

Viruses & Prions

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ENVELOPED DNA VIRUSES

Cytomegalovirus

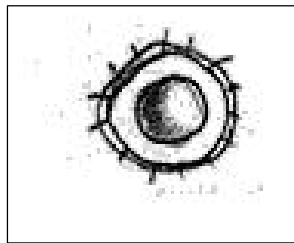
Characteristics	Enveloped DNA virus with a double stranded DNA genome that causes cytomegalic inclusion body disease, characterized by multinucleated giant cells. In utero, congenital abnormalities can occur. Most adult infections are asymptomatic, but the latent virus can become activated when immunosuppression occurs.
Habitat & Transmission	Habitat is humans. Virus is transmitted by body fluids (saliva in young children and semen and vaginal secretions in adults) , transplacentally, or by organ transplant.
Diagnosis	CPE in cultured cells (Owl's eye nuclear inclusions) and by fluorescent antibody staining. A fourfold rise in antibody titer is diagnostic.
Treatment	Ganciclovir or Foscarnet. Immunosuppressed patients should receive CMV negative blood.
Pathogenesis	Infects the pharynx and disseminates. Transfusion or transplantation bypasses the initial pharyngeal infection stage.

Epstein-Barr Virus

Characteristics	Enveloped DNA virus with linear-double stranded genome that causes infectious mononucleosis and Burkitt's lymphoma.
Habitat & Transmission	Habitat is human pharynx. Transmitted by saliva.
Diagnosis	Lymphocytosis occurs, monospot test positive (heterophil antibody test), and anti-EBV antibody titer rises.
Treatment	Supportive Care.
Pathogenesis	Virus binds to CD21 and CR2 to infect B-cells and epithelial cells. Infected B-cells are activated to produce antibody and proliferate after the virus is integrated into the B-cell genome. The B-cells are also immortalized by EBNA2 and LMP-1, which are produced by the virus. A CD8+ T-cell response is required to clear the infection.

Hepatitis B Virus

Characteristics	Enveloped DNA virus with a circular double stranded genome that causes serum hepatitis. The circular genome is incomplete, with approximately 1/3 of a strand absent.
Habitat & Transmission	Habitat is human blood. Transmitted by blood, blood products, and by sexual contact.
Diagnosis	Presence of surface antigen (HBsAg) or core antigen (HBcAg) indicates current infection; presence of IgM or IgG (HBsAb) indicates prior exposure. The presence of HBeAg indicates transmissibility.
Treatment	Supportive care and interferon alpha-2B for severe cases. A recombinant vaccine is available.
Pathogenesis	The virus infects hepatocytes. Hepatocytes are then destroyed by CD8+ T-Cells, causing hepatitis. Viral genome can integrate into hepatocyte DNA, increasing the risk of hepatocellular carcinoma.



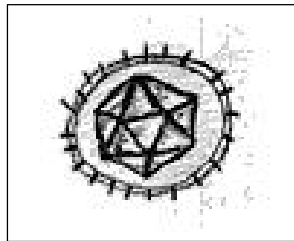
Hepatitis B virus in cross section

Herpes B Virus

Characteristics	Enveloped DNA virus that causes encephalitis.
Habitat & Transmission	Habitat is primates. Virus can be transmitted during contact with animals or animal tissues.
Diagnosis	Virus must be cultured. Antigens cross-react with HSV-1 antigens
Treatment	Acyclovir. Immune globulin can be given after a monkey bite.
Pathogenesis	Virus infects CNS and causes encephalitis.

Herpes Simplex Virus Type 1

Characteristics	Enveloped DNA virus that causes herpes labialis and encephalitis.
Habitat & Transmission	Infects humans and is transmitted by saliva.
Diagnosis	Tzank test is positive (multinucleated giant cells seen in smear) Virus identity confirmed by antibody neutralization or fluorescent antibody test.
Treatment	Acyclovir or Famciclovir or Valacyclovir.
Pathogenesis	Initial lesion on face. Virus then travels up the axon and becomes dormant in the trigeminal ganglion. Virus is reactivated by sunlight or stress.



Herpes Virus

Herpes Simplex Virus Type 2

Characteristics	Enveloped virus with a linear double-stranded DNA genome that causes genital herpes and aseptic meningitis.
Habitat & Transmission	Habitat is the human genital tract. Transmitted by sexual contact or during vaginal delivery.
Diagnosis	Tzank test positive. Virus identity confirmed by antibody neutralization or fluorescent antibody staining.
Treatment	Acyclovir or Famciclovir or Valacyclovir.
Pathogenesis	Initial lesion is on genitals. Virus then travels up axons and becomes dormant in lumbar or sacral ganglia. The virus is reactivated by stress.

