Categories of microbes and infections caused by microbes

Science, Biology

The paper " Categories of Microbes and Infections Caused by Microbes" is an outstanding example of an essay on biology. Microbes are tiny organisms, found in abundance on Earth (in air, soil, rock, water), but are too tiny to be seen without a microscope. They are found in almost every habitat existing in nature. Some microbes thrive in heat while others, in cold and can be found in plants, animals as well as human bodies and in the most hostile of environments. Microbes can be disease-causing (germs) or essential for life which is why the relationship between microbes and humans is intense and complex. Microbes usually belong to 4 categories – bacteria, fungi, viruses, and protozoa. Bacteria are made up of only one cell, shaped like balls, rods or spirals. These are the oldest living creatures on Earth, dating back to 3. 5 billion years. Depending on their inhabitation, bacteria can be Psychrophiles (found in cold temperatures like in Arctic and Antarctic), Thermophiles (found in hot temperatures) and Extreme Thermophiles or Hyperthermophiles (thrive at very high temperatures like volcanic vents on the ocean floor). However, bacteria generally prefer mild temperatures of a healthy human body. Also, bacteria can be categorized as Aerobic (need oxygen to survive) or Anaerobic (thrive without oxygen). One such anaerobic bacterium named Lactobacilli acidophilus help in human digestion, fight cancer cells and provide vitamins. Also, food products like yogurt, cheese, etc are made using bacteria. The second category of microbes is viruses which are the smallest microbe. These are not cells but consist of one or more molecules of DNA or RNA containing virus genes surrounded by a protein coat. These are shaped like rod, sphere, multisided or tadpoles. Most viruses cause disease since they enter living cells and then multiply. The

specific virus attacks specific cells in the human body’s organs or tissues. Viruses called bacteriophages also infect bacteria that help develop alternatives for the prevention or treatment of bacterial infection. Another category of microbes is fungi which are primitive plants and can be found in air, soil, plants, water or the human body without causing illness. There are millions of types of fungi, most common being mushrooms, yeast, etc. Fungal diseases are known as mycoses which affect skin, nails, hair, lungs or nervous system. Useful fungi like Penicillin (and other antibiotics kill harmful bacteria in the human body) and yeasts help in the fermentation of food. The last category of microbes known as Protozoa is a group of one-celled animals and can be parasites or predators and these usually cause disease in human beings. In water, they also serve as food for marine animals. These require a moist environment to survive and are found on decaying matter on land and in soil. These are also present in the guts of termites which help them digest food. The history of infections, caused by microbial parasites, dates back to the prehistoric times. Ancient Egyptian and Chinese writings describe Smallpox which was caused by variola virus which killed millions of people over thousands of years before it was eradicated by vaccination. Malaria is caused by Plasmodium, a protozoan parasite, and poliomyelitis, which is caused by the poliovirus and can be deadly. Thus comes into play, the role of microbiology, the science which explores how microbes work and ways to control them. Microbes can travel through the air and therefore can be transmitted from one human being to another by coughing or sneezing. Also, close contact can pass n such germs. Around 500 bacteria live in the human mouth. Touching infected substances or contaminated surfaces can also lead

to passing on of germs. Household pets can also harbor germs, for instance, rabies virus in cats and dogs. The saliva of cats and dogs contains 100 such different types of germs. Mosquitoes, fleas, ticks (known as vectors or pathogens) also act as germ carriers and transmit protozoan from an infected person to an uninfected person. Food and water, contaminated with microbes spread foodborne diseases worldwide, which are also fatal in certain cases when not treated properly. The main reasons for the same are poor manufacturing processes like undercooking or unpasteurized food products. Transplanted animal organs in humans can also cause diseases due to the transmission of microbes which were potentially harmless in animals to humans where it might be quite harmful. Unsanitary conditions in animal agriculture and increasing commerce have led to increased opportunities for animal microbes to be transferred to humans. The infections caused by microbes can be acute (quick to infect and do not recur, chronic (lasts for a long time) or latent (lasts forever but feels sick only once a while) in nature. Acute infections are severe in nature but last a short while with discomfort and symptoms like tiredness, ache, cough, sneezing. Chronic infections are developed from acute ones which may last for days, months or even a lifetime and recovery from this infection is rare. Moreover, infected persons become the carrier of the virus themselves. Latent infections are silent or hidden and the symptoms may not show after the first acute one. It is, however, important to understand that there is a difference between a disease and an infection. When cells or molecules in the body stop working causing symptoms, it is a disease. Infection occurs when a microbe enters the body and begins to reproduce. Thus, an infection may lead to the disease

at a later stage when a microbe can directly damage cells or the immune system. Immunity against a microbe is developed in humans in several ways. Naturally acquired immunity makes the immune system aware of its enemies so that it becomes active when they meet a particular antigen again (when the T cell and B cell in immune system meet up with an antigen, such as a virus or bacterium or when a pregnant woman passes antibodies to her unborn baby and later on through breastfeeding). An antigen is a substance which is recognized by the immune system and can come from foreign bodies such as bacteria or virus. Artificial immunity as a protection from germs can be acquired through vaccines, which contain microorganisms or parts of microorganisms that have been weakened or killed. The type and amount of antigen and the route through which it enters body determines whether the immunity is strong or weak and short- or long-lived. When faced with the same antigen, some people's immune systems might respond intensively, others meekly, and some might not respond at all. The genes inherited can also influence the likelihood of getting a disease and how the body reacts to certain microbes. As the old saying goes, ' Prevention is better than cure'. In order to prevent transmission of germs following precautions should be taken on a day-to-day basis for instance, washing hands at regular intervals, vaccines, and antiviral medicines. It is always advisable to consult doctors who are professionally trained to determine the seriousness of the infection, treatment, and prevention of disease. The diagnosis of infection can be done in a variety of manners like inspecting the medical history and physical examination of a person. Other methods are blood or urine tests, X-rays, scan and biopsies. Biopsy refers to

the study f a part of the tissue of the infected area under a microscope. The treatment of an infectious disease depends on factors like the nature of infecting microbe, age and medical condition of the infected person, type of disease (certain diseases require only relieving of symptoms and others for the destruction of offending microbe). The body of the infected person itself fights against disease through B, T cells and antibodies. Through fever (since certain microbes cannot survive at a temperature higher than body temperature), coughing and sneezing (which is mucus production and moves germs out of the body quickly and efficiently), inflammation, vomiting, diarrhea, fatigue, cramping, etc. body reacts to an infection. Doctors or health care professionals also provide treatment specific to a microbe, such as for bacteria, specific antibiotics are prescribed. Viral diseases are hard to treat since viruses reside in body cells and are protected from general medicines in bloodstreams for which antiviral medicines are to be administered. Fungal infections are treated through medicines that are applied directly to the infected area. However, there are very limited medicines that fight protozoa. Despite the infections caused, it must not be forgotten that microbes are essential to human existence and the surrounding. They are a vital part of earth cycles like carbon and nitrogen cycle and important role in ecosystems through recycling dead organisms and decomposition of waste products. In food microbes are used for brewing, making wine, food processing like baking and pickling, etc. and also for fermentation. These are also helpful in sewage treatment, production of methane and several other scientific research purposes.