OPEN ACCESS Freely available online

ISSN: 2157-7560
Journal of
Vaccines & Vaccination

Perspective

Immunogenicity of Live Attenuated and Inactivated HAV Vaccines in Vaccinated Pediatric Populations

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ABOUT THE STUDY

Hepatitis A Virus (HAV) is a highly contagious liver infection that poses a significant global health burden. To combat the spread of this virus, vaccination has become a significant intervention, particularly in children who are susceptible to severe complications. Two main types of vaccines are employed for Hepatitis A immunization: live attenuated vaccines and inactivated vaccines. Understanding the immune responses elicited by each type is essential for optimizing vaccination strategies and ensuring long-term protection in pediatric populations.

Live attenuated vaccines

Live attenuated vaccines, like the one used for Hepatitis A, contain a weakened, but still replicating, form of the virus. In the case of HAV, the vaccine strain is modified to reduce its pathogenicity while maintaining the ability to stimulate a robust immune response. The live attenuated vaccine engages both the innate and adaptive immune systems, providing a more comprehensive defense against future encounters with the virus.

Upon administration of a live attenuated HAV vaccine, the weakened virus replicates in the host, triggering an immune response that closely mimics a natural infection. This process stimulates the production of both humoral and cellular immunity. The humoral response involves the production of antibodies, primarily Immunoglobulin G (IgG), which play a crucial role in neutralizing the virus and preventing its entry into liver cells.

Inactivated vaccines

Contrastingly, inactivated vaccines use virus particles that have been killed or inactivated to prevent replication. The inactivated Hepatitis A vaccine contains viral particles that cannot replicate, ensuring there is no risk of causing the disease. While inactivated vaccines are incapable of providing the same level of replication as live attenuated vaccines, they still induce a robust immune response.

The inactivated HAV vaccine primarily stimulates the humoral immune response, leading to the production of antibodies, particularly IgG. However, the cellular immune response is less pronounced compared to live attenuated vaccines. The lack of viral replication limits the stimulation of cellular immunity, which plays a significant role in clearing infected cells and providing long-lasting protection.

Comparative immune responses

Several studies have compared the immune responses elicited by live attenuated and inactivated HAV vaccines in pediatric populations. Generally, both vaccine types demonstrate high efficacy in preventing Hepatitis A infection. However, nuances exist in the nature and duration of the immune responses they induce.

Live attenuated vaccines have been shown to induce a more robust and durable immune response. The replication of the weakened virus allows for prolonged exposure to viral antigens, leading to sustained antibody production and the development of immunological memory. This results in long-term protection, often providing immunity for decades after vaccination.

On the other hand, inactivated vaccines may require booster doses to maintain protective antibody levels over time. The absence of viral replication limits the duration of antigen exposure, potentially necessitating additional doses to reinforce the immune response. Despite this, inactivated vaccines remain highly effective in preventing acute Hepatitis A infections in the short and medium term.

CONCLUSION

In conclusion, both live attenuated and inactivated vaccines play crucial roles in protecting children against Hepatitis A. The choice between these vaccines depends on various factors,

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Received: 16-Oct-2023, Manuscript No. JVV-23-23975; **Editor assigned:** 18-Oct-2023, PreQC No. JVV-23-23975 (PQ); **Reviewed:** 01-Nov-2023, QC No. JVV-23-23975; **Revised:** 08-Nov-2023, Manuscript No. JVV-23-23975 (R); **Published:** 15-Nov-2023. DOI: 10.35248/2157-7560.23.S24.002

Citation: Denis M (2023) Immunogenicity of Live Attenuated and Inactivated HAV Vaccines in Vaccinated Pediatric Populations. J Vaccines Vaccin. S24:002.

including age, health status, and the desired duration of protection. Live attenuated vaccines bring out a more comprehensive and durable immune response, while inactivated vaccines offer a safe and effective alternative, particularly in populations where live vaccines may pose a risk.

As vaccination programs continue to evolve, ongoing research is essential to refine immunization strategies and ensure optimal protection against Hepatitis A in children. Additionally, the integration of vaccination efforts with broader public health measures remains pivotal in reducing the global burden of HAV and preventing the associated morbidity and mortality in pediatric populations.