Examples of enveloped viruses

The following are some examples of enveloped viruses:

- DNA viruses
  - Herpesviruses
  - Poxviruses
  - Hepadnaviruses
  - Asfarviridae
- RNA viruses
  - Flaviviruses
  - Alphaviruses
  - Togaviruses
  - Coronaviruses
  - Hepatitis D
  - Orthomyxoviruses
  - Paramyxoviruses
  - Rhabdovirus
  - Bunyaviruses
  - Filoviruses
- Retroviruses
  - Retroviruses

Individual viruses in each class and some of the better known diseases that each causes.

Herpesviruses - ***Herpesviridae*** is a large family of DNA viruses that cause infections and certain diseases in animals, including humans. The members of this family are also known as

herpesviruses. The family name is derived from the Greek word *ἕρπειν* (*herpein* 'to creep'), referring to spreading cutaneous lesions, usually involving blisters, seen in flares of herpes simplex 1, herpes simplex 2 and herpes zoster (shingles). In 1971, the International Committee on the Taxonomy of Viruses (ICTV) established *Herpesvirus* as a genus with 23 viruses among four groups. As of 2020, 115 species are recognized, all but one of which are in one of the three subfamilies. Herpesviruses can cause both latent and lytic infections.

Nine herpesvirus types are known to primarily infect humans,[7] at least five of which are extremely widespread among most human populations, and which cause common diseases: herpes simplex 1 and 2 (HSV-1 and HSV-2, also known as HHV-1 and HHV-2; both of which can cause orolabial and genital herpes), varicella zoster (or HHV-3; the cause of chickenpox and shingles), Epstein–Barr (EBV or HHV-4; implicated in several diseases, including mononucleosis and **some cancers**), and human cytomegalovirus (HCMV or HHV-5). More than 90% of adults have been infected with at least one of these, and a latent form of the virus remains in almost all humans who have been infected. Other human herpesviruses are human herpesvirus 6A and 6B (HHV-6A and HHV-6B), human herpesvirus 7 (HHV-7), and Kaposi's sarcoma-associated herpesvirus (KSHV, also known as HHV-8).

In total, more than 130 herpesviruses are known, some of them from mammals, birds, fish, reptiles, amphibians, and molluscs. Among the animal herpesviruses are pseudorabies virus causing Aujeszky's disease in pigs, and bovine herpesvirus 1 causing bovine infectious rhinotracheitis and pustular vulvovaginitis.

Poxviruses - *Poxviridae* is a family of double-stranded DNA viruses. Vertebrates and arthropods serve as natural hosts. There are currently 83 species in this family, divided among 22 genera, which are divided into two subfamilies. Diseases associated with this family include smallpox.
Four genera of poxviruses may infect humans: *Orthopoxvirus*, *Parapoxvirus*, *Yatapoxvirus*, *Molluscipoxvirus*. *Orthopoxvirus*: smallpox virus (variola), vaccinia virus, cowpox virus, monkeypox virus; *Parapoxvirus*: orf virus, pseudocowpox, bovine papular stomatitis virus; *Yatapoxvirus*: tanapox virus, yaba monkey tumor virus; *Molluscipoxvirus*: molluscum contagiosum virus (MCV).
[The most common are vaccinia (seen on the Indian subcontinent) and molluscum contagiosum, but monkeypox infections are rising. The similarly named disease chickenpox is not a true poxvirus and is caused by the herpesvirus varicella zoster.

Hepadnaviruses - *Hepadnaviridae*[a] is a family of viruses in which humans, apes, and birds serve as natural hosts. There are currently 18 species in this family, divided among 5 genera. Its best-known member is hepatitis B virus. Diseases associated with this family include: liver infections, such as hepatitis, hepatocellular carcinomas (chronic infections), and cirrhosis.

Asfarvirdae - This family consists of one genus, Asfivirus, which contains the African swine fever virus. The African swine fever virus is believed to circulate between soft-bodied ticks and pigs, specifically wild pigs, warthogs, and bush pigs. The virus is found primarily in sub-Saharan Africa.

Flaviviruses - Flaviviruses are vector-borne RNA viruses that can emerge unexpectedly in human populations and cause a spectrum of potentially severe diseases including hepatitis, hemorrhagic syndromes, fatal mucosal disease (pestiviruses), hemorrhagic fever, shock syndrome, encephalitis, acute flaccid paralysis, congenital abnormalities and fetal death. This epidemiological pattern has occurred numerous times during the last 70 years, including epidemics of dengue virus and West Nile virus, and the most recent explosive epidemic of Zika virus in the Americas. Flaviviruses are now globally distributed and infect up to 400 million people annually. Of significant concern, outbreaks of other less well-characterized flaviviruses have been reported in humans and animals in different regions of the world. The family gets its name from the yellow fever virus; *flavus* is Latin for "yellow", and yellow fever in turn was named because of its propensity to cause jaundice in victims.