Herpes Virus 6

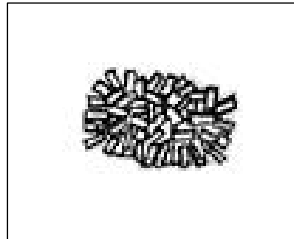
Characteristics	Enveloped DNA virus that causes exanthem subitum (fever and rash).
Habitat & Transmission	Habitat is humans. Transmitted by saliva.
Diagnosis	Diagnosed by serology.
Treatment	None.
Pathogenesis	Virus infects T and B cells. Can become latent in these cells, reactivating during times of immunosuppression.

Molluscum Contagiosum Virus

Characteristics	Enveloped DNA virus with a linear double stranded genome that causes Molluscum Contagiosum, small "pearly" papular lesions.
Habitat & Transmission	Habitat is humans. Spread by contact with skin lesions.
Diagnosis	Usually clinical. Can be identified by CPE in cell culture or electron microscopy.
Treatment	Removal of the lesion.
Pathogenesis	Virus infects cells in the malpighian layer and causes soft, pink, and rounded raised lesions.

Smallpox Virus

Characteristics	Enveloped DNA virus with a linear double stranded genome that causes smallpox.
Habitat & Transmission	Habitat is humans. Spread by aerosol or by contact with skin lesions.
Diagnosis	Identified by CPE in cell culture or pocks on chorioallantoic membrane. Cytoplasmic inclusion bodies can be seen, and a 4-fold rise in antibody titer is diagnostic.
Treatment	Supportive care. A live attenuated vaccine is available, but only given to military personnel. Last reported human case was in 1977. Disease was eradicated due to aggressive vaccination program.
Pathogenesis	Virus infects mucosal cells and then spreads to reticuloendothelial system and skin by viremia. Considered a possible candidate for human gene therapy and multivalent vaccine development.



Smallpox virus

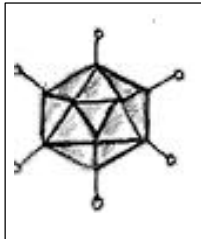
Varicella-Zoster Virus

Characteristics	Enveloped virus with a double stranded DNA genome that causes varicella (chickenpox) in children and zoster (shingles) in adults.
Habitat & Transmission	Habitat is human respiratory tract and nervous system. Virus is transmitted via aerosol, or direct contact with lesions.
Diagnosis	Diagnosis is usually made on clinical grounds. CPE in cell culture (multinucleated giant cells) or fluorescent antibody staining can confirm diagnosis.
Treatment	Acyclovir or Famciclovir or Valacyclovir. Varicella-zoster immune globulin (VZIG) can be given in severe cases.
Pathogenesis	Respiratory tract is infected and virus disseminates. Lesions appear on skin after nerves and sensory ganglia are infected. The skin lesions clear and the virus remains dormant in the ganglia. Reactivation of the virus causes very painful skin lesions (zoster) in a dermatomal distribution.

NONENVELOPED DNA VIRUSES

Adenovirus

Characteristics	Non-enveloped DNA virus with a linear double stranded genome and causes upper respiratory tract infections, pneumonia and diarrhea.
Habitat & Transmission	Habitat is humans and animals. Spread by aerosol and direct contact.
Diagnosis	Identified by fluorescent antibody staining or complement fixation. A four fold rise in antibody titer is diagnostic.
Treatment	Supportive care. A live attenuated vaccine against serotypes 3, 4, and 7 are used by the military.
Pathogenesis	Virus infects respiratory, ocular, or intestinal epithelium. Cell mediated immune response and viral release causes cell death. This virus has been used as a vector for human gene therapy.



Adenovirus

Papillomavirus

Characteristics	Nonenveloped DNA viruses with a double stranded circular genome that causes papillomas (warts) and increases the risk of squamous cell carcinoma and cervical cancer. Many genotypes.
Habitat & Transmission	Habitat is human skin cells. Spread by direct contact of skin or genital lesions.
Diagnosis	Koilocytes found in lesions, DNA hybridization can be done to identify virus type.
Treatment	Interferon Alpha-2B and/or surgery for severe cases.
Pathogenesis	Viral gene products inhibit p53 and the retinoblastoma tumor suppresser gene.

