

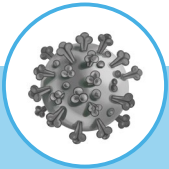
Available Types of Vaccine Platforms in the United States



- When creating vaccines, it's important to consider the immune system's response to each type of virus, the population that needs to be vaccinated, and the best technology that can be utilized to create optimal vaccines¹

- A variety of vaccine platforms are used to target various infectious diseases^{1,2}
- FDA-approved vaccines that have been developed using various platforms have a demonstrated safety and efficacy profile. Each vaccine platform has its own advantages and disadvantages³

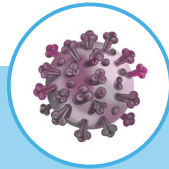
Viral Vaccine Technologies



Inactivated Vaccines

Killed form of the virus that causes disease, prepared by inactivating the pathogen through radiation, heat, or chemical compound use^{1,3}

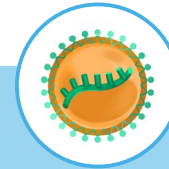
Examples: Hepatitis A, influenza, polio, rabies



Live-Attenuated Vaccines

Weakened form of the virus that causes disease^{1,3}

Examples: Measles, mumps, rubella, influenza, rotavirus, smallpox, chickenpox



mRNA Vaccines

mRNA is injected and translated into viral proteins that generate an immune response¹

Example: COVID-19^{a,b}



Subunit Vaccines

Protein immunogens, or antigens, from the virus, usually produced through recombinant technologies³

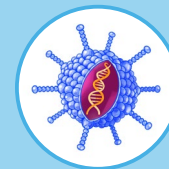
Examples: COVID-19,^c hepatitis B, influenza, human papillomavirus^{4,5}



Recombinant Vaccines

A sequence from the genetic code of a virus is inserted inside another vector as a foreign transgene³

Examples: Hepatitis B, human papillomavirus, influenza⁴



Viral Vector Vaccines

A modified version of a different virus is used as a vector to deliver the genetic instruction for the antigen¹

Example: COVID-19^b

^a Approved by the FDA.

^b Has FDA emergency use authorization.

^c Does not have FDA emergency use authorization.

References:

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3. D'Amico C, Fontana F, Cheng R, Santos HA. Development of vaccine formulations: past, present, and future. *Drug Deliv Transl Res*. 2021;11(2):353-372. doi:10.1007/s13346-021-00924-7
4. Centers for Disease Control and Prevention. Principles of vaccination. Accessed July 8, 2021. <https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/prinvac.pdf>
5. Keech C, Albert G, Cho I, et al. Phase 1-2 trial of a SARS-CoV-2 recombinant spike protein nanoparticle vaccine. *N Engl J Med*. 2020;383(24):2320-2332. doi:10.1056/NEJMoa2026920

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