Alphaviruses - There are 32 alphaviruses, each of which infect various vertebrates such as humans, rodents, fish, birds, and larger mammals such as horses, as well as invertebrates. Alphaviruses are viruses that can attack the brain. There are three main types: 1) eastern equine encephalomyelitis (EEE); 2) Venezuelan equine encephalomyelitis (VEE); and 3) western equine encephalomyelitis (WEE). Chikungunya virus and Mayaro virus also belong to this group.

Togaviruses - Togaviruses are divided into two genera: *Rubivirus* and *Alphavirus (described above)*. The genus *Rubivirus* contains only one species, Rubella virus, which is one of the five most common childhood illnesses. Rubella is caused by a virus that's passed from person to person. It can spread when an infected

person coughs or sneezes. It can also spread by direct contact with infected mucus from the nose and throat. It can also be passed on from pregnant women to their unborn children through the bloodstream.

Rubella is a contagious viral infection best known by its distinctive red rash. It's also called German measles or three-day measles. This infection may cause mild or no symptoms in most people. However, it can cause serious problems for unborn babies whose mothers become infected during pregnancy. A person who has been infected with the virus that causes rubella is contagious for about one week before the onset of the rash until about one week after the rash disappears. An infected person can spread the illness before the person realizes he or she has it.

Rubella is rare in many countries because most children are vaccinated against the infection at an early age. In some parts of the world, the virus is still active. This is something to consider before going abroad, especially if you're pregnant.

Coronaviruses - Coronaviruses are a large family of viruses that usually cause mild to moderate upper-respiratory tract illnesses in humans. These viruses cause diseases in animals and humans. They often circulate among camels, cats, bats and other animals, and can sometimes evolve and infect people. Three coronaviruses have caused more serious and fatal disease in people: SARS coronavirus (SARS-CoV), which emerged in November 2002 and causes severe acute respiratory syndrome (SARS); MERS coronavirus (MERS-CoV), which emerged in 2012 and causes Middle East respiratory syndrome (MERS); and SARS-CoV-2, which emerged in 2019 and causes coronavirus disease 2019 (COVID-19).

Hepatitis D - The hepatitis delta viruses, or HDV, are eight species of negative-sense single-stranded RNA viruses (or virus-like particles) classified together as a genus. Hepatitis D is an inflammation of the liver caused by the hepatitis D virus (HDV). Hepatitis D infection cannot occur in the absence of hepatitis B virus.

HDV infecting a person with chronic hepatitis B (superinfection) is considered the most serious type of viral hepatitis due to its severity of complications. These complications include a greater likelihood of experiencing liver failure in acute infections and a rapid progression to liver cirrhosis, with an increased risk of developing liver cancer in chronic infections. In combination with hepatitis B virus, hepatitis D has the highest fatality rate of all the hepatitis infections, at 20%. A recent estimate from 2020 suggests that currently 48 million people are infected with this virus.

Orthomyxoviruses - is a family of negative-sense RNA viruses. It includes seven genera: *Alphainfluenzavirus*, *Betainfluenzavirus*, *Gammainfluenzavirus*, *Deltainfluenzavirus*, *Isavirus*, *Thogotovirus*, and *Quaranjavirus*. The first four genera contain viruses that cause influenza in birds (see also avian influenza) and mammals, including humans. Isaviruses infect salmon; the thogotoviruses are arboviruses, infecting vertebrates and invertebrates (such as ticks and mosquitoes). The Quaranjaviruses are also arboviruses, infecting vertebrates (birds) and invertebrates (arthropods).

The four genera of Influenza virus that infect vertebrates, which are identified by antigenic differences in their nucleoprotein and matrix protein, are as follows: *Alphainfluenzavirus* infects humans, other mammals, and birds, and **causes all flu pandemics**, *Betainfluenzavirus* infects humans and seals, *Gammainfluenzavirus* infects humans and pigs and *Deltainfluenzavirus* which infects pigs and cattle.

Alphainfluenzavirus (type A influenza viruses) are the most virulent human pathogens among the influenza types and cause the most severe disease. It is thought that all influenza A viruses causing outbreaks or pandemics originate from wild aquatic birds. All influenza A virus pandemics since the 1900's were caused by Avian influenza, through Reassortment with human influenza strains (seasonal flu) or through adaptation in a mixing vessel such as the 2009 swine flu pandemic.