ENVELOPED RNA VIRUSES

California Encephalitis Virus

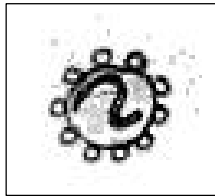
Characteristics	Enveloped virus that has a segmented (3 segments), positive polarity linear RNA genome. Causes encephalitis.
Habitat & Transmission	Habitat is small mammals. Transmitted by mosquitoes.
Diagnosis	A four fold rise in antibody titer.
Treatment	Supportive care.
Pathogenesis	Enters bloodstream and travels to CNS, causing encephalitis.

Colorado Tick Fever Virus

Characteristics	Enveloped virus that has a single stranded positive polarity linear RNA genome. Causes fever, headache, and myalgia.
Habitat & Transmission	Habitat is small rodents. Transmitted by ticks.
Diagnosis	Isolation of virus in tissue culture or a four fold rise in antibody titer.
Treatment	Supportive care.
Pathogenesis	Enters bloodstream and travels to many organs.

Coronavirus

Characteristics	Enveloped virus that has a single stranded negative polarity linear RNA genome. Common cause of upper respiratory tract infections.
Habitat & Transmission	Habitat is humans. Transmitted via aerosol.
Diagnosis	Rarely done.
Treatment	Supportive care.
Pathogenesis	Not known.



Corona virus in cross section

Dengue Virus

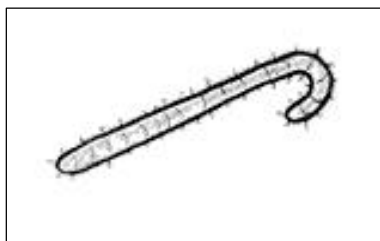
Characteristics	Enveloped virus that has a single stranded positive polarity linear RNA genome. Causes Dengue Fever.
Habitat & Transmission	Habitat is humans. Transmitted by mosquitoes.
Diagnosis	Isolation of virus in tissue culture or a four fold rise in antibody titer.
Treatment	Supportive care.
Pathogenesis	Hematogenous route. Host immune response causes immune complex deposition in circulatory system. This causes activation of compliment cascade, which results in increased vascular permeability and thrombocytopenia. Thrombocytopenia predisposes to hemorrhage.

Eastern Equine Encephalitis Virus

Characteristics	Enveloped virus that has a single stranded positive polarity linear RNA genome. Causes encephalitis.
Habitat & Transmission	Habitat is wild birds. Transmitted by mosquitoes.
Diagnosis	Isolation of virus in tissue culture or a four fold rise in antibody titer.
Treatment	Supportive care. A vaccine is available for horses.
Pathogenesis	Enters bloodstream and travels to CNS, causing encephalitis.

Ebola Virus

Characteristics	Enveloped virus that has a single stranded negative polarity linear RNA genome. Causes hemorrhagic fever.
Habitat & Transmission	Habitat is primates. Transmitted by body fluids and monkey bites.
Diagnosis	Diagnosis is made by isolating virus from cell culture or a four fold rise in anti-Ebola antibody titer.
Treatment	Supportive care. Isolation of infected individuals can limit the spread of the disease.
Pathogenesis	Causes disseminated intravascular coagulation and shock. The severe thrombocytopenia causes hemorrhages.



Ebola virus

Hantavirus

Characteristics	Enveloped virus that has a single stranded negative polarity linear RNA genome. Causes Hantavirus Pulmonary Syndrome and Korean Hemorrhagic fever.
Habitat & Transmission	Habitat is rodents. Transmitted to humans by rodent feces.
Diagnosis	PCR used to detect genome in lung tissue.
Treatment	Supportive care.
Pathogenesis	Hantavirus Pulmonary Syndrome is characterized by influenza like symptoms followed by respiratory failure. Korean Hemorrhagic fever is characterized by headache, petechial hemorrhages, shock, and organ failure.

Hepatitis C Virus

Characteristics	Enveloped virus with a single stranded positive polarity RNA genome. Infection causes Hepatitis C and predisposes to hepatocellular carcinoma.
Habitat & Transmission	Habitat is humans. Transmitted by body fluids and transplacentally.
Diagnosis	Presence of anti-HCV antibodies.
Treatment	Interferon Alpha-2B prevents chronic hepatitis but does not resolve chronic carrier state. Spread of virus can be limited by condom use, and by screening donated blood products.
Pathogenesis	Cytotoxic T cells (CD 8+) destroy infected hepatocytes. Infection can cause chronic hepatitis and a carrier state. Infection is also a major risk factor for hepatocellular carcinoma.

