## 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

<table>
<thead>
<tr>
<th>MYCOBACTERIAL – LIVE ATTENUATED VACCINES</th>
<th>LICENSED VACCINES</th>
<th>FIRST INTRODUCED</th>
<th>CANDIDATES IN PIPELINE</th>
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| Uses a weakened, harmless form of the pathogen (the disease causing organism). | MMR (measles, mumps, rubella), yellow fever, influenza, oral polio, typhoid, Japanese encephalitis, rotavirus, BCG, varicella zoster | 1978 (smallpox) | Ph 2b  
- BCG (revac)  
Ph 3  
- BCG (travel)  
- Immuvac (MIP)  
- MTBVAC  
- VPM1002 |

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<thead>
<tr>
<th>MYCOBACTERIAL – INACTIVATED VACCINES</th>
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| Uses the entire pathogen to produce an immune response. The pathogen is killed or made inactive so it cannot cause infection. | Whole-cell pertussis, polio, influenza, Japanese encephalitis, hepatitis A, rabies | 1986 (typhoid) | Ph 2b  
- DAR-901  
- RUTI® |

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<tr>
<th>PROTEIN/ADJUVANT VACCINES</th>
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| 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. 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. | Pertussis, seasonal influenza, hepatitis B, meningococcal, pneumococcal, typhoid, hepatitis A | 1970 (anthrax) | Ph 2a  
- AEC/BC02  
- ID93+GLA-SE  
Ph 2b  
- H56:IC31  
- M72/AS01E  
Ph 3  
- GamTBVac |

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<th>VIRAL VECTOR VACCINES</th>
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| Genes from the pathogen are inserted into the DNA of a harmless or weakened virus, called a vector. 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). When the protein is produced, the immune system sees it as a foreign or harmful antigen and produces an immune response. | Ebola, SARS-CoV-2 | 2019 (Ebola)  
2020 (SARS-CoV-2) | Ph 1  
- AdHu5Ag85A  
- TB/FLU-01L  
- TB/FLU-04L  
Ph 2a  
- ChAdOx1.85A +MVA85A |

Source: IAVI Vaccine Literacy Library, IAVI, New York, USA, 2022.

See the full TB vaccine pipeline at [www.newtbvaccines/tb-vaccine-pipeline](http://www.newtbvaccines/tb-vaccine-pipeline)