VIRAL VECTOR LEXICON

Term	Definition
3' UTR	The untranslated region immediately after the stop codon in an mRNA. Often contains sequences that influence the localization, stability, export, and translation efficiency of the mRNA, including the poly (A) tail.
5' UTR	The untranslated region before the start codon in an mRNA. Helps regulate translation of the mRNA; also called the leader sequence or leader RNA.
Amphotropic	A type of retrovirus host tropism where the retrovirus is capable of productively infecting a cell from its native host as well as a wide variety of other host species.
Antibiotic Resistance Marker	A gene encoding a protein that, when expressed, provides the cells producing the protein with protection against that antibiotic. Serves as a type of selectable marker used when cloning genes into bacterial plasmids or eukaryotic cells.
Attenuated Virus	A virus that produces infections that are milder in healthy adults than the illnesses produced by the wild-type viruses from which they are derived. This "weakening" of the virus is often the result of the functional loss of key proteins associated with viral virulence through mutation or deletion.
Cell tropism	The range of cell types a virus is capable of productively infecting.
Convergence/ similarity	The independent evolution of similar structures or activities from progenitors with no shared ancestry. The classic example is the enzymatic activity of serine and cysteine proteases, where the identical arrangement amino acids to generate a catalytic site has evolved independently more than 20 times across different enzyme superfamilies.
Diploid	Having a single set of paired chromosomes, such as the cells in eukaryotic organisms except for the sperm or egg cells. In most cases, a nonlethal change to a gene in a diploid cell has a 50% chance of transmission to any daughter cells.
Donor organism	The organism from which genetic material is obtained for transfer to the recipient organism.
Ecotropic	A type of retrovirus host tropism where the retrovirus is capable of productively infecting a single variety of host organism.
Electroporation	A method of transfection in which electricity is used to temporarily increase the permeability of the cell membrane, allowing for the uptake of foreign nucleic acid material.

Term	Definition
Endogenous (retroviral) element	A DNA provirus derived from a retrovirus that integrated into the host DNA after germ line infection, which is inherited by offspring from their parents. Often requires complementation or recombination in order to produce infectious virions.
Episomal genome	A virus genome that can exist independent of the chromosomes in the nucleus of a cell. Herpesvirus genomes, for example, form circular episomes during the latent phase of infection. Episomal genomes are distributed to daughter cells during host cell division with varying degrees of efficacy, depending on the virus species.
Gene cassette	A type of mobile genetic element that often serves as the "payload" of a viral vector. A cassette is comprised of a manipulable coding sequence (one or more genes) between one or more sets of restriction sites or, in the case of CRISPR systems, a proto-spacer adjacent motif. The cassette may include promoter and terminator sequences required to ensure the transcription of the coding sequence. Cassettes integrate into host cell genomes through homologous recombination, non-homologous recombination, or targeted insertion via systems such as CRISPR/Cas9. The cassettes often contains a selectable marker (e.g. drug resistance gene, GFP, or luciferase) to facilitate the identification of cells in which integration has occurred.
Genetic engineering	Techniques that use recombinant, synthesized, or amplified nucleic acids to modify or create a genome.
Germline cells	The population of cells that pass on a multicellular organism's genetic material to any progeny organisms. This includes the cells that produce the eggs and the sperm.
Haploid	Having a single set of unpaired chromosomes, such as yeast, male bees and ants, and sperm and egg cells. A nonlethal change to a gene in a haploid cell will be transferred to all daughter cells, or to a zygote formed by that cell.
Helper virus	A virus that allows a co-infecting, otherwise replication incompetent virus or satellites to replicate. Co-infection with a helper virus is required for the replication of satellite viruses and satellite nucleic acids.
Homology	The state of having the same or similar relation, relative position, or structure due to a common progenitor. Sequence homology between genome sequences typically occurs because of a speciation event, a duplication event, or a horizontal/lateral gene transfer event.
Host tropism	The range of species that a virus is capable of productively infecting. Is not necessarily linked to pathogenicity.

