VACCINE TYPES

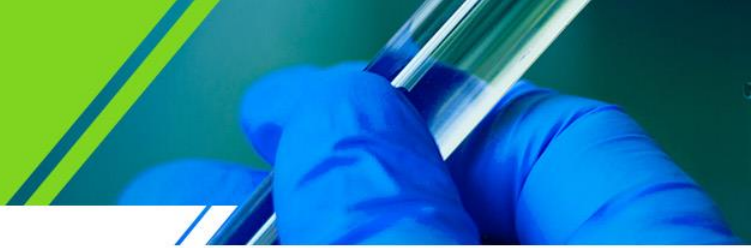
VACCINE PLATFORMS

- Live attenuated
- Inactivated Virus
- Toxoid
- Subunit
- Conjugate
- Polysaccharide
- Recombinant

VACCINE TYPES

1. Live, attenuated - weakened version of the virus

- No symptoms of infection
  - Unable to reproduce inside body
  - Unable to pass on the virus to other people
  - Immune response similar to the natural infection is triggered
- Lifelong immunity only one or two doses



VACCINE TYPES CONT'D

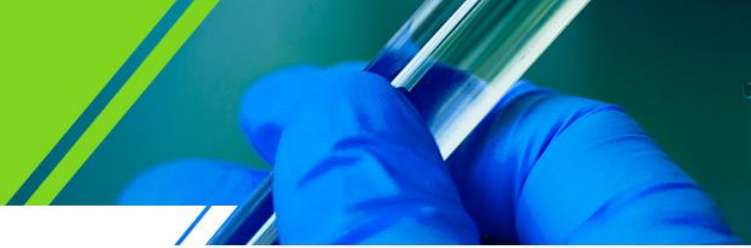
EXAMPLES

- MMR
- Yellow fever
- Rotavirus
- Smallpox and Chicken pox

VACCINE TYPES CONT'D

2. Inactivated / killed virus

- Do not offer lifelong immunity
- Top up over time
- Fewer side effects than live-attenuated vaccines



VACCINE TYPES CONT'D

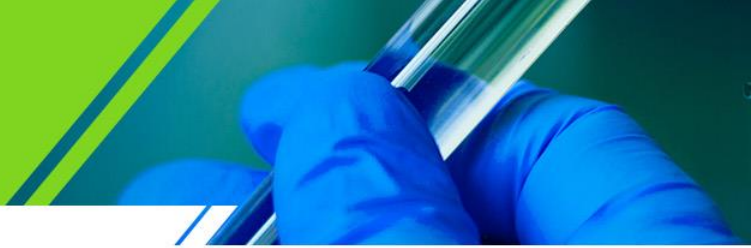
EXAMPLES

- Polio
- Influenza
- Rabies

VACCINE TYPES CONT'D

3. Toxoid

- Use toxins created by the bacteria or virus
- Immune response is focused on this specific toxin
- Do not offer lifelong immunity
- Top up over time



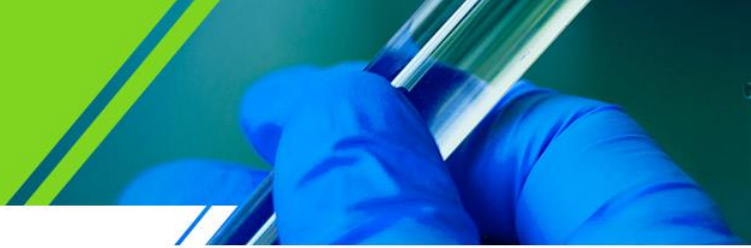
VACCINE TYPES CONT'D

- Diphtheria
- Tetanus

VACCINE TYPES CONT'D

4. Subunit

- Antigens from the surface of the virus triggers
- Few side effects because they are so specifically targeted



