

## glossary

of AIDS VACCINE-RELATED TERMS

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Adapted from glossaries compiled by the AIDS Education Global Information System (AEGIS) and the US National Institute of Allergy and Infectious Diseases (NIAID) and from articles in this volume.

### **adenovirus**

A family of viruses that causes the common cold. Researchers are using weakened versions of certain adenovirus strains to make vectors that carry HIV genes into cells, as a way of developing a live vector vaccine against AIDS.

### **adenovirus-associated vector**

#### **AAV**

A harmless virus which is different than adenovirus but is also being used to make live vector vaccines against AIDS.

### **adjuvant**

A substance sometimes included in a vaccine formulation to enhance or modify its immune-stimulating properties.

### **adverse event**

#### **adverse reaction**

An undesirable change in the body of a clinical trial participant. Follow-up work is needed to determine whether or not an adverse event is due to the study vaccine or drug. Adverse events most commonly associated with vaccines include a sore arm after injection or a slight fever.

### **AIDSVAX**

The experimental AIDS vaccine made from the HIV envelope (specifically, the gp120 subunit) by VaxGen, a California-based biotechnology company. It was the first AIDS vaccine to be tested for efficacy (in two separate trials), but was found not to work.

### **antibody**

Infection-fighting protein in the blood, which recognizes and helps destroy pathogens such as bacteria and viruses. Antibodies are made by white blood cells called B-cells in response to stimulation by foreign molecules (antigens). Each antibody binds only to the specific antigen that stimulated its production.

### **antigen**

Any substance recognized by the cells or antibodies of the immune system.

### **antigen-presenting cell**

A cell (such as a macrophage) that “presents” foreign antigens to the immune system, thereby alerting the body to the presence of an invader. It does this by chopping the antigens into small pieces, which it then displays on its cell surface.

### **arm**

In a clinical trial, a group of participants who receive the same treatment. For example, vaccine trials usually have a vaccine arm and a placebo (control) arm.

### **antiretroviral therapy**

#### **ARV**

Treatment for HIV infection that uses medicines which work by killing or suppressing the virus.

### **attenuated**

Weakened. Attenuated viruses are often used as vaccines because they no longer cause disease but may still stimulate a strong immune response. Examples include vaccines against measles, mumps and rubella, as well as oral vaccines against polio.

## **b**

### **B-cell**

#### **B-lymphocyte**

A subset of white blood cells in the immune system, derived from bone marrow and spleen. B-cells develop into plasma cells, which produce antibodies.

### **binding antibody**

An antibody that attaches to some part of a pathogen, such as HIV. Binding antibodies may or may not lead to elimination of the pathogen.

### **blinded study**

Clinical trial in which the participants do not know until the study ends whether they received the experimental product or a placebo. Blinding is done to reduce bias in clinical trials. (see also **double-blinded study**)

**booster**

A second or subsequent vaccine dose given after the primary dose, to enhance immune responses. A booster vaccine may or may not be the same as the primary vaccine. (see **prime-boost**)

**bridging study**

A clinical trial that tests the safety of a vaccine and its ability to induce specific types of immune responses in a particular population, often as an indirect way of gathering information about efficacy. For example, if a vaccine is shown to protect adults against a certain disease and bridging studies show that it induces similar immune responses in adults and adolescents, then the vaccine may be assumed to work for adolescents as well.

**C** **canarypox**

A virus that infects birds but is harmless and unable to grow in people. It was one of the first vectors used to make live vector AIDS vaccines, several of which have been tested in clinical trials. An efficacy trial that combines a canarypox-based vaccine and a protein subunit vaccine against AIDS is taking place in Thailand.

**CD4+ T-cell****CD4+ T-lymphocyte; helper T-cell**

Immune cell that carries a protein called CD4 on its surface. CD4+ T-cells help orchestrate the activities of the immune system, such as turning antibody production on and off and activating killer T-cells. They are also the main targets of HIV infection. In HIV-infected people, the number of CD4+ T-cells in a blood sample is often used as a measure of the health of the immune system.

**CD8+ T-cell****CD8+ T-lymphocyte**

Immune cell that carries a protein called CD8 on its surface. One important class of CD8+ T-cells, called cytotoxic T-cells (CTLs) or killer T-cells, destroys host cells that are infected with viruses or bacteria. CTLs are thought to play an important role in immunity to HIV.