Hepatitis D Virus ('Delta Agent')

Characteristics	Defective (unable to reproduce without presence of Hep B) enveloped virus that has a single stranded negative polarity circular RNA genome. Coinfects Hepatitis B infected cells and causes a more severe hepatitis.
Habitat & Transmission	Habitat is humans. Transmitted by body fluids and transplacentally.
Diagnosis	Serology is used to detect HDV antigens or anti-HDV antibodies.
Treatment	Interferon Alpha-2B can limit hepatitis, but does not resolve carrier state. Infection can be prevented by HBV vaccine because virus can only infect HBV-infected cells.
Pathogenesis	Hepatocyte injury caused by cytotoxic T cells. Can cause chronic hepatitis and a chronic carrier state.

Human Immunodeficiency Virus

Characteristics	Enveloped virus has two copies of a single stranded positive polarity RNA genome. Currently six subtype known. Two major subtypes (HIV-1 and HIV-2). Causes Acquired Immune Deficiency Syndrome.
Habitat & Transmission	Habitat is humans. Transmitted by body fluids and transplacentally.
Diagnosis	Diagnosis made by ELISA followed by Western blot to confirm findings. PCR can be used to quantify viral load in plasma.
Treatment	AZT and other nucleotide analogs (ddl and ddC) plus HIV protease inhibitors. AZT is given to HIV positive mothers to limit the risk of transplacental transmission. Screening of blood products and condom use can limit the spread of the virus.
Pathogenesis	Binds to CD4 receptor and kills T-helper cells (and other CD4+ cells such as astrocytes). Destruction of T-helper cells predisposes to opportunistic infection.

Human T-Cell Leukemia Virus -1

Characteristics	Enveloped virus that has a single stranded negative polarity linear RNA genome. Causes T Cell lymphoma.
Habitat & Transmission	Habitat is humans.. Transmitted by body fluids.
Diagnosis	PCR and serology.
Treatment	Supportive care.
Pathogenesis	Infects and transforms CD4 + T-cells. Viral proteins stimulate the transcription of a number of T-Cell genes including IL-2 and the IL-2 receptor.

Human T Cell Leukemia Virus -II

Characteristics	Enveloped virus that has a single stranded negative polarity linear RNA genome. Causes T Cell lymphoma.
Habitat & Transmission	Habitat is humans.. Transmitted by body fluids.
Diagnosis	PCR and serology.
Treatment	Supportive care.
Pathogenesis	Infects and transforms CD4 + T-cells. Viral proteins stimulate the transcription of a number of T-Cell genes including IL-2 and the IL-2 receptor.

Influenza Virus

Characteristics	Enveloped RNA virus with a segmented single stranded negative polarity genome that causes influenza. Three major subtypes exist (A, B, and C).
Habitat & Transmission	Infects humans, fowl, and pigs. Spread via aerosol.
Diagnosis	Virus identified by hemagglutination inhibition or complement fixation. A four fold rise in antibody titer can also be seen in convalescent serum.
Treatment	Amantadine or Rimantadine for severe cases. A vaccine is available with 2 inactivated strains of the A virus and 1 inactivated strain of the B virus.
Pathogenesis	The genome has 8 segments which can undergo recombination with other influenza viruses (antigenic shift) and the RNA genome is susceptible to mutation (antigenic drift). Hemagglutinin binds to sialic acids on host cell glycoproteins. The virus is then endocytosed, and the hemagglutinin mediates escape from the endolysosome to the cytoplasm. Neuraminidase removes sialic acids from host cell proteins, preventing superinfection by another influenza virus.



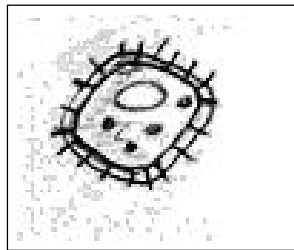
Influenza virus in cross section

Japanese Encephalitis Virus

Characteristics	Enveloped virus that has a single stranded negative polarity linear RNA genome. Causes encephalitis.
Habitat & Transmission	Habitat is birds and pigs. Transmitted by mosquitoes.
Diagnosis	Isolation of virus and detection of CPE, serology, or detection by immunological staining in brain tissue.
Treatment	Supportive care. An inactivated viral vaccine is available. Mosquito control can limit the number of persons infected.
Pathogenesis	Enters bloodstream and travels to CNS, causing encephalitis.

