



RNA Viral Infections and its Role in Pathogenesis

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Description

RNA (Ribonucleic Acid) viruses are a diverse group of infectious agents that cause a range of diseases in humans and animals. These viruses have RNA as their genetic material instead of DNA (Deoxyribonucleic Acid), which is the genetic material found in humans and most other organisms. RNA viruses are classified into different families based on their genetic characteristics, host range, and pathogenesis. The RNA genome of a virus can be Single-Stranded (SS) or Double-Stranded (DS). Single-stranded RNA viruses can be further classified as positive-sense (+) or negative-sense (-) depending on the orientation of their RNA. Positive-sense RNA viruses have a genome that can act as messenger RNA (mRNA) and directly translate into viral proteins, whereas negative-sense RNA viruses have a genome that requires a complementary RNA strand to be synthesized before translation. RNA viruses are known to cause a wide range of diseases in humans, including the common cold, influenza, measles, mumps, rubella, hepatitis C, and the Human Immunodeficiency Virus (HIV). Influenza, commonly known as the flu, is a highly contagious respiratory illness caused by the influenza virus. The influenza virus is a negative-sense RNA virus that belongs to the Orthomyxoviridae family. The virus is transmitted through droplets when an infected person coughs or sneezes, or by touching contaminated surfaces.

The symptoms of influenza include fever, cough, sore throat, runny or stuffy nose, body aches, headaches, and fatigue. Most people recover from the flu within a week or two without any complications. Treatment for the flu usually involves supportive care, such as rest, hydration, and over-the-counter medications to relieve symptoms. Antiviral medications such as oseltamivir (Tamiflu) and zanamivir

(Relenza) can also be prescribed to reduce the severity and duration of symptoms. COVID-19 is a respiratory illness caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). The virus is a positive-sense RNA virus that belongs to the Coronaviridae family. COVID-19 is primarily spread through respiratory droplets when an infected person talks, coughs, or sneezes, and through contact with contaminated surfaces. The symptoms of COVID-19 range from mild to severe and can include fever, cough, and shortness of breath, fatigue, body aches, a loss of taste or smell, and a sore throat. In severe cases, COVID-19 can lead to pneumonia, Acute Respiratory Distress Syndrome (ARDS), and death, particularly in high-risk individuals such as the elderly and those with underlying medical conditions. There are currently no specific treatments for COVID-19, but supportive care such as oxygen therapy, fluids, and antipyretic medication can help relieve symptoms. Several vaccines have been developed and authorized for emergency use to prevent COVID-19, including the Pfizer-BioNTech, Moderna, and Johnson vaccines. Hepatitis C is a viral infection that affects the liver and is caused by the Hepatitis C Virus (HCV), a positive-sense RNA virus that belongs to the Flaviviridae family. HCV is primarily spread through contact with infected blood, such as through sharing needles or other equipment used to inject drugs or receiving contaminated blood transfusions or organ transplants. In some cases, HCV can also be transmitted from mother to baby during childbirth. The symptoms of acute hepatitis C can include fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, and jaundice (yellowing of the skin and eyes). Most people with acute hepatitis C will develop chronic hepatitis C, which can lead to liver cirrhosis, liver failure, and liver cancer. Treatment for hepatitis C involves antiviral medications such as interferon and ribavirin, and more recently, Direct-Acting Antivirals (DAAs) such as sofosbuvir, ledipasvir, and glecaprevir. These medications can cure hepatitis C in most cases, although they can have side effects such as fatigue, headache, and nausea.

Conclusion

RNA viruses are a diverse group of infectious agents that cause a range of diseases in humans and animals. These viruses have RNA as their genetic material instead of DNA and are classified into different families based on their genetic characteristics, host range, and pathogenesis. Treatment for RNA viral diseases varies depending on the specific virus and the severity of the infection. Supportive care, antiviral medications, and vaccines are all used to treat and prevent these diseases. The study of RNA-based therapies is also opening up new avenues for the treatment of genetic diseases.

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