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Assessment of an LSDV-vectored Vaccine for Heterologous Prime-boost HIV Immunization Strategies

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Introduction

HIV remains a global public health challenge, with millions of people living with the virus worldwide. Despite significant progress in the development of antiretroviral therapies there is no effective vaccine available to prevent HIV infection. A viable HIV vaccine would provide an essential tool in the fight against the global HIV epidemic by reducing transmission and potentially offering a cure. Over the past decades, various vaccine strategies have been explored, including both traditional and novel approaches. Among these, viral vector-based vaccines have gained considerable attention due to their ability to elicit robust immune responses. In particular, the use of viral vectors for HIV vaccine development has seen promising results in preclinical studies and human clinical trials. One such viral vector is the Livestock-and-Swine-Derived Vaccine which has shown potential as a delivery platform for heterologous prime-boost HIV immunisations. This paper evaluates the potential of LSDV-vectored vaccines in the context of HIV immunisation, focusing on their mechanisms of action, efficacy, and challenges [1,2].

Description

Despite the success of antiretroviral therapies, there are significant limitations to ART. While ART helps suppress viral load in HIV-positive individuals, it does not offer a cure, and lifelong treatment is required. Moreover, ART does not prevent HIV transmission, meaning the global burden of new infections remains high. An effective HIV vaccine could serve as a preventive measure and reduce transmission rates, ultimately curbing the spread of the virus. The immune system's inability to mount an effective response to HIV is due to the virus's ability to rapidly mutate and evade immune detection. This characteristic has made HIV vaccine development particularly challenging. Conventional vaccine strategies, such as those used for polio or influenza, have not been successful for HIV, largely due to the virus's high mutation rate and complex mechanisms of immune evasion. This has led to the exploration of new strategies, including the use of viral vectors to deliver HIV antigens to the immune system. Viral vectors are modified viruses that are used as vehicles to deliver specific antigens to the immune system. These vectors can induce both humoral (antibody-mediated) and cellular immune responses, providing a comprehensive defense against pathogens. The major advantage of viral vectors is their ability to effectively present antigens in a way that mimics natural infection, triggering strong immune responses [3-5].

Conclusion

The evaluation of LSDV-vectored vaccines for heterologous prime-boost HIV immunisations holds significant promise in the quest for an effective HIV vaccine. Early preclinical and clinical data suggest that LSDV vectors can induce strong and durable immune responses, providing protection against HIV. The use of heterologous prime-boost strategies further enhances the immune response, making this approach a potentially valuable tool in the development of a preventive HIV vaccine. However, several challenges remain, including the issue of pre-existing immunity, HIV's rapid mutation rate, and the complexities of manufacturing and regulatory approval. Continued research is essential to optimize LSDV-based vaccines and address these challenges. If successful, LSDV-vectored vaccines could play a critical role in reducing the global burden of HIV and ultimately contributing to the development of a vaccine that can prevent HIV infection worldwide.

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Conflict of Interest

None.

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