Lassa Fever Virus

Characteristics	Enveloped virus that has a single stranded negative polarity linear RNA genome. Causes hemorrhagic fever.
Habitat & Transmission	Habitat is rodents. Transmitted by rodent feces and urine. Person to person transmission is via body fluids.
Diagnosis	Diagnosis is made by isolating virus from cell culture or a four fold rise in anti-Lassa Fever virus antibody titer.
Treatment	Supportive care and Ribavirin. Isolation of infected individuals can limit the spread of the disease. Rodent control can eliminate the source of the virus.
Pathogenesis	Causes a petechial rash and GI tract hemorrhage. Multiple organs become involved, and death is due to shock.



Lassa fever virus in cross section

Marburg Virus

Characteristics	Enveloped virus that has a single stranded negative polarity linear RNA genome. Causes hemorrhagic fever.
Habitat & Transmission	Habitat is primates. Transmitted by body fluids and monkey bites.
Diagnosis	Diagnosis is made by isolating virus from cell culture or a four fold rise in anti-Marburg virus antibody titer.
Treatment	Supportive care. Isolation of infected individuals can limit the spread of the disease.
Pathogenesis	Causes disseminated intravascular coagulation and shock. The severe thrombocytopenia causes hemorrhages.

Measles Virus

Characteristics	Enveloped virus has a linear single stranded negative polarity RNA genome. Infection causes measles.
Habitat & Transmission	Habitat is humans. Transmitted via aerosol.
Diagnosis	Diagnosis made by clinical presentation. Serology can be used to confirm the diagnosis.
Treatment	Supportive care. A live attenuated viral vaccine is available. One of the 'M's' in the MMR vaccine.
Pathogenesis	Infects respiratory epithelium and disseminates via bloodstream. Lymph nodes and skin become infected. Pneumonia and encephalitis are rare complications.



Measles virus in cross section

Mumps Virus

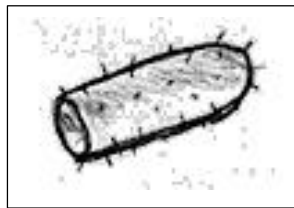
Characteristics	Enveloped virus has a single stranded negative polarity RNA genome. Infection causes mumps.
Habitat & Transmission	Habitat is humans. Spread via aerosol.
Diagnosis	Diagnosis made serologically or by hemadsorption.
Treatment	Supportive care. A live attenuated viral vaccine is available. One of the 'M's' in the MMR vaccine.
Pathogenesis	Spreads from the respiratory tract to local lymph nodes. Also spreads to parotid glands, gonads, meninges, and pancreas.

Parainfluenza Virus

Characteristics	Enveloped virus has a single stranded negative polarity genome. Causes croup and bronchiolitis in children.
Habitat & Transmission	Habitat is humans. Spread via aerosol.
Diagnosis	Virus detected by hemadsorption and immunofluorescence. A 4 fold rise in antibody titer is diagnostic.
Treatment	Supportive care.
Pathogenesis	Virus infects and kills respiratory epithelial cells. Histological examination shows multinucleated giant cells.

Rabies Virus

Characteristics	Bullet shaped virus has a single stranded negative polarity RNA genome. It causes rabies.
Habitat & Transmission	Habitat is mammals. Transmitted by animal bite or inhalation of feces.
Diagnosis	Serology can be used to confirm infection in an acutely ill patient. Histological sections of brain tissue will show Negri bodies.
Treatment	Supportive care. Inactivated viral vaccine and anti-rabies immunoglobulin are available for human use, and may prevent post-exposure development of disease. A live attenuated viral vaccine is available for domestic animals.
Pathogenesis	Virus binds to acetylcholine receptor on neurons and travels to the CNS and causes encephalitis. Virus replicates in the CNS and spreads to salivary glands. Infection of CNS is nearly always fatal.



Rabies virus

Respiratory Syncytial Virus

Characteristics	Enveloped virus has a single stranded negative polarity RNA genome. It causes bronchiolitis and pneumonia in small children.
Habitat & Transmission	Habitat is humans. Spread via aerosol.
Diagnosis	Diagnosis is made by viral isolation and detection of multinucleated giant cells. Immunofluorescence can also be used for identification.
Treatment	Supportive care and ribavirin by aerosol for severe cases.
Pathogenesis	Infection is limited to respiratory tract.

