

## Killed (Inactivated) Fractional Protein Vaccines

There are 2 types of killed (inactivated) fractional vaccines: protein-based and polysaccharide-based. Out of the protein-based vaccines, there are subunits and toxoids. The subunit vaccines include influenza, pertussis, hepatitis B, HPV, and anthrax while the toxoids include diphtheria and tetanus. The DTaP/Tdap combined vaccine consists of diphtheria toxin, tetanus toxin, and acellular pertussis subunit.



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### Subunit Vaccines

#### Subunit

##### Submarine

Protein-based fractional vaccines can be categorized into subunit and toxoids. Subunit vaccines contain a particular antigen (proteinaceous compound) that generates a T-cell dependent immune response.

#### Influenza (Intramuscular)

##### In-flute-virus

There are several types of vaccines for influenza. The classic "Flu shot" is a trivalent or quadrivalent vaccine which contains the killed subunits of the influenza virus for that particular year. Recall that in comparison, the intranasal influenza vaccine is a live vaccine.

#### Bordetella Pertussis

##### Border Pearl-tusks

Bordetella pertussis causes pertussis ("whooping cough"). The DTaP vaccine contains acellular *B. pertussis* subunits.

#### Hepatitis B

##### Happy-tie-liver Bee

For hepatitis B vaccination, the hepatitis B surface antigen (HBsAg) is used as the proteinaceous subunit. The hepatitis B vaccine is given in early childhood or in adults if they are at risk.

#### Human Papillomavirus (HPV)

##### Human Puppet-Virus

The HPV vaccine helps confer immunity to human papillomavirus, which can cause cervical cancer, laryngeal cancer, anal cancer, or warts.

#### Bacillus anthracis (Anthrax)

##### Rods Amtrak

The anthrax vaccine adsorbed (AVA) is available for pre-exposure and post-exposure prophylaxis against anthrax (caused by *B. anthracis*).

### Toxoid Vaccines

## Toxoid

### Toxic-green-barrel

Toxoid vaccines are fractional vaccines that consist of inactivated but immunogenic toxins released from certain organisms.

## **Corynebacterium diphtheriae (Diphtheria)**

### Corn-dip-bacteria

The toxins released from *C. diphtheriae* are obtained and inactivated. They are combined with toxins in *C. tetani* as well as acellular pertussis subunits to form the DTaP/Tdap vaccine.

## **Clostridium tetani (Tetanus)**

### Titanic-ship

The toxins released from *C. tetani* are obtained and inactivated. They are combined with toxins in *C. diphtheriae* as well as acellular pertussis subunits to form the DTaP/Tdap vaccine.

## Considerations

### DTaP and Tdap

#### DTaP-dancer

The diphtheria, tetanus, and acellular pertussis (DTaP) vaccine is composed of *C. diphtheriae* toxins, *C. tetani* toxins, and *B. pertussis* subunits. DTaP is administered to children under 7 years of age while Tdap is administered to those 7 and older.