Term	Definition
Insert	A piece of nucleic acid that is incorporated into a larger nucleic acid unit by a recombinant process such as ligation or recombination.
Insertional mutagenesis	The creation of mutations in DNA through the addition of one or more base pairs into the genome.
Integration	The insertion of foreign nucleic acids into a host cell chromosome. The site of the insertion may be targeted or random, depending on how the foreign nucleic acids are structured. Most inserted sequences are very stable once integrated within the host cell chromosome.
Internal promoter	Usually associated with viral genomes. A native (or endogenous) DNA or RNA sequence that allows for RNA polymerase binding and transcription initiation. Located in the middle, rather than at the end, of the genome.
Lentivirus	A genus of retroviruses that cause chronic and deadly disease in hosts that is characterized by a long incubation period between infection and the development of symptoms. Several lentiviruses cause severe immunodeficiency in their hosts (e.g. human immunodeficiency virus, simian immunodeficiency virus, feline immunodeficiency virus), although not all members of the genus do (e.g. equine infectious anemia virus, caprine arthritis encephalitis virus).
Mobilizable element	A segment of the vector genome or the vector's "payload" that has the potential to recombine with movable DNA such as a provirus or endogenous retroviral elements present in the host genome and produce recombinant pseudotyped retroviruses. Not to be confused with the integrative and mobilizable elements, or mobilizable transposons, found in bacteria, which encode their own mechanisms for excision from and integration into the bacterial genome.
Neurotropic	A type of tissue tropism where the virus is capable of productively infecting only neural tissues
Organism	Any active, infective, or dormant stage of life form of an entity characterized as living, including vertebrate and invertebrate animals, plants, bacteria, fungi, mycoplasmas, mycoplasma-like organisms, as well as entities such as viroids, viruses, or any entity characterized as living, related to the foregoing.
Packaging	The process of producing viral particles that contain genetic materials, such as the normal viral genome or a modified version that includes the transgene of interest.

Term	Definition
Pantropic	A type of tissue tropism where the virus is capable of productively infecting multiple tissue types.
Payload	The genetic material of interest being transferred by the viral vector.
poly(A) tail	A repeating series of adenines that marks the terminus of the 3' UTR of an mRNA. Helps protect the mRNA from degradation, aids in its export from the nucleus, and helps promote translation.
Polytropic	A type of retrovirus host tropism where the retrovirus is capable of infecting cells from its native host (typically mice) as well as cells from a limited range of other species.
Productive infection	One in which a virus is able to enter an appropriate cell and generate and release replication competent progeny virions.
Promoter	A sequence of DNA to which the components of the RNA polymerase bind, initiating transcription of a single RNA molecule.
Provirus	The genetic material of a retrovirus that has been incorporated into a host genome.
Pseudotyping	The process of producing viruses or viral vectors comprised of the structural and enzymatic core of one virus and the envelope glycoprotein of another virus
Recipient organism	The organism whose nucleic acid sequence will be modified through the use of genetic engineering.
Replication competent	Capable of infecting cells and generating additional infectious genomes or particles
Retrotransposon	A genetic component that copies and pastes itself into different genomic locations by converting RNA back into DNA through reverse transcription.
Retrovirus	An RNA virus with a replication cycle that includes the reverse transcription of its genome from RNA to DNA and then the integration of that DNA copy into a host cell chromosome.
Satellite nucleic acid	A sub-viral agent comprised of genetic material that is entirely dependent on the coinfection of a host cell with a helper virus for replication. This dependency includes relying on the helper virus to encode the structural proteins needed to encapsulate its genetic material. Most commonly associated with plants, although examples can be found in mammals, arthropods, and bacteria.

Term	Definition
Satellite virus	A sub-viral agent comprised of genetic material that encodes the structural proteins that encapsulate its genetic material, but is otherwise entirely dependent on the coinfection of a host cell with a helper virus for replication. Most commonly associated with plants, although examples can be found in mammals (e.g. hepatitis D virus), arthropods, and bacteria.
Subgenomic RNA	RNA copies of a portion of a viral genome, generated either by transcription from multiple internal promoters or by splicing of the larger transcript. This allows multiple proteins to be created from the same original template strand of RNA, as each subgenomic RNA would then potentially be translated into protein.
Terminator	A sequence in DNA that signals the termination of transcription to the RNA polymerase.
Tissue tropism	The range of tissue types within a host that a virus is capable of productively infecting. Blood is considered a type of connective tissue.
Transduction	A process by which foreign nucleic acid material is introduced into a cell by a virus or viral vector.
Transfection	A process by which purified nucleic acid material is introduced into a cell, typically through chemical or electrical means.
Transgene	A gene that has been transferred from one organism to another. Often the "payload" carried by a viral vector.
Viral vector	A modified form of a virus used to deliver a genetic material "payload" into a cell
Xenotropic	A type of retrovirus host tropism where the retrovirus is incapable of causing productive infection in cells from its native host (typically mice), but is capable of causing productive infection in cells derived from other species. In mice, the block is at the level of the entry of the virus into the cell.