Rubella Virus

Characteristics	Enveloped virus has a single stranded positive polarity RNA genome. Causes rubella.
Habitat & Transmission	Habitat is humans. Spread via aerosol.
Diagnosis	Virus interferes with the cytopathic effects of coxsackievirus in culture. IgM and IgA titers rise in convalescent serum.
Treatment	Supportive care. A live attenuated viral vaccine is available. The 'R' in the MMR vaccine.
Pathogenesis	Infects upper respiratory tract and enters bloodstream. Virus then infects lymph nodes and skin. Virus can cross the placenta and cause congenital malformations in the first trimester.

St. Louis Encephalitis Virus

Characteristics	Enveloped virus that has a single stranded positive polarity linear RNA genome. Causes encephalitis.
Habitat & Transmission	Habitat is wild birds. Transmitted by mosquitoes.
Diagnosis	Serology.
Treatment	Supportive care.
Pathogenesis	Enters bloodstream and travels to CNS, causing encephalitis.

Western Equine Encephalitis Virus

Characteristics	Enveloped virus that has a single stranded positive polarity linear RNA genome. Causes encephalitis.
Habitat & Transmission	Habitat is wild birds. Transmitted by mosquitoes.
Diagnosis	Isolation of virus in tissue culture or a four fold rise in antibody titer.
Treatment	Supportive care. A vaccine is available for horses.
Pathogenesis	Enters bloodstream and travels to CNS, causing encephalitis.

Yellow Fever Virus

Characteristics	Enveloped virus that has a single stranded positive polarity linear RNA genome. Causes yellow fever.
Habitat & Transmission	Habitat is primates. Transmitted by mosquitoes.
Diagnosis	Isolation of virus in tissue culture or a four fold rise in antibody titer.
Treatment	Supportive care.
Pathogenesis	Enters bloodstream and travels to many organs. Viral infection causes jaundice, fever, and gastrointestinal tract hemorrhage.

NONENVELOPED RNA VIRUSES

Astrovirus

Characteristics	Non-enveloped virus with a single stranded positive polarity RNA genome. Causes watery diarrhea.
Habitat & Transmission	Habitat is humans. Transmitted by fecal-oral route.
Diagnosis	Diagnostic tests are rarely done. Virus detected by CPE in cell culture. A four fold rise in antibody titer is diagnostic.
Treatment	Supportive care.
Pathogenesis	Not known.

Coxsackievirus

Characteristics	Non enveloped virus that has a single stranded positive polarity RNA genome. Infection causes aseptic meningitis, myocarditis, and pericarditis.
Habitat & Transmission	Habitat is humans. Transmitted by fecal-oral route.
Diagnosis	Virus detected by CPE in culture. A four fold rise in antibody titer is diagnostic.
Treatment	Supportive care.
Pathogenesis	Infects upper respiratory and gastrointestinal tract. Enters bloodstream and infects other organs.

Hepatitis A Virus

Characteristics	Non-enveloped virus that has a single stranded positive polarity RNA genome. Causes Hepatitis A.
Habitat & Transmission	Habitat is humans. Transmitted by fecal-oral route.
Diagnosis	Serology used to detect viral antigens or anti-Hepatitis A IgM.
Treatment	Supportive care. A killed viral vaccine is available. Immunoglobulin can prevent the disease in exposed individuals.
Pathogenesis	Virus infects gastrointestinal tract and spreads to the liver. Infected hepatocytes are killed by cytotoxic T cells.

Hepatitis E Virus

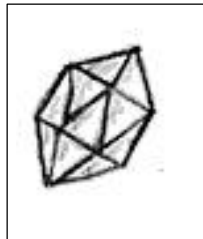
Characteristics	Non-enveloped virus with a single stranded positive polarity RNA genome. A cause of hepatitis.
Habitat & Transmission	Habitat is humans. Transmitted via fecal oral route.
Diagnosis	Exclude other hepatitis viruses.
Treatment	Supportive care.
Pathogenesis	Virus infects GI tract and then enters bloodstream. Virus then infects hepatocytes, which are then destroyed by cytotoxic T Cells. Disease is more severe in pregnant women.

