

PLAGUES IN MAN

ISC 2937
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Glossary

AIDS (Acquired Immune Deficiency Syndrome) - a virus that weakens the immune system and subjects the patient to opportunistic diseases such as pneumonia and tuberculosis. The virus is transmitted through the exchange of body fluids, primarily semen, blood, and blood products. Though progress has been made in prolonging the life of AIDS patients, there is currently no cure for the disease. However, it can be prevented by having protected sex and using sterilized needles. AIDS is a problem throughout the world, especially in sub-Saharan Africa.

aerobic - growing or thriving only in the presence of oxygen.

aerosol transmission - a cloud or mist of solid or liquid particles containing pathogenic microorganisms, released by sneezing or coughing.

analgesics - drugs that relieve pain.

Anthrax - a zoonosis that is associated with grazing animals such as sheep and cows which is caused by the bacterium, *Bacillus anthracis*. Animals are infected by inhaling bacterial spores or by consuming soil contaminated with the spores. In humans, there are three types of infection-cutaneous, inhalation, and rarely gastrointestinal. The causative agent of anthrax is the focus of biological warfare.

antibiotic - a substance made either from a mold or bacterium, or synthetically that inhibits or kills certain microorganisms, specifically bacteria, and that treats infections.

antibodies - any of a large number of proteins of high molecular weight that are produced, as part of the immune response, in response to an antigen which it then neutralizes, tags or destroys.

antigen - any foreign substance that when introduced into the body, stimulates an immune response.

arthropod - an invertebrate having jointed limbs and a segmented body with an exoskeleton.

attenuated - reduced in strength

autoimmune disease - any of a large group of diseases characterized by abnormal functioning of the immune system that causes it to produce antibodies against your own tissues.

autotrophs - microorganisms that use inorganic materials as sources of nutrients.

B cells - one of the two major classes of lymphocytes; during infections, B cells mature into plasma cells, which produce antibodies directed at specific antigens.

bacterium - a single celled microscopic organism, whose genetic material is not enclosed by a membrane.

binary fission - a form of asexual reproduction in which a cell divides into two daughter cells after DNA replication.

biological warfare - the use of bacteria or viruses, or their toxins as weapons.

Bovine Spongiform Encephalopathy- A fatal neurological disease of cattle commonly called mad cow disease. The disease is one of the transmissible spongiform encephalopathies (TSEs) that affect all mammals. These are the prion diseases caused by a infectious protein. The outbreak of BSE in Great Britain started in the mid '80s and resulted in the killing of hundreds of thousand of cattle from infected herds. Transmission to humans appears to have occurred because of the appearance of cases of "new variant" Creutzfeldt Jakob Disease (vCJD), the human equivalent.

Bubonic Plague - a bacterial infection, transmitted from the flea bite of an infected rat to humans. Symptoms include high fever, chills, weakness, and enlarged lymph nodes that turn black (hence the Name "The Black Death.) The Plague originated in China and was spread to Western Asia and Europe because China was one of the busiest trading nations. This devastating disease killed 1/3 of Europe's population over a five year period. Though the plague no longer exists, the basic elements of transmission do making future epidemics a possibility. Preventative measures are the proper disposal of garbage and protecting household animals from flea infestation.

budding - a form of asexual reproduction where a bud or outgrowth from the end or side of the parent cell emerges and develops into a new organism.

capsid - the outer protein shell surrounding the nucleic acid of a virus.

capsomeres - repetitive protein subunits which form the capsid; often arranged in a symmetric pattern.

carbohydrate - chemical substances containing carbon, oxygen, and hydrogen atoms which are an essential structural component of living cells and a source of energy for animals; i.e. sugars and starches.

cell-mediated - the branch of the immune system in which specific defense cells, rather than antibodies, respond and act against a foreign antigen.

cellulose - a complex carbohydrate that is the chief element of all plant tissues and fibers.