Paramyxoviruses - Diseases associated with this family include measles, mumps, and respiratory tract infections. The family has four subfamilies, 17 genera, and 78 species, three genera of which are unassigned to a subfamily.

A number of important human diseases are caused by paramyxoviruses. These include mumps, as well as measles, which caused around 733,000 deaths in 2000.

The human parainfluenza viruses (HPIV) are the second most common causes of respiratory tract disease in infants and children. There are four types of HPIVs, known as HPIV-1, HPIV-2, HPIV-3 and HPIV-4. HPIV-1 and HPIV-2 may cause cold-like symptoms, along with croup in children. HPIV-3 is associated with bronchiolitis, bronchitis, and pneumonia. HPIV-4 is less common than the other types, and is known to cause mild to severe respiratory tract illnesses.

Paramyxoviruses are also responsible for a range of diseases in other animal species, for example canine distemper virus (dogs), phocine distemper virus (seals), cetacean morbillivirus (dolphins and porpoises), Newcastle disease virus (birds), and rinderpest virus (cattle). Some paramyxoviruses, such as the henipaviruses, are zoonotic pathogens, occurring naturally in an animal host, but also able to infect humans.

Hendra virus (HeV) and Nipah virus (NiV) in the genus *Henipavirus* have emerged in humans and livestock in Australia and Southeast Asia. Both viruses are contagious, highly virulent, and capable of infecting a number of mammalian species and causing potentially fatal disease. Due to the lack of a licensed vaccine or antiviral therapies, HeV and NiV are designated as Biosafety level (BSL) 4 agents.

Rhabdovirus - Vertebrates (including mammals and humans), invertebrates, plants, fungi and protozoans serve as natural hosts. Diseases associated with member viruses include rabies encephalitis caused by the rabies virus, and flu-like symptoms in humans caused by vesiculoviruses (vesicular stomatitis virus - VSV). VSV also affects animals.The family has 40 genera, most assigned to three subfamilies.

Rabies is the most notable human disease that is caused by this family of viruses. It is the most lethal human infectious disease known, with a fatality rate of nearly 100%. In addition to being deadly, rabies infection causes horrific symptoms.

Bunyaviruses - Member viruses infect arthropods, plants, protozoans, and vertebrates. Though generally found in arthropods or rodents, certain viruses in this order occasionally infect humans. Some of them also infect plants. Human infections with certain members of *Bunyavirales*, such as *Crimean-Congo hemorrhagic fever orthonairovirus*, are associated with high levels of morbidity and mortality, consequently handling of these viruses is done in biosafety level 4 laboratories. They are also the cause of severe fever with thrombocytopenia syndrome.

Hantaviruses are another medically important member of the order *Bunyvirales*. They are found worldwide, and are relatively common in Korea, Scandinavia (including Finland), Russia, western North America and parts of South America. Hantavirus infections are associated with high fever, lung edema, and pulmonary failure. The mortality rate varies significantly depending on the form, being up to 50% in the Americas.

Filoviruses - Two members of the family that are commonly known are Ebola virus and Marburg virus. Both viruses, and some of their lesser known relatives, cause severe disease in humans and nonhuman primates in the form of viral hemorrhagic fevers.

All filoviruses are classified by the US as select agents, by the World Health Organization as Risk Group 4 Pathogens (requiring Biosafety Level 4-equivalent containment), by the National Institutes of Health/National Institute of Allergy and Infectious Diseases as Category A Priority Pathogens, and by the Centers for Disease Control and Prevention as Category A Bioterrorism Agents, and are listed as Biological Agents for Export Control by the Australia Group.

The Department of Homeland Security's National Biodefense Analysis and Countermeasures Center considers the risk of a mutated Ebola virus strain with aerosol transmission capability emerging in the future as a serious threat to national security and has collaborated with the Centers for Disease Control and Prevention (CDC) to design methods to detect EBOV aerosols.

Retroviruses - Retroviruses have many subfamilies in three basic groups:

Oncoretroviruses (cancer-causing retroviruses) include human T-lymphotropic virus (HTLV) causing a type of leukemia in humans, and murine leukemia viruses (MLVs) in mice.

Lentiviruses (slow viruses) include HIV-1 and HIV-2, the cause of aquired immune deficiency syndrome (AIDS) in humans.

Spumaviruses (foamy viruses) are benign and not linked to any disease in humans or animals.