**cell-mediated immunity**also **cellular immunity**

Branch of the immune system consisting mainly of T-cells (such as helper T-cells and killer T-cells) and macrophages. Its role is to recognize and destroy cells infected with pathogens so that the pathogen cannot multiply and then spread to other cells.

**cell membrane**

The envelope surrounding a cell and enclosing its contents.

**challenge experiment**

The deliberate exposure of an immunized animal to an infectious agent. Challenge experiments are never done in humans in HIV vaccine research.

**circulating recombinant form**

**CRF**

In HIV, a mosaic virus that contains pieces from HIV of at least two different clades and has entered the pool of HIV strains circulating in a population.

**clade**

also **subtype**

A group of genetically related HIV isolates. There are two major groups of HIV-1 isolates, called M and O. Group M consists of nine clades, A through K (with no E or I).

**clinical trial**

**clinical study**

A highly organized procedure for determining the safety and/or effectiveness of a new medicine, vaccine or therapy, by giving the new agent to participants under strictly controlled conditions. In many clinical trials, new agents are tested against older ones and/or an inactive substance (placebo). The clinical trials process includes Phase I, II and III studies and Phase IV post-marketing evaluation.

**cocktail vaccine**

A vaccine produced from two or more viral (or bacterial) strains.

**cohort**

A group of individuals who share certain characteristics and are followed over time in a research study. For example, a Phase I vaccine trial typically enrolls a cohort at low risk for HIV.

**Community Advisory Board**

**CAB**

A group of community members (e.g., people with HIV/AIDS, care providers, advocates) who provide recommendations regarding the conduct of clinical research in their community.

**conserved sequence**

A genetic sequence which changes very little from one individual (or HIV isolate) to another.

**control**

see **placebo** and **placebo-controlled clinical trial**

**correlates of protection****correlates of immunity**

The specific immune responses that are associated with protection from a certain infection. The precise correlates of immunity for HIV are unknown.

**cross-reaction**

Immune response to an antigen other than that which originally stimulated the response.

**CTL****cytotoxic T-lymphocyte;****killer T-cell**

see **CD8+ T-cell**

**cytokine**

A group of proteins produced by different subsets of white blood cells and that act as messengers between cells. A cytokine can stimulate or inhibit the activity of a specific type of immune cell. Some are being tested as immune modulators in vaccine formulations.

**d** **diversity**

see **genetic diversity**

**DNA****deoxyribonucleic acid**

The genetic material of all living things except for RNA-carrying viruses, such as HIV. DNA is a double-stranded, twisted molecular chain found within each cell and is made from four chemical building blocks. It contains the information needed for cells to produce proteins, which in turn enable cells to reproduce and carry out their functions.

**DNA vaccine**

An experimental vaccine technology in which one or more genes encoding specific antigen(s) are injected into the body, where they hopefully produce these antigen(s) in the recipient and trigger immune responses. The technology is potentially promising for producing simple, inexpensive and heat-stable vaccines.

**double-blinded study**

Clinical trial in which neither the study staff nor the participants know which participants received the experimental product and which ones received placebo. Double-blind studies are thought to produce the most objective results.

## **e**fficacy

In vaccine research, the ability of a vaccine to protect people against a specific infection or disease as measured in a clinical trial. A vaccine can be tested for efficacy in Phase III (or Phase IIb) trials once Phase I and II trials show it to be safe and to induce immune responses.

## **env** (gene)

### **Env** (protein)

HIV gene encoding gp160, a glycoprotein molecule that gets split into the Env proteins gp120 and gp41.

## **envelope**

The outer surface of a virus, also called the coat. Not all viruses have an envelope. In the case of HIV, the envelope contains two viral proteins (gp120 and gp41), which are initially produced as a single, larger protein (gp160) that is then cleaved in two.

## **enzyme**

A protein that accelerates the rate of a specific chemical reaction, without itself being altered. For example, HIV makes an enzyme called reverse transcriptase, which copies the viral genetic material (RNA) into DNA during the HIV replication cycle.

## **epitope**

Within an antigen, a specific site that stimulates an immune response.

## **exposed seronegative**

### **ESN**

A rare individual who remains uninfected despite being repeatedly exposed to HIV. Researchers have found ESNs among sex workers, uninfected partners of HIV-infected people and breastfed infants of HIV-positive mothers.

## **f**owlpox

A virus belonging to the same bird virus family as MVA and canarypox, and which has also been used to make live vector vaccines against AIDS.

