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Importance of Internal Controls to Monitor Adequate Specimen Collection

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DESCRIPTION

Orthopoxviruses are a group of DNA viruses that include variola virus, the causative agent of smallpox, and other related viruses such as monkeypox and cowpox. These viruses pose a significant threat to human health due to their ability to cause severe illness and potential for intentional use as bioweapons. Over the years, extensive research has been conducted to develop effective treatment strategies against orthopoxviruses. In this article, we will explore the current understanding of orthopoxvirus treatment and discuss the promising advancements in combating this lethal pathogen. Historically, the primary approach to treating orthopoxvirus infections involved supportive care and symptomatic treatment. This included measures to alleviate fever, manage dehydration, and provide relief from other associated symptoms. Additionally, infection control practices, such as isolation and quarantine, played a crucial role in preventing the spread of the disease. In recent years, considerable efforts have been made to develop antiviral therapies targeting orthopoxviruses. One of the most extensively studied antiviral agents is cidofovir, a nucleoside analog with broad-spectrum activity against DNA viruses. Cidofovir has shown promise *in vitro* and in animal models but has limited clinical use due to its potential nephrotoxicity. Another antiviral agent, brincidofovir, is an orally bioavailable prodrug of cidofovir. It offers potential advantages in terms of improved safety and ease of administration. Recent clinical trials have demonstrated its efficacy against various orthopoxvirus infections, including smallpox and monkeypox. Furthermore, the development of RNA Interference (RNAi) technology has opened up new possibilities for the treatment of orthopoxvirus infections. RNAi utilizes small interfering RNAs (siRNAs) to silence specific genes essential for viral replication. Preclinical studies have shown promising results, highlighting the potential of RNAi as an antiviral strategy against orthopoxviruses. Vaccination remains the most effective preventive measure against orthopoxviruses. The smallpox vaccine, made from live vaccinia virus, led to the eradication of smallpox in 1980. However, due to the eradication of smallpox and the associated risks of the vaccine, routine smallpox vaccination is no longer recommended. In recent years, efforts have been directed towards developing safer and more targeted vaccines. One such example is the Modified Vaccinia Ankara (MVA) vaccine, which is a non-replicating vector that induces a robust immune response without the risk of causing disease. MVA-based vaccines have shown promising results in preclinical and clinical studies against various orthopoxviruses, including monkeypox and cowpox. Advances in molecular biology and immunology have paved the way for the development of novel therapeutic approaches against orthopoxviruses. Monoclonal Antibodies (mAbs) have emerged as a potential treatment option. mAbs can target specific viral proteins and prevent viral entry or neutralize viral particles. Several mAbs have shown efficacy in animal models and early-phase clinical trials against orthopoxviruses. Additionally, immunomodulatory therapies, such as interferons and immune checkpoint inhibitors, have shown promise in enhancing the immune response against orthopoxvirus infections. These therapies aim to modulate the host immune system to mount a more effective antiviral response. The treatment landscape for orthopoxvirus infections has seen significant advancements in recent years. Antiviral therapies, including cidofovir and brincidofovir, hold promise for the treatment of orthopoxvirus infections. Vaccination strategies, such as the MVA vaccine, offer effective prevention options. Furthermore, novel therapeutic approaches, including monoclonal antibodies and immunomodulatory therapies, show potential for improving patient outcomes. Continued research and collaboration between scientists, clinicians, and public health agencies are crucial to further refine and develop these treatment options, ultimately enhancing our ability to combat orthopoxvirus infections and mitigate their potential consequences.

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CONFLICT OF INTEREST

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