Adjuvants: Adding Impact to Speed

Adjuvants are substances that are added to vaccines to enhance the immune response. They work by activating the innate immune system, which helps to produce a stronger and more effective adaptive immune response to the antigen in the vaccine. This accelerated response can be particularly important in a pandemic situation, where rapid protection is needed.

The role and impact of adjuvants vary depending on the type of vaccine. Some adjuvants are used with subunit vaccines, which are made from parts of the pathogen that are expected to trigger an immune response. Adjuvants can increase the immunogenicity of these vaccines, making them more effective. One example is the ASO3 adjuvant used in the COVID-19 vaccine developed by AstraZeneca and Oxford University, which has been shown to enhance the immune response.

Other adjuvants are used with inactivated or attenuated whole pathogen vaccines. For these vaccines, adjuvants can help to overcome platform limitations, ensuring a more effective and widely applicable vaccine. For example, phospholipids are used in the inactivated influenza vaccine produced by CSL/Seqirus, which has been shown to be effective in older adults.

In the case of mRNA vaccines, which are rapidly gaining acceptance as a new vaccine technology, adjuvants can help to overcome some of the challenges associated with these vaccines. For instance, adjuvants can be used to increase the immunogenicity of the mRNA vaccine, making it more effective.

The choice of adjuvant must be considered in the context of each vaccine for development and licensure, and can vary depending on the target population. For example, adjuvants can be particularly impactful in a pandemic, and in the case of COVID-19, adjuvants have been considered for use in all age groups to ensure the highest possible level of protection.

The following adjuvants have been used in licensed vaccines:

1. GSK’s ASO3 formulation
2. Alum (aluminum hydroxide)
3. MF59 (a surfactant and oil emulsion)
4. Montanide ISA-51

In addition to these, there are also emerging adjuvant technologies, such as synthetic adjuvants and immune potentiators, that are being explored for use in future vaccines.

Conclusion

In summary, adjuvants play a crucial role in enhancing the effectiveness of vaccines. They are particularly important in a pandemic situation, where rapid protection is needed. The choice of adjuvant must be carefully considered, and further research is needed to develop more effective and widely applicable adjuvants.

References


For more information on adjuvants and COVID-19 vaccines, please visit the Human Vaccines Project website at https://humanvaccinesproject.org/