencies of international concern to the WHO and to strengthen their capacities for public health surveillance, diagnosis, and response. Technological advances in disease surveillance and detection such as regional syndromic surveillance, bioinformatics, and rapid diagnostic methods, have strengthened infectious disease control and prevention efforts. By identifying viruses, bacteria, and parasites in animals where they naturally live, and monitoring those organisms as they move from animals into people, it may be possible to prevent deadly new infections of animal origin from entering and racing through human populations. The One Health Initiative, a worldwide movement to forge collaborations among physicians, veterinarians, and other related disciplines, is an example of efforts to improve communication about human and animal diseases. Public Health in Developing Nations The gaps in life expectancy between the richest and poorest countries now exceed 40 yearsâ€”in large measure owing to the toll of infectious diseases. Safe water supplies, sewage treatment and disposal, improved food safety, and vaccination programs are urgently needed in developing nations. A major barrier to achieving these improvements is the underlying weakness of public health systems in resource-poor countries, including a shortage of health care workers, which hinders efforts to immunize, treat, and monitor the status of patients. Poor nations also lack disease surveillance programs and up-to-date laboratories, which are essential in the mission to find, diagnose, and contain infectious diseases. Distribution of Medicines Life-saving vaccines and medications are not distributed equitably around the world. Only 2 percent of people with multidrug-resistant TB receive the right medications. And while children in wealthy countries are routinely immunized with vaccines that protect against childhood pneumonia and diarrhea, children in poor countries are not; for each child who dies from pneumonia in an industrialized country, more than 2, children die from the infection in developing countries. Many factors influence whether poor nations can obtain affordable drugs of good quality. Most drug research and development is not geared toward the needs of people in poor countries because they are not a large market. Social and political challenges to the distribution of medicines are factors as well. Efforts are being made by foundations, pharmaceutical companies, and other organizations to overcome these challenges, providing funding, research, and donations of medications. Two health workers give a child polio vaccine during a vaccination campaign in the Democratic Republic of the Congo.

THE IMMUNE SYSTEM AND DRUGS FOR INFECTIOUS DISEASES pdf

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