Understanding Vaccine Terminology: Adjuvants, Protein-Based Nanoparticles and More

The first vaccine was developed in 1796 for smallpox, and vaccine science has been evolving ever since.[1] Today, the scientific community continues to create innovative vaccine technology, working not just to combat infectious diseases but to also research how vaccines could potentially tackle some of the world's most significant health challenges, like cancer.

Vaccines play a vital role in helping to protect global public health, so it's important to understand the science behind vaccines to help make informed health decisions. Read on to learn more about vaccines and some common vaccine-associated terminology.

What are vaccines?

Vaccines contain specific antigen(s) that trigger the body's natural defenses, which help fight against the disease without causing illness.[2]

How do vaccines work with the immune system?

The immune system fights disease-causing germs (pathogens) like bacteria and viruses.[3] Vaccines trigger the immune system to produce antibodies, which are proteins that help fight against specific pathogens.[2] If you are exposed to that pathogen in the future, the immune system recognizes it and is ready to attack and destroy it.[3]

What are important terms to know about vaccines and the immune system?

- **Immunity** is the body's ability to resist disease-causing pathogens.[4]
- **Immunization** is the process by which a person becomes protected against a disease, usually through vaccination.[4]
- **Antigens** are the parts of pathogens that trigger an immune response.[4]
- **Antibodies** are proteins the immune system produces to help neutralize antigens.[4]
- **Immunogenicity** refers to the ability of an antigen to cause the body to make an immune response against it. The strength of an immune response depends on how immunogenic the antigen is.[5]

Are there different types of vaccines?

There are several types of vaccines. While each vaccine teaches your immune system how to fight off specific kinds of germs, they can be designed in different ways to achieve this goal.[6]

- **Inactivated vaccines** use the killed version of the germ that causes disease. These types of vaccines can be used to help protect against diseases like hepatitis A and rabies.[6]
- **Live-attenuated vaccines** use a weakened (or attenuated) form of the disease-causing germ. Live vaccines are used to help protect against infectious diseases such as measles and chickenpox.[6]
- **Messenger RNA (mRNA) vaccines** instruct the body to make proteins in order to trigger an immune response. These vaccines are currently approved as an option to help protect against COVID-19 and respiratory syncytial virus (RSV). They are also being explored for use in other areas.[6]
- **Subunit, recombinant, polysaccharide and conjugate vaccines** use specific pieces of the germ—like its protein, sugar or capsid (a casing around the germ). These vaccines can be used to help protect against diseases like COVID-19, shingles and human papillomavirus virus (HPV).[6]

- **Toxoid vaccines** use a weakened or inactivated form of a toxin (harmful product) made by the disease-causing germ. Toxoid vaccines can be used to help protect against diseases such as diphtheria and tetanus.[6]
- **Viral vector vaccines** use a modified version of a different virus as a vector to deliver genetic instructions to make the antigen. These types of vaccines had been approved for COVID-19 and have been studied in other disease areas, such as Zika and human immunodeficiency virus (HIV).[6]

What is the science behind Novavax's vaccines?

Novavax specializes in subunit vaccines using recombinant proteins from the specific viruses or bacteria our approved vaccines or investigational vaccine candidates are designed to help protect against. Our proprietary technology platform has two key components:

- **Protein-based nanoparticles** are made from Novavax's engineered proteins that help trigger an immune response. Presenting multiple copies of a protein on the surface of each nanoparticle helps to enhance the immune response, resulting in vaccines that may work better.[7]
- **Matrix-M®** is our proprietary adjuvant, which is a substance added to a vaccine to help stimulate a broad and stronger immune response. Matrix-M is made of naturally occurring compounds sustainably harvested from the bark of the Quillaja saponaria Molina tree in Chile.[8]

At Novavax, we're proud of our continued innovation in the vaccine space, adding to a rich legacy of vaccines that have helped save millions of lives. This history and decades of in-house research have led to the development of our proven proprietary technology platform. Our unique approach to vaccine development can help address some of the world's most significant health challenges and impact the lives of people around the globe.

View our pipeline to learn about the therapeutic areas we're tackling with our technology.

References

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