Centers for Disease Control and Prevention (CDC) - a governmental agency whose mission is to promote health and quality of life by preventing and controlling, disease, injury, and disability.

chemolithotrophs - organisms which obtain their energy from the oxidation of inorganic compounds.

Chicken Pox - a viral infection spread through direct contact or by coughing, sneezing, and touching contaminated clothing causing a blister like rash on the surface of the skin and mucous membranes.

The blisters first appear on the face and then spread to the entire body. Some children may have a few, and others have several hundred. A mild fever, or a general malaise are other symptoms that may accompany this infection. In 1995, a vaccine was developed that took 15 years to receive approval from the Food and Drug Administration, though it is not widely used. If a child does contract the disease, a topical solution is applied to the blisters, to soothe the itching, and in very rare cases, children have developed serious complications that have proved fatal.

Cholera - transmitted by fecal contaminated food and water and by ingesting raw or undercooked seafood. Symptoms include diarrhea, abdominal cramps, nausea, vomiting, and severe dehydration. This bacterial infection is endemic to India, Africa, the Mediterranean, South and Central America, Mexico, and the United States. The treatment that is administered is usually antibiotics, which shorten the duration of the illness. Death can result from the severe dehydration due to diarrhea. Contaminated water supply is the main mechanism for spreading the disease and improving sanitation conditions serves as the best form of prevention. A vaccination is available as a short term method to countries at risk. The smuggling of shellfish led to the reemergence of Cholera in the United States, so avoiding raw or undercooked seafood would reduce the risk.

chromosome - a threadlike body in the cell nucleus that carries the genes in a linear order.

cilia - short hair-like appendages found on the surfaces of some types of cells and organisms; used for either propelling trapped material out of the body or for locomotion.

conjugation - a mating process where the temporary union of two one celled organisms results in the exchange of genetic material.

cytoplasm - the living substance of a cell excluding the nucleus.

Dengue Fever - a virus transmitted from the bite of the Aedes mosquito. Symptoms include headaches, fever, joint pain, and a rash. The disease can be fatal if the patient goes into shock. Dengue fever occurs in most tropical areas, more recently in Asia, the Pacific, and the Americas. The peak feeding activity of this mosquito is after daybreak and in the late afternoon. Wearing protective clothing that covers most of the body, arms and legs, and using insect repellent with the chemical DEET, are ways to prevent the disease. Prevention and control can be accomplished through mosquito control. Eradication of the mosquito with insecticides are the best preventative measures.

diagnosis - the act of identifying a disease and its cause.

dialysis - a medical procedure that uses a machine to filter waste products from the bloodstream and restore the blood's normal constituents.

Diphtheria - an acute bacterial infectious disease that is spread by droplets sprays from an infected person; children can be immunized against this disease.

DNA (deoxyribonucleic acid) - the primary genetic material of a cell.

Ebola - a deadly virus that is transmitted through direct contact with the blood or bodily fluids of an infected person, unsterilized needles or an infected animal. Symptoms include high fever, headaches, muscle aches, stomach pain, fatigue, and diarrhea. Initial symptoms occur 4-16 days after infection, and if not caught in time, proceed very rapidly. Ultimately, the virus causes all major

organs to fail, resulting in death. In 1976 in Zaire, the disease appeared from an unknown place and killed 340 people. The origin of the virus was in the Congo, moving to the Sudan, the Ivory Coast, Zaire, and most recently in 1996 in rural Gabon. There are 4 types of Ebola virus: Ebola Zaire, Reston, Tai, and Sudan. Ebola Reston, which is the only virus that is not fatal to humans, only monkeys, made its way to the United States via an import of monkeys from the Philippines. The scariest characteristic of this virus is that it is airborne. Early diagnosis is important in treating the virus, and extreme infection control methods such as isolation are the only way to prevent the spread of the virus.

electron microscopy - a form of microscopy in which a beam of electrons deflected by electromagnets can magnify a specimen up to 400, 000 times its original size.

Encephalitis - a virus caused by the bite of an infected mosquito; it can be prevented by wearing long pants and long sleeves, staying inside from dusk to dark when mosquitoes feed, and using insect repellent.

endemic - a disease that is constantly present to a greater or lesser degree in people of a certain class or in people living in a particular location.

endoplasmic reticulum - an extensive network of internal membranes within an eukaryotic cell which is necessary for protein synthesis.

enzyme - any of several complex proteins that are produced by cells and act as catalysts in specific biochemical reactions.

epidemic - a widespread outbreak of an infectious disease where many people are infected at the same time.

epidemiology - the branch of medical science dealing with the incidence, distribution and control of disease in a population.

eukaryote - a cell that possesses a defined nucleus surrounded by a membrane; protists, fungi, plants and animals are eukaryotes.

exposure - the act of coming into contact with a disease-causing microorganism; exposure may or may not lead to infection.

extremophiles - organisms (typically bacteria) that are adapted to living in extreme conditions, such as high salt, in ice or in thermal springs.

fermentation - the oxidation of compounds by the enzyme action of microorganisms.

flagellum - a thin filamentous appendage on cells, such as bacteria and protists, responsible for locomotion.

flora - in microbiology, the microorganisms present in a given environment; normal flora are those microorganisms which reside harmlessly within the human body.

genotype - the particular set of genes found within an organism.

genus - a category in biological classification comprising one or more phylogenetically related species.

germ theory - a theory in medicine that infectious diseases result from the action of microorganisms.

Golgi apparatus - a membrane bound structure found within the cytoplasm of eukaryotic cells which functions in protein synthesis.

habitat - the type of environment in which an organism or group normally lives or occurs.

Hantavirus Pulmonary Syndrome - transmitted by exposure to rodent excrement via aerosol distribution, especially in moist areas, and rodent saliva from bites. This viral disease results in flu-like symptoms during the incubation period to severe respiratory problems, internal bleeding, and if the disease is not caught in time - death. The virus is divided into two groups: one found in Asia and Europe, the other in the United States. A recent outbreak in Chile in 1997, killed 25 people. From the initial outbreak in 1993, to 1997 – a total of 172 reported cases in the United States with only 45% resulting in death. Keeping an extremely clean house, especially the kitchen area, is key to the prevention of this virus. Other prevention measures include rodent proofing the area by keeping food in containers, discarding uneaten pet food, setting mouse traps, and keeping garbage properly stored. To date, there is no specific treatment for hantavirus, and the earlier the symptoms are reported, the better chance the patient has for recovery.

helix - something spiral in form.

hemagglutinin (H) protein - one of the two main proteins found on the surface of the virus which causes the flu; it is necessary for attaching the virus to the host cell.

hemorrhagic - showing evidence of bleeding; certain infections (hemorrhagic fevers) result in the loss of blood and body fluids.

Hepatitis A,B,C - Three types of this viral disease are transmitted in different ways: A- through ingestion of contaminated food or water, B- Sexually transmitted, and the use of unsterilized needles, and C- transfusion of tainted blood or transplant of infected tissue, affecting the liver. Symptoms are: nausea, fever, weakness, loss of appetite, and jaundice. Large nationwide outbreaks have occurred every decade, the last in 1989. Vaccinations have been developed for Hepatitis A and B, but not for C. Screening of blood and organ tissue donors is the best means of prevention of Hepatitis C.

Herpes - a recurrent viral infection caused by Herpesvirus hominis (HVH); consists of the following five viruses: Herpes simplex virus types 1 and 2, human cytomegalovirus, Varicella-Zoster virus, and Epstein-Barr virus.

heterotrophs - microorganisms which require carbon dioxide and other organic compounds for their nutrition and energy needs.

HIV (Human Immunodeficiency Virus) - a type of retrovirus that is responsible for the fatal illness Acquired Immunodeficiency Syndrome (AIDS).

host - an organism that provides food or shelter for another organism. humoral immunity - the branch of the immune system in which antibodies are produced in response to a foreign antigen.

hypodermic - administered by injection beneath the skin.

icosahedral - having twenty equal sides or faces.

immune system - the parts of the body that prevent and fight disease.

inflammatory disease - disease with inflamed tissue, characterized by pain, swelling, redness and heat.