## **g**ag (gene)

### **Gag** (protein)

HIV gene encoding p55, a protein which is then cleaved into several smaller Gag proteins (called p17, p24, p7 and p6) that form the inner (viral) core surrounding the genetic material.

## **genetic diversity**

### also **genetic variation**

The degree of difference in DNA sequence among individual organisms, groups, or members of a population. HIV is the most genetically diverse viral pathogen known.

**genetic engineering**

The set of laboratory methods for isolating a specific gene from the genome of an organism and splicing it to other pieces of DNA so it can be propagated in the laboratory and made to produce protein—for example, insulin (for use as a medication), or an HIV protein for a vaccine.

**genome**

The complete genetic material in an individual cell or virus. The HIV genome contains 9 genes; the human genome contains between 20,000 and 25,000 genes.

**glycoprotein****gp**

A protein molecule with one or more branches of sugar molecules attached to it. Many cellular and viral proteins are glycoproteins, including the outer coat proteins of HIV. A number after the gp (e.g., gp160, gp120, gp41) is the molecular weight of the glycoprotein.

**glycoprotein 41****gp41**

A glycoprotein embedded in the outer envelope of HIV, and which functions to anchor gp120. gp41 plays a key role in helping HIV enter CD4+ T-cells during infection by facilitating the fusion of the viral and cell membranes.

**glycoprotein 120****gp120**

The glycoprotein on the outer surface of the HIV envelope. It is widely used in experimental AIDS vaccines because the outer envelope is the first part of the virus “seen” by the immune system. When HIV in the blood infects a cell, gp120 binds to the host cell membrane, which initiates its entry into the cell.

**Good Clinical Practice****GCP**

An internationally accepted set of principles and procedures for conducting research involving humans in a manner that is ethical, scientifically sound and properly documented. It covers elements such as the responsibilities of trial investigators, sponsors and Institutional Review Boards (IRBs) and the information that must be included in the trial protocol and informed consent documents.

**Good Manufacturing Practice****GMP**

An internationally accepted set of procedures and standards for how experimental products (i.e., those being evaluated in clinical trials) should be manufactured, handled and stored.

**h** **helper T-cell**  
see **CD4+ T-cell**

### **herpes simplex virus**

#### **HSV**

A group of viruses that cause blisters. HSV type 1 usually causes blisters on the lips or mouth (called cold sores or fever sores); HSV type 2 is sexually transmitted and causes lesions in the genital and anal areas. A vaccine against HSV type 2 is in development.

### **human papilloma virus**

#### **HPV**

A group of sexually transmitted viruses that cause cervical cancer in women. Candidate vaccines against HPV are now in clinical testing.

### **humoral immunity**

Branch of the immune system consisting mainly of B-cells. Its role is to make proteins called antibodies, which recognize and help destroy pathogens in the blood. Certain antibodies can block (or neutralize) pathogens in the blood, thereby preventing infection of the body's cells.

### **i**mmune deficiency

The inability of certain parts of the immune system to function as they should, thus making people susceptible to diseases they would not ordinarily develop.

### **immune escape**

Process in which a microorganism undergoes changes (usually mutation) that alter it enough so it becomes unrecognizable to the immune system, which in turn allows it to evade the immune response.

### **immune response**

The body's reaction to foreign molecules (antigens). This response may neutralize or eliminate the antigens and provide immunity.

### **immunity**

Natural or vaccine-induced resistance to a specific disease. Immunity may be partial or complete, specific or nonspecific, long-lasting or temporary.

### **immunization**

The process of inducing immunity to a specific pathogen by giving someone a vaccine, which "teaches" the immune system to recognize the pathogen and thus prevents illness upon exposure to the same pathogen at a later time.

### **immunogen**

Any substance capable of provoking an immune response.

**immunogenicity**

The strength and breadth of an immune response induced by a given antigen. The more immunogenic an antigen is, the better an immune response it induces.

**immunological memory**

The ability of the immune system to “recall” specific antigens it encountered during an earlier infection and then to quickly mobilize an immune response. Long-term memory is the basis of protection against re-occurrence of a disease.

**incidence**

The rate of new infections in a specific population over a certain period of time, usually one year.

**inclusion/exclusion criteria**

The medical and social characteristics which qualify or disqualify a person for participation in a clinical trial. For example, some trials may include people between 18 and 49 years of age and exclude those with chronic liver disease or certain drug allergies, or who are pregnant.

