Bahman Khalilidehkordi
Shahrekord University of Medical Sciences, Iran

Editorial

Virology is that the study of viruses – submicroscopic, parasitic particles of genetic material contained during a protein coat – and virus-like agents. It focuses on the subsequent aspects of viruses: their structure, classification and evolution, their ways to infect and exploit host cells for copy , their interaction with host organism physiology and immunity, the diseases they cause, the techniques to isolate and culture them, and their use in research and therapy. Virology is a subfield of microbiology.Structure and classification of Virus: A major branch of virology is virus classification. Viruses are often classified consistent with the host cell they infect: animal viruses, plant viruses, fungal viruses, and bacteriophages (viruses infecting bacteria, which include the foremost complex viruses). Another classification uses the geometrical shape of their capsid (often a helix or an icosahedron) or the virus's structure (e.g. presence or absence of a lipid envelope). Viruses home in size from about 30 nm to about 450 nm, which suggests that the majority of them can't be seen with light microscopes. The shape and structure of viruses has been studied by microscopy, NMR spectroscopy, and X-ray crystallography. The most useful and most generally used arrangement distinguishes viruses consistent with the sort of macromolecule they use as genetic material and therefore the viral replication method they employ to coax host cells into producing more viruses:

DNA viruses (divided into double-stranded DNA viruses and single-stranded DNA viruses), RNA viruses (divided into positive-sense single-stranded RNA viruses, negative-sense single-stranded RNA viruses and thus the much less common double-stranded RNA viruses), reverse transcribing viruses (double-stranded reverse-transcribing DNA viruses and single-stranded reverse-transcribing RNA viruses including retroviruses).

Virologists also study subviral particles, infectious entities notably smaller and simpler than viruses: viroids (naked circular RNA molecules infecting plants), satellites (nucleic acid molecules with or without a capsid that require a helper virus for infection and reproduction), and prions (proteins which will exist during a pathological conformation that induces other prion molecules to assume that very same conformation). Taxa in virology aren't necessarily monophyletic, because the evolutionary relationships of the varied virus groups remain unclear. Three hypotheses regarding their origin exist: Viruses arose from non-living matter, separately from yet in parallel to cells, perhaps within the type of self-replicating RNA ribozymes almost like viroids. Viruses arose by genome reduction from earlier, more competent cellular life forms that became parasites to host cells and subsequently lost most of their functionality; samples of such tiny parasitic prokaryotes are Mycoplasma and Nanoarchaea. Viruses arose from mobile genetic elements of cells (such as transposons, retrotransposons or plasmids) that became encapsulated in protein capsids, acquired the power to "break free" from the host cell and infect other cells. Of particular interest here is mimivirus, a huge virus that infects amoebae and encodes much of the molecular machinery traditionally associated with bacteria. Two possibilities are that it's a simplified version of a parasitic prokaryote or it originated as an easier virus that acquired genes from its host. The evolution of viruses, which frequently occurs together with the evolution of their hosts, is studied within the field of viral evolution. While viruses reproduce and evolve, they're doing not engage in metabolism, don't move, and depend on variety cell for copy . The often-debated question of whether or not they're alive or not could also be a matter of definition that does not affect the biological reality of viruses. Molecular biology research and viral therapy: Bacteriophages, the viruses which infect bacteria, are often relatively easily grown as viral plaques on bacterial cultures. Bacteriophages occasionally move genetic material from one bacterial cell to a different during a process referred to as transduction, and this horizontal gene transfer is one reason why they served as a major research tool within the early development of biology . The ordering , the function of ribozymes, the primary recombinant deoxyribonucleic acid and early genetic libraries were all received using bacteriophages. Certain genetic elements derived from viruses, like highly effective promoters, are commonly utilized in biology research today. Growing animal viruses outside of the living host animal is harder . Classically, fertilized chicken eggs have often been used, but cell cultures are increasingly employed for this purpose today. Since some viruses that infect eukaryotes got to transport their genetic material into the host cell's nucleus, they're attractive tools for introducing new genes into the host (known as transformation or transfection). Modified retroviruses are often used for this purpose, as they integrate their genes into the host's chromosomes.

DNA viruses

Viruses with a DNA genome, except for the DNA reverse transcribing viruses, are members of three of the four recognized viral realms: Duplodnaviria, Monodnaviria, and Varidnaviria. But the incertae sedis order Ligamenvirales, and many other incertae sedis families and genera, are also used to classify DNA viruses. The domains Duplodnaviria and Varidnaviria consist of double-stranded DNA viruses; other double-stranded DNA viruses are incertae sedis. The domain Monodnaviria consists of single-stranded DNA viruses that generally encode a HUH endonuclease; other single-stranded DNA viruses are incertae sedis.

RNA viruses:

All viruses that have an RNA genome, and that encode an RNA-dependent RNA polymerase (RdRp), are members of the kingdom Orthornavirae, within the realm Riboviria.