Influenza - more commonly the "flu", is transmitted from the sneeze or cough of an infected person, person to person contact, or contact with objects that an infected person has contaminated with nose and throat secretions. The symptoms are fever, headache, chills, fatigue, muscle aches and pains, runny nose, sore throat, and hacking coughs. "Flu shots" have been developed, but some people are adversely affected by it. Good hygiene and sanitary measures are an effective means of prevention. People who do suffer from the virus are advised to drink plenty of fluids, bed rest, and over-the-counter medicines may lessen the intensity of the disease. Influenza epidemics, such as the Spanish influenza of 1918, can result in massive devastation.

inhibitor - a molecule which represses or prevents another molecule from engaging in a reaction.

intravenous - occurring within or entering by way of a vein.

Junin virus - this South American arenavirus is known as the Argentine hemorrhagic fever inflicting several hundred people annually; a rodent-borne virus whose origin or cause of spread remain unknown.

Kyasanur Forest Disease - a tick-borne encephalitis complex; a flavivirus transmitted between infected ticks and monkeys which can cause severe hemorrhagic fever.

Kuru - a slow-virus disease rarely seen today due to the discontinuance of cannibalism and ritualistic butchering; caused neurodegenerative changes; symptoms included gait disturbance, in coordination, and swallowing difficulty. It is one of the prion diseases of man.

Lassa Fever – A hemorrhagic fever with a high mortality rate caused by the Lassa fever virus, a member of the family Arenaviridae. The disease was first observed in Lassa, Nigeria, in 1969. The virus has a segmented, RNA genome and is considered an ambisense virus. Like other Arenaviruses its natural host is a rodent, and the disease is transmitted to man through rodent droppings and urine.

Legionnaires' Disease - a serious respiratory infection caused by the bacterium, *Legionella pneumophila*, which is commonly associated with man-made aquatic environments such as spas, ventilation systems etc. Aerosol transmission of the bacteria is common. An outbreak first occurred in 1976 during a Legionnaires' convention at a hotel in Philadelphia and was caused by spread of the etiologic agent in the air-conditioning system of the hotel.

Leprosy - an infection of skin and peripheral nerves due to an acid fast bacterium, *Mycobacterium leprae*. There are two well defined manifestations of the disease, Tuberculoid leprosy, characterized

by isolated skin lesions and some peripheral nerve damage and the more aggressive lepromatous leprosy, which can lead to disfigurement and death.

Leptospirosis - a bacterial infection that is transmitted through direct contact with water, food, or soil containing urine from an infected animal.

limbic system - a system of functionally related neural structures in the brain that are concerned with emotion and motivation.

lipid - a fat or fat-like substance which is insoluble in water but soluble in organic solvents, and is an essential structural component of living cells (along with proteins and carbohydrates)

Lyme Disease - transmitted from the bite of a deer tick, this bacterium subjects the victim to a circular rash with a clear center area. Other early warning signs are flu-like symptoms: fever, headache, fatigue, and muscle or joint pains. Within weeks to months of the onset of the rash, more serious symptoms occur: heart abnormalities, meningitis, encephalitis, and facial palsy. The first reported case of Lyme disease in 1982 was in the Long Island area, and subsequent cases were reported in Hudson Valley, Ulster and Dutchess Counties, and in Canada. Wearing protective clothing, long sleeves and putting pants inside the socks when outdoors, using insect and tick repellent containing the chemical DEET, are ways to prevent Lyme disease.

lymphocyte - a white blood cell present in the blood, lymph, and lymphoid tissue; the two major types are T cells and B cells.

lysosomes - structures found within the cytoplasm of certain eukaryotic cells which contain digestive enzymes; responsible for ridding the cell of debris.

macrophage - a large, immune system cell that devours foreign antigens and stimulates the action of other immune system cells.

macroscopic - large enough to be visible to the naked eye.