VACCINE TYPES CONT'D

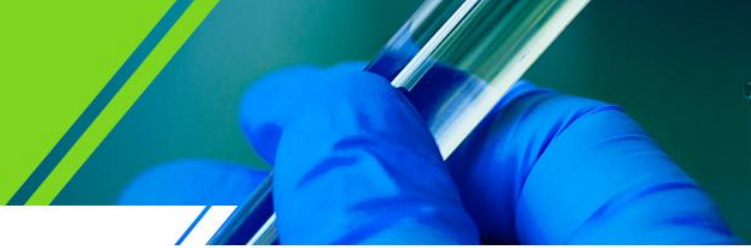
EXAMPLE

- Pertussis

VACCINE TYPES CONT'D

5. Conjugate – connect antigens for easier recognition

- Conjugate vaccines use two different components
  - Outer antigen coat of the bacteria or virus
  - Carrier protein
- Immune system to act more aggressively



VACCINE TYPES CONT'D

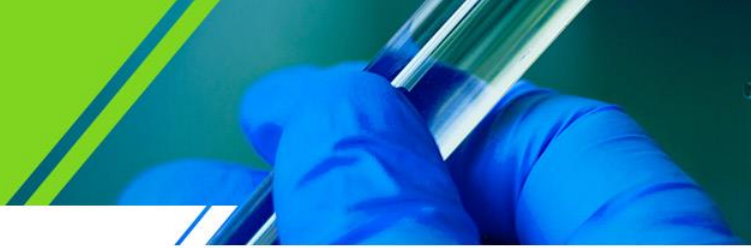
EXAMPLE

- Haemophilus influenzae

VACCINE TYPES CONT'D

6. Polysaccharide vaccines

- Sugar molecules from the outer layer of a bacteria or virus
- Chemically linked to carrier proteins and work similarly to conjugate vaccines



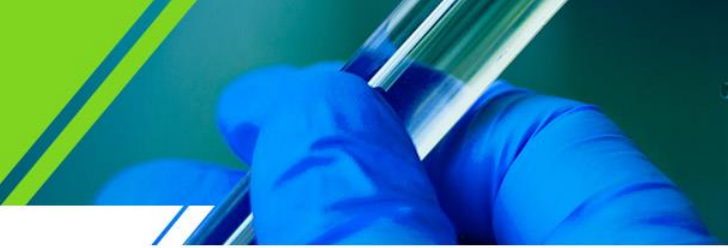
VACCINE TYPES CONT'D

- EXAMPLE
- Neisseria meningitidis

VACCINE TYPES CONT'D

7. **Recombinant**

- Genetic engineering
- The gene that creates the protein for a bacteria or virus is isolated and placed inside another cells' genes
- When that cell reproduces, it produces vaccine proteins that protects the body



VACCINE TYPES CONT'D

- EXAMPLE
- Hepatitis B

VACCINE TYPES CONT'D

8. DNA

- DNA that creates specific antigens from a germ. Once injected into the body, the DNA for the germ is reproduced by the body and is recognized by the immune system
- Immune response will then protect the body against further infection and will continue to protect the future

VACCINE TYPES

- DNA vaccines are thought to be more effective than protein- or antigen-based vaccines
- Antigen can sometimes be degraded or consumed by the body before the immune system can generate a full attack against the antigen

ADDITIVES

- Preservatives
  - Prevent contamination once the vial has been opened
- Stabilizers
  - Prevent chemical reactions from occurring within the vaccine and keep the vaccine components from sticking to the vaccine vial

ADDITIVES CONT'D

- Surfactant
  - All ingredients are kept blended together
  - Prevent settling and clumping of elements
  - Often used in foods like ice cream
- Residuals
  - Not active ingredients
  - May include egg proteins, yeast or antibiotics
  - Small quantities
  - Measured as parts per million or billion

ADDITIVES CONT'D

- Diluent
  - Liquid used to dilute a vaccine to the correct concentration immediately prior to use
  - Commonly used diluent is sterile water

ADDITIVES CONT'D

- Adjuvant
  - Adjuvant improves the immune response to the vaccine
    - Keeps the vaccine at the injection site
    - Stimulating local immune cells
- Tiny amount of aluminium salts like aluminium phosphate, hydroxide or potassium aluminium sulphate
- No long-term health problems
- Ingest aluminium regularly through eