



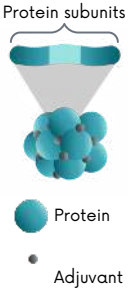

Platforms in the TB vaccine pipeline



There are several different types of vaccine platforms being used to develop new tuberculosis (TB) vaccines. A platform refers to the type of vaccine, based on how it is structured and how it produces an immune response.



It is important to distinguish between the types of TB vaccines, including traditional 'live attenuated' vaccines, inactivated vaccines, protein/adjuvant vaccines (also known as subunit vaccines) that contain only components of a pathogen, as well as viral vector vaccines, a platform that has been developed over the past few decades.

TYPES OF VACCINES	LICENSED VACCINES	FIRST INTRODUCED	CANDIDATES IN PIPELINE
Mycobacterial – live attenuated vaccines			
 <p>Uses a weakened, harmless form of the pathogen (the disease causing organism).</p> <p>Introduction of the weakened pathogen into a human will mimic true infection without causing disease and will enable the body to produce an immune response.</p>	<p>MMR (measles, mumps, rubella), yellow fever, influenza, oral polio, typhoid, Japanese encephalitis, rotavirus, BCG, varicella zoster</p>	<p>1798 (smallpox)</p>	<p>Ph 2b</p> <ul style="list-style-type: none"> BCG (revac) <p>Ph 3</p> <ul style="list-style-type: none"> BCG (travel) Immuvac (MIP) MTBVAC VPM1002
Mycobacterial – inactivated vaccines			
 <p>Uses the entire pathogen to produce an immune response.</p> <p>The pathogen is killed or made inactive so it cannot cause infection.</p>	<p>Whole-cell pertussis, polio, influenza, Japanese encephalitis, hepatitis A, rabies</p>	<p>1986 (typhoid)</p>	<p>Ph 2b</p> <ul style="list-style-type: none"> DAR-901 RUTI®
Protein/adjuvant vaccines			
 <p>Protein subunits</p> <p>Protein</p> <p>Adjuvant</p> <p>Contains a protein(s) of the pathogen, which acts as the foreign antigen. An antigen is any substance that stimulates the immune system to trigger an immune response.</p> <p>Certain protein vaccines are paired with an adjuvant. An adjuvant is an ingredient that helps the body create a stronger immune response to an antigen.</p>	<p>Pertussis, seasonal influenza, hepatitis B, meningococcal, pneumococcal, typhoid, hepatitis A</p>	<p>1970 (anthrax)</p>	<p>Ph 2a</p> <ul style="list-style-type: none"> AEC/BC02 ID93+GLA-SE <p>Ph 2b</p> <ul style="list-style-type: none"> H56:IC31 M72/AS01E <p>Ph 3</p> <ul style="list-style-type: none"> GamTBVac
Viral vector vaccines			
 <p>Viral vector genes</p> <p>Pathogen gene(s)</p> <p>Genes from the pathogen are inserted into the DNA of a harmless or weakened virus, called a vector.</p> <p>The vector carries the genes into the human cell. The genes use the cell's machinery to produce some protein(s) of the pathogen as instructed by the gene(s).</p> <p>When the protein is produced, the immune system sees it as a foreign or harmful antigen and produces an immune response.</p>	<p>Ebola, SARS-CoV-2</p>	<p>2019 (Ebola)</p> <p>2020 (SARS-CoV-2)</p>	<p>Ph 1</p> <ul style="list-style-type: none"> AdHu5Ag85A TB/FLU-01L TB/FLU-04L <p>Ph 2a</p> <ul style="list-style-type: none"> ChAdOx1.85A + MVA85A