Mad Cow Disease – a degenerative neurological disease caused by an infectious protein called a prion. The most common route of transmission is consumption of prion-containing meats. This condition is also called New Variant- Creutzfeldt-Jakob disease

magnetic resonance imaging (MRI) - a special imaging technique used to image internal structures of the body, particularly the soft tissues; creating an image superior to a normal x-ray.

Malaria - a tropical parasitic disease that kills more people than any other communicable disease except tuberculosis is reemerging in areas that had controlled or eradicated the disease, namely the Central Asian Republics of Tajikistan and Azerbaijan, and in Korea. The emergence of multi-drug resistant parasitic strains has also caused the resurgence of this disease. Malaria is transmitted through the bite of an anopheles mosquito, and if promptly diagnosed and adequately treated, is curable. Symptoms include high fever, severe chills, enlarged spleen, repeated vomiting, anemia and jaundice. Malaria endemic countries are some of the world's poorest. Anti-malarial drugs work, but most of these countries can't afford them. Controlling the mosquito would be the best line of defense, through personal means - insect repellent, household areas, and community population methods - insecticides and environmental control.

Marburg Virus – a virus closely related to the ebolaviruses in the family Filoviridae. Like all filoviruses it is a negative strand, single-stranded RNA virus that is “thread-like”, dimensions are 80 x 800 nm. This virus caused a lethal outbreak among researchers and animal handlers in 1967 in Belgrade, Yugoslavia and Marburg, Germany, and was transmitted from African green monkeys.

Measles - a viral infection that is spread through contact with the saliva from an infected person, sharing utensils is the most common way to catch this contagious disease; symptoms include rash, cough, and fever; childhood immunization is the best form of prevention.

metabolic reaction - chemical changes in living cells by which energy is provided for vital processes.

Meningitis - an infection of the fluid of a person's spinal cord and the fluid that surrounds the brain. People sometimes refer to it as spinal meningitis. Meningitis is usually caused by a viral or bacterial infection. Knowing whether meningitis is caused by a virus or bacterium is important because the severity of illness and the treatment differ.

microbe - a microscopic organism, such as a bacterium, a virus or a protozoan.

microorganism - any organism that can only be seen with a microscope; protozoans, bacteria, fungi, and viruses are examples of microorganisms.

mitochondria - small intracellular organelles, found in eukaryotic cells which are responsible for energy production and cellular respiration.

multicellular - consisting of, or having, more than one cell or many cells.

Mumps - a virus that lives in the mouth, nose, and throat can be transmitted when an infected person cough, sneezes, talks, or touches someone else; symptoms include fever, headache, and swollen glands under the jaw; childhood immunization is the best form of prevention.

mutagen - an agent that can cause an increase in the rate of mutation; includes X-rays, ultraviolet irradiation, and various chemicals.

natural selection - a natural process that directs the evolution of organisms best adapted to the environment.

nucleotide - the basic structural unit of nucleic acids (DNA or RNA).

nucleus - the membrane-bound structure found in eukaryotic cells which contains DNA and RNA and is responsible for growth and reproduction.

organelles - subcellular, membrane-bound structures, found within eukaryotic cells which perform discrete functions necessary for the life of the cell.

organism - any individual living thing, whether animal, plant or microorganism.

outbreak - the occurrence of a large number of cases of a disease in a short period of time.

pandemic - an epidemic that affects multiple geographic areas at the same time.

parasite - an animal or plant that lives in or on another, and from which it obtains nourishment.

pasteurization - partial sterilization of food at a temperature that destroys harmful microorganisms without major changes in the chemistry of the food.

pathogen - any disease-producing agent; i.e. virus, bacteria or other microorganisms.

pertussis - a disease of the respiratory mucous membrane; also known as whooping cough.

phagocytosis - the intake of material into a cell by the formation of a membrane bound sac.

photosynthesis - the process by which green plants, algae and some bacteria absorb light energy and use it to synthesize organic compounds (initially carbohydrates).

