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HIV and Other Retroviruses: Mechanisms of Infection and Treatment

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INTRODUCTION

Retroviruses belong to the Retroviridae family. Over 38 million people globally are living with HIV. Antiretroviral Therapy (ART) helps control the virus and prevents transmission. This property allows them to establish persistent infections and, in some cases, cause diseases such as cancer or immunodeficiency syndromes. Among the retroviruses, the most well-known is the Human Immunodeficiency Virus (HIV), responsible for Acquired Immunodeficiency Syndrome (AIDS). However, retroviruses are not limited to humans and infect a variety of animals as well, making them an important subject in virology and medical research. Facilitates the integration of viral DNA into the host genome. Cleaves viral precursor proteins, allowing for the maturation of new viral particles. Prevention methods include condom use, Pre-Exposure Prophylaxis (PrEP), and Post-Exposure Prophylaxis (PEP). HTLV-1 and HTLV-2 are deltaretroviruses that can cause HTLV is mainly transmitted through blood transfusions, sexual contact, and from mother to child via breastfeeding. Some retroviruses, such as Rous Sarcoma Virus (RSV) and murine leukemia viruses, are associated with oncogenesis. These viruses insert oncogenes into the host genome, triggering uncontrolled cell growth and leading to cancer. Retroviruses have played a crucial role in advancing molecular biology and genetics. Reverse transcriptase, a hallmark enzyme of retroviruses, has been instrumental in the development of Polymerase Chain Reaction (PCR) and gene therapy techniques.

DESCRIPTION

Applications in Biotechnology gene Therapy retroviral vectors are used to deliver therapeutic genes for treating genetic disorders like Severe Combined Immunodeficiency (SCID). mRNA Vaccine Development research on retroviruses has contributed to advances in vaccine technology, including COVID-19 mRNA vaccines. Ongoing research aims to deepen our understanding of retroviruses and improve treatment strategies. HIV Cure Research scientists are exploring CRISPR gene editing, immune-based therapies, and latency-reversing agents to eliminate HIV from infected individuals. Each of these genera is associated with different host species and pathologies. The Lentivirus genus, in particular, is known for its ability to cause chronic and progressive diseases in humans and animals. Several vaccine candidates are in clinical trials. Broad-Spectrum Antiretroviral Drugs new drug formulations aim to improve treatment adherence and reduce drug resistance. Engineered retroviruses are being tested for their ability to selectively target and kill cancer cells. HIV is a lentivirus that targets the immune system, specifically CD4+ T cells. Without treatment, HIV progresses to AIDS, leading to severe immunodeficiency and increased susceptibility to opportunistic infections. Antiretroviral Therapy (ART) effectively suppresses viral replication.

CONCLUSION

The study of retroviruses not only helps in combating viral diseases but also contributes to groundbreaking discoveries in genetics and medicine. Continued research and innovation hold promise for new therapeutic and preventive strategies in the fight against retroviral infections. Retroviruses are fascinating and complex pathogens with significant implications for human health. Antigen/Antibody Tests Detect both HIV antigens and antibodies. While HIV remains the most impactful retrovirus, research into viral mechanisms and treatment options continues to advance. The ongoing study of retroviruses not only improves our understanding of viral diseases but also contributes to broader scientific advancements in immunology, gene therapy, and virology.

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CONFLICT OF INTEREST

The author declares there is no conflict of interest.

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