**informed consent**

An agreement signed by all volunteers participating in a clinical research study, indicating their understanding of: 1) why the research is being done; 2) what researchers hope to learn; 3) what will be done during the trial, and for how long; 4) what risks are involved; 5) what, if any, benefits can be expected from the trial; 6) what other interventions are available; and 7) the participant's right to leave the trial at any time.

**Institutional Review Board****IRB**

Committee of physicians, statisticians, community representatives and others. Its role is to review all proposed clinical trial protocols at a specific institution before a study can begin. IRBs are responsible for ensuring that a trial is done in a sound, ethical manner and that the rights of participants are adequately protected.

**isolate**

A particular strain of HIV-1 from an infected person (primary isolate) or a cultured cell line (laboratory isolate), defined by its genetic sequence. Isolates of HIV from different people are almost never identical.

**k** **killer T-cell**  
see **CD8+ T-cell**

**l** **lipopeptide**  
Segment of a protein, linked to a fatty molecule called a lipid. Lipopeptides derived from HIV are being used to make candidate AIDS vaccines. The presence of the lipid seems to enhance immunogenicity.

### **live vector vaccine**

A vaccine made by using a virus or bacteria that cannot cause disease to transport genes from HIV (or some other pathogen) into the body. Once inside cells, the genes produce proteins, which in turn induce immune responses. This type of vaccine often generates cellular immunity. Examples include vaccines based on adenovirus vectors or the bacteria *Salmonella*.

### **long-term non-progressor**

#### **LTNP**

An HIV-infected person who remains free of AIDS symptoms (such as immune system decline or opportunistic diseases) for an unusually long period of time. LTNP typically have strong CD8+ T-cell responses, minimal lymph node damage and a relatively low viral load. About 10% of HIV-positive people seem to be LTNP.

### **lymphocyte**

The diverse set of white blood cells that carry out many of the functions of the immune system. There are two main types: B-cells (responsible for producing antibodies) and T-cells (which orchestrate the overall immune response and destroy cells infected with pathogen, among their many roles).

### **m** **macrophage**

A type of large immune cell that devours invading pathogens and other intruders. Macrophages then stimulate other immune cells to respond by “presenting” them with small pieces of the invaders. They can also harbor large quantities of HIV without being killed, and may therefore act as viral reservoirs. (see **antigen-presenting cell**)

### **membrane**

see **cell membrane**

### **memory cell**

Long-lived subsets of T-cells and B-cells that have been exposed to specific antigens and can “recall” them (and then quickly mobilize an immune response) if that antigen is encountered again during a later infection, even many years later.

**microbicide**

Product (such as a gel or cream) that could be applied topically to genital surfaces to prevent or reduce the transmission of HIV and other disease-causing organisms during sexual intercourse.

Microbicides might also take other forms, including films, suppositories, and slow-releasing sponges or vaginal rings. The development of safe and effective microbicides could help many women substantially lower their risk of HIV infection.

**MTCT****mother-to-child transmission**

Transmission of HIV from a mother to her unborn child in the womb or during birth, or to infants via breast milk.

**mucosal immunity**

Immune responses localized in the body's mucous membranes. Mucosal immunity depends on immune cells and antibodies in the linings of the reproductive and gastrointestinal tracts and other moist body surfaces exposed to the outside world, which are entry points for many types of infection (including HIV).

**mucosal tissues**

Moist layer of tissue lining the body's openings, including the genital/urinary and anal tracts, the gut and the respiratory tract.

**mutation**

A genetic change that is inherited in all progeny of the mutated cell or virus.

**MVA****modified vaccinia Ankara**

A harmless relative of the smallpox (vaccinia) virus, and which has been engineered for use as a live vector vaccine. MVA is used in several AIDS vaccine candidates now in development.

**n** *nef* (gene)

**Nef** (protein)

HIV gene encoding Nef, a regulatory protein. Nef is not essential for the virus but helps regulates viral replication.

**neutralizing antibody****NAb**

An antibody that docks onto a pathogen and prevents it from infecting cells. Inducing strong, broad neutralizing antibodies is thought to be key for the development of AIDS vaccines that block infection, but has so far not been achieved.

### **NYVAC**

A member of the poxvirus family (like MVA and canarypox) and also used as a live viral vector for AIDS vaccines.

### **Oligomer**

A protein with two or more separate subunits that associate with one another. In HIV virions, the envelope protein is an oligomer with three gp120 subunits.

### **Pathogen**

Disease-causing microorganism.