phototrophs - microorganisms (bacteria) capable of using light energy for metabolism.

phylum - the second highest taxonomic classification for the kingdom Animalia (animals), between kingdom level and class level.

phylogeny - the evolutionary history of a particular taxonomic group.

pili - thread-like structures present on some bacteria; pili are shorter than flagella, and are used to adhere bacteria to one another during mating and to adhere to animal cells.

placebo - a medicinal preparation having no specific pharmacological activity against a patient's illness or complaint; given solely for the psychophysiological effects of the treatment.

plankton - small (often microscopic) plants and animals floating, drifting or weakly swimming in bodies of fresh or salt water.

plasmid - a small, independently replicating circle of DNA, found in bacteria, that can be transferred from one organism to another during certain types of mating.

Pneumonic Plague - a later stage of bubonic plague which is highly contagious- the bacterium, *Yersinia pestis*, reaches the lungs through the bloodstream and typically causes a fatal pneumonia

Polio - the virus gains entry to the body by fecal oral contact, or person to person contact. The disease causes paralysis, which is irreversible, and in more severe cases this paralysis can lead to death by asphyxiation. The symptoms are generally mild: low grade fever, malaise, vomiting, stiff neck and back, and pain in the limbs. Large polio epidemics caused panic in the 1940's and 1950's in industrialized countries such as the US and Western Europe. In 1954 Dr. Jonas Salk developed a vaccine that greatly decreased the occurrence of the disease, and in 1963 an oral vaccine was developed that led to it's eradication in the US. The virus is still prevalent in South Asia and Sub-Saharan Africa. Immunization is the best forms of prevention and treatment of Polio.

polygyny - the mating of a single male with several females.

polymerase chain reaction (PCR) - the first practical system for in vitro amplification of DNA, and as such one of the most important recent developments in molecular biology.

polymorphonuclear leukocytes - also called neutrophils; white blood cells which respond quickly, phagocytose and destroy foreign antigens, such as pathogenic microorganisms.

polypeptides - two or more amino acids bound together which upon a chemical reaction with water yields multiple amino acids.

polysaccharide - any of a class of carbohydrates whose molecules contain chains of monosaccharide (simple sugar) molecules.

prions - an infective group of complex organic compounds (proteins) suggested as the causative agents of several infectious diseases.

prokaryotes - organisms, namely bacteria and blue green algae, characterized by the lack of a distinct nucleus.

prophylactic - preventive measure or medication.

protease - any enzyme that catalyses the splitting of interior peptide bonds in a protein.

protein - any of a group of complex organic compounds which contain carbon, hydrogen, oxygen, nitrogen and usually sulfur, the characteristic element being nitrogen; widely distributed in plants and animals.

protist - unicellular, colonial or multicellular organisms including protozoa and most algae.

protozoa - simple, unicellular animals comprising some 50,000 organisms.

pseudopods - temporary blunt ended projections of the cytoplasm of a cell that is used for locomotion or food collecting (in amoeba).

"Q" Fever - a bacterial infection that is contracted by contact with materials contaminated with animal feces, blood, inhaling contaminated dust or droplets, or ingesting contaminated food or liquids
receptor – a molecule on the surface of a cell that serves as a recognition or binding site.

recombination - formation by the process of crossing over an independent assortment of new genes in the offspring that did not occur in the parents.

reservoir host - a host that carries a pathogen without injury to itself and serves as a source of infection for other host organisms.

ribosomes - a structure found within the cytoplasm of cells, made up of protein and RNA, that serves as the site of protein synthesis.

Rift Valley Fever - an acute, fever-causing viral disease that affects domestic animals (such as cattle, buffalo, sheep, goats, and camels) and humans; RVF is most commonly associated with mosquito-borne epidemics during years of heavy rainfall.

RNA (ribonucleic acid) - a nucleic acid that governs protein synthesis in a cell.

serum - the clear, thin fluid portion of the blood which remains after coagulation; antibodies and other proteins are found in the serum.

Smallpox – An often fatal disease characterized by high fever, and systemic symptoms followed by a rash that develops into fluid-filled vesicles often covering the entire body. Recovery is slow and often results in disfigurement and blindness. The agent is variola virus a member of the family, Poxviridae. It is a large “complex” double-stranded DNA virus that replicates in the cytoplasm like a “mini-nucleus”. The disease was eradicated through efforts of the WHO in 1977.

spore formation - formation of unicellular, often environmentally resistant, dormant or reproductive bodies produced by some microbes.

sexually transmitted disease (STD) - a communicable disease transmitted by sexual intercourse or genital contact.

symbiotic - the relationship between two interacting organisms or populations.

Syphilis – A sexually transmitted disease caused by the spirochete, *Treponema pallidum*. The disease occurs in three stages: primary syphilis characterized by an ulcerating lesion in the genital region (a chancre), secondary syphilis occurring at about six weeks characterized by a whole body rash, and tertiary syphilis that presents often years later as either gummas, problems with the heart and great vessels, and neurological pathology with blindness and other cranial nerve involvement.

T cells - thymus derived white blood cells (lymphocytes) that participate in a variety of cell-mediated immune responses.

T-cytotoxic cells - a subset of T lymphocytes which are able to directly kill foreign cells, especially virally infected host cells.

T-helper cells - a subset of T lymphocytes which normally orchestrate the immune response by signaling other cells in the immune system to perform their special functions.

tegument - the covering of a living body, or of some part or organ of such a body.

thymus - the lymphoid organ in which T lymphocytes are educated, mature and multiply.

Toxigenic E. coli - a bacterial infection transmitted through the ingestion of undercooked ground beef, unpasteurized milk, or water that has been contaminated by sewage. Symptoms include bloody diarrhea, abdominal cramps, nausea, fever, and occasionally kidney failure. A recent outbreak was in June of 1998 in the United States affecting approximately 4500 people. Other outbreaks have been reported in Japan and England. The disease can be prevented through sanitary measures such as washing hands, cooking meat thoroughly, and avoiding unpasteurized milk.

Tuberculosis – a chronic, debilitating disease caused by the acid-fast bacterium, *Mycobacterium tuberculosis*. The disease is primarily a lung infection, but it may spread to any area of the body.

The disease was formerly called consumption and was, in the 19th century, responsible for 50% of the mortality due to infectious agents.

Typhus - a serious war-time disease caused *Rickettsia prowazekii* and spread by the human body louse. The disease is characterized by high fever and rash and often involves the lungs, kidneys and heart.

unicellular - when an organism has only one cell.

vaccine - a substance that contains antigenic components, either weakened, dead or synthetic, from an infectious organism which is used to produce active immunity against that organism.

vector - an organism that transmits a pathogen.

vertebrate - one of the grand divisions of the animal kingdom, comprising all animals that have a backbone composed of bony or cartilaginous vertebrae.

virions - a single virus particle, complete with coat.

virulence - the degree or ability of a pathogenic organism to cause disease.

virus - ultramicroscopic infectious agent that replicates itself only within cells of living hosts.

West Nile fever - a disease caused by west Nile virus, a member of the Flaviviridae. This virus is an enveloped + strand RNA virus. The virus is transmitted to man by mosquitoes and causes an encephalitis in the elderly and immune suppressed.

white blood cell - white corpuscles in the blood; they are spherical, colorless masses involved with host defenses; blood cells that engulf and digest bacteria and fungi; an important part of the body's defense system.

World Health Organization (WHO) - an agency of the United Nations founded in 1948 to promote technical cooperation for health among nations, carry out programs to control and eradicate disease, and strive to improve the quality of human life.

Yellow Fever - a liver disease transmitted to man by mosquitoes. Symptoms include high fever, severe headache and jaundice, and in the most severe cases becomes a hemorrhagic fever. The agent is the yellow fever virus (first human virus discovered), a member of the Flaviviridae (Flavi= yellow).