Norwalk Virus

Characteristics	Non-enveloped virus with a single stranded positive polarity RNA genome. Causes diarrhea in young children.
Habitat & Transmission	Habitat is humans. Transmitted by fecal oral route.
Diagnosis	Not performed.
Treatment	Supportive care.
Pathogenesis	The virus infects the gastrointestinal tract.

Polio Virus

Characteristics	Non-enveloped virus with a single stranded positive polarity RNA genome. Causes polio and aseptic meningitis.
Habitat & Transmission	Habitat is humans. Transmitted by fecal-oral route.
Diagnosis	Virus detected by CPE in cell culture. A four fold rise in antibody titer is diagnostic.
Treatment	Supportive care. Inactivated (Salk) and attenuated (Sabin) vaccines are available.
Pathogenesis	Virus binds to ICAM-1 to infect the respiratory and gastrointestinal epithelium. Spreads to lymph nodes and enters bloodstream. Virus then crosses blood-brain barrier to infect CNS. Infected neurons are destroyed by cytotoxic T-cells.



Poliovirus

Rhinoviruses

Characteristics	Non-enveloped virus with a single stranded positive polarity RNA genome. A cause of the common cold. 100+ serotypes.
Habitat & Transmission	Habitat is humans. Transmitted via aerosol and hand-to-nose contact.
Diagnosis	Not usually done.
Treatment	Supportive care.
Pathogenesis	Virus binds to ICAM-1 in the upper respiratory tract and conjunctiva and is endocytosed. The virus replicates at temperatures lower than 37° C, so it does not spread from these locations. The virus mediates the release of bradykinins, which cause increased mucus secretions.

Rota Virus

Characteristics	Non-enveloped virus with a segmented (11 segments) double stranded RNA genome. Causes diarrhea in young children.
Habitat & Transmission	Habitat is humans. Transmitted by aerosol or fecal oral route.
Diagnosis	Detection of rotavirus in stool by ELISA or a four fold rise in antibody titer against the virus.
Treatment	Supportive care.
Pathogenesis	The virus infects the gastrointestinal tract and kills epithelial cells that form intestinal villi. This greatly reduces the surface area of the gut, which impairs absorption of water and nutrients from the GI tract.

Prions

Bovine Spongiform Encephalopathy ('Mad Cow Disease')

Characteristics	Infectious protein that causes bovine spongiform encephalopathy.
Habitat & Transmission	Habitat is cows and sheep. Transmitted to cows by the ingestion of infected sheep tissues (cattle feed protein supplement). It is thought that this prion has been transmitted to humans by eating cow tissues.
Diagnosis	Identification of CPE in brain biopsy and immunological staining for prion protein.
Treatment	Supportive care. Can be prevented by not using sheep tissue for cattle food.
Pathogenesis	Prion exposure results in the development of disease.

Creutzfeldt-Jakob Disease

Characteristics	Infectious protein that causes Creutzfeldt-Jakob Disease.
Habitat & Transmission	Habitat is humans. Transmitted by contaminated tissues (corneas, pituitary extracts, and neurosurgical instruments). A minority of cases are hereditary and due to a point mutation in the prion gene.
Diagnosis	Identification of CPE in brain biopsy and immunological staining for prion protein.
Treatment	Supportive care. Proper sterilization of neurosurgical equipment can reduce the spread of the disease.
Pathogenesis	The 'prion gene' is part of the human genome, but does not cause disease. Alterations to the prion gene or exposure to the prion protein results in disease.

Gertsmann-Straussler-Scheinker Syndrome

Characteristics	Infectious protein that causes Gertsmann-Straussler-Scheinker Syndrome.
Habitat & Transmission	Habitat is humans. Disease is due to a mutation in the prion gene. Transmission by contaminated tissue is possible.
Diagnosis	Identification of CPE in brain biopsy and immunological staining for prion protein.
Treatment	Supportive care. Proper sterilization of neurosurgical equipment may reduce the spread of the disease.
Pathogenesis	Mutations in the prion gene results in hereditary Gertsmann-Straussler-Scheinker Syndrome.

Kuru

Characteristics	Infectious protein that causes Kuru.
Habitat & Transmission	Habitat is humans. Transmitted by cannibalism (eating human brains)
Diagnosis	Identification of CPE in brain biopsy and immunological staining for prion protein. History of cannibalism.
Treatment	Supportive care. Can be prevented by not eating human tissues.
Pathogenesis	Prion exposure results in the development of disease.