### **peptide**

Segment of a protein molecule. In AIDS vaccine development, peptides are used both in testing immune responses to HIV and as components of vaccines.

### **Phase I trial**

Controlled clinical study done in the first stage of evaluating experimental products (such as medicines or vaccines) in humans. Phase I vaccine trials test a product's safety in humans, including any side effects seen with increasing doses, and usually also monitor whether it induces immune responses. They typically involve a small number of healthy volunteers (usually 60 or less); for AIDS vaccine studies, the volunteers are generally selected to be at low-risk for HIV infection.

### **Phase II trial**

Controlled clinical study done in the second stage of testing new products in humans. Phase II vaccine trials extend the safety data gathered during Phase I, collect more information on the product's ability to induce immune responses and determine the best dose and immunization schedule. They enroll up to several hundred volunteers, sometimes including people with characteristics similar to potential participants of a future efficacy (Phase III) trial. For example, Phase II studies of candidate AIDS vaccines may enroll some volunteers at higher risk for HIV infection.

### **Phase IIb (proof of concept) trial**

Controlled clinical study designed to look for preliminary evidence of a product's efficacy. Phase IIb studies are smaller, shorter and less expensive than a full-fledged Phase III study.

**Phase III (efficacy) trial**

Large, controlled clinical study done in the third stage of human testing, to determine if and how well a vaccine or medicine works. For AIDS vaccines, efficacy is measured by looking for prevention of HIV infection, reduction in the severity of disease and/or delay of disease onset. A Phase III study should gather sufficient data so that the product can be approved for licensure if it is found to work. This usually includes further safety data for evaluating the overall benefit-risk relationship of the vaccine. Phase III trials of AIDS vaccines will typically need to enroll at least several thousand volunteers.

**Phase IV trial**

Study conducted after a vaccine or medicine has been licensed, to determine its true effectiveness under “real world” conditions of use rather than under the controlled conditions of a clinical trial. For vaccines, they measure properties such as how long protection lasts and look for any late-emerging or very rare side effects. A Phase IV study can involve up to many thousands of people.

**placebo**

Inactive substance given to some study participants, while others receive the test substance (e.g., a vaccine). Placebos provide a basis for comparison.

**placebo-controlled clinical trial**

Clinical trial in which one group of volunteers is given the experimental vaccine or medicine, and the other is given a placebo. The results of the two groups are then compared to see if the experimental product was effective relative to the placebo.

**plasmid**

Small, independently-replicating piece of bacterial DNA. Researchers often use harmless plasmids to transfer foreign genes into cells, for example, in making DNA vaccines.

***pol***

The HIV gene that encodes a group of enzymes needed for viral replication (called protease, integrase and reverse transcriptase).

**prevalence**

The proportion of people with a particular disease or infection in a given population.

**prime-boost**

An approach to inducing immunity, which uses a first vaccine dose (prime) to induce an initial set of immune responses, followed by a second type of vaccine (booster) to amplify the desired responses. A prime-boost combination may induce different types of immune responses and/or better overall responses than those seen with only one type of vaccine.

***pro*** (gene)

**protease** (protein)

HIV gene encoding an enzyme called a protease, which cleaves proteins. HIV protease cuts the large precursor proteins produced from viral RNA into their component parts, which are then assembled into new viral particles.

**protein**

A large, varied class of molecules that are the main constituents of cells and carry out the different functions that cells (or viruses) perform. For example, they can be structural proteins (like the HIV envelope protein), regulatory proteins (like cytokines) that control the activity of other proteins, antibody molecules or enzymes (like HIV reverse transcriptase). Proteins are long chains made from twenty different building blocks called amino acids. Each protein has a unique, genetically defined amino acid sequence which determines its three-dimensional shape and its function.

**protein subunit vaccine**

A vaccine containing a protein from the virus or other pathogen. Subunit vaccines produced by genetic engineering are called recombinant subunit vaccines.

**protocol**

The detailed plan for a clinical trial, outlining its purpose, methodologies (such as vaccine dosages, routes of administration, length of study, eligibility criteria) and other aspects of trial design.

**pseudovirion**

Non-infectious particle resembling a complete virus but lacking its genetic material and one or more viral proteins, so it is unable to replicate. AIDS vaccines based on pseudovirions are in pre-clinical development.

**r**andomized trial

A clinical study in which participants are assigned by chance to one of the arms of the trial, such as the vaccine and the placebo arms. Randomization minimizes the differences among groups by equally distributing people with particular characteristics among all the trial arms.

**recombinant protein subunit vaccine**

Vaccine produced by genetic engineering and consisting of a particular protein from the virus or other pathogen.

**recombination**

A process that increases genetic diversity by exchanging pieces of the genomes from two viral strains, or two individual organisms. All types of living things undergo recombination.

**regulatory proteins**

Proteins that help regulate viral replication in infected cells, in contrast to the structural proteins that make up the virus particle itself. The HIV regulatory proteins are encoded by the *nef*, *rev*, *tat* and *vpr* genes.

**replication**

For HIV, the process of multiplying, or producing progeny particles. Replication involves many steps: copying the genetic material, producing all the different proteins that go into a virus particle, and then assembling the particles. Like all viruses, HIV cannot replicate on its own but must be inside a host cell so it can co-opt some of the host's cellular machinery.

**retrovirus**

A group of viruses (including HIV) that carries its genetic material in the form of RNA rather than DNA, unlike all other living things. These viruses contain an enzyme called reverse transcriptase which transcribes RNA into DNA—a process opposite that which normally occurs in animals and plants (where DNA is made into RNA), and which accounts for the prefix “retro.”

### **reverse transcriptase**

#### **RT**

An enzyme found only in retroviruses, which copies RNA into DNA. It is encoded by the HIV RT gene.

#### **RNA**

#### **ribonucleic acid**

A single-stranded molecule composed of chemical building blocks similar to those DNA. RNA is the sole genetic material of retroviruses and an intermediary in making proteins in all living things.

### **S**eroconversion

The development of antibodies to a particular antigen, due either to an infection or a vaccine that exposes the immune system to the antigen. When people develop antibodies to HIV, they “seroconvert” from antibody-negative (**seronegative**) to antibody-positive (**seropositive**).

#### **SHIV**

#### **simian/human immunodeficiency virus**

A genetically engineered hybrid virus with an HIV envelope and SIV core. SHIV is widely used for testing vaccines in monkeys.

#### **SIV**

#### **simian immunodeficiency virus**

An HIV-like virus that infects monkeys and causes an AIDS-like disease in some species.

### **statistical significance**

The probability that an observed difference (for example, between two arms of a vaccine trial) is due to the vaccine rather than to chance alone. This probability is determined by using statistical tests to evaluate the trial data. In general, results of a clinical trial are considered statistically significant if there is a less than a 5% probability that the observed difference would occur by chance alone.

### **sterilizing immunity**

An immune response that prevents the establishment of any detectable infection.

#### **strain**

A genetically distinct isolate of HIV. HIV is very heterogeneous, and two isolates are rarely ever the same. When HIV is isolated from an individual and studied in the lab, it is given its own unique identifier, or strain name.

### **structural proteins**

In HIV, the proteins that make up the virus particle. These include Env and Gag proteins.

### **subunit vaccine**

see **protein subunit vaccine**

**subtype**

also **clade**

A classification scheme based on genetic differences among isolates.

**t** **T-cell**

One of two main types of lymphocytes critical to the immune system. It includes CD4+ and CD8+ T-cells. The "T" stands for the thymus, where T-cells mature.

**V** **variation**

see **genetic variation**

**vector**

Bacteria or virus that does not cause disease in humans and can be used in making vaccines, by virtue of its ability to transfer foreign genes into cells. Different vectors have different properties, which in turn determine how suitable they are for particular vaccine strategies or designs. (see **live vector vaccine**)

**VEE virus**

**Venezuelan Equine Encephalitis**

A virus causing disease in horses, and which has been engineered to make a non-pathogenic live vector vaccine against AIDS. VEE targets mainly a class of antigen-presenting cells called dendritic cells.

**viral core**

The internal portion of the HIV particle, containing proteins encoded by the *gag* gene.

**viral load**

The amount of HIV in the blood. Viral load is used as an indicator of the state of an HIV infection.

**viral replication**

see **replication**

**viral vector vaccine**

A type of live vector vaccine, made by using a virus that cannot cause disease to transport HIV or other foreign genes into the body. This type of vaccine often generates cellular immunity and is widely used in AIDS vaccine development.

**viremia**

The presence of virus in the bloodstream.

**virion**

A complete virus particle outside a host cell.

**virus**

A microorganism composed of a piece of genetic material (RNA or DNA) surrounded by a protein coat. To replicate, a virus must infect a cell and direct its cellular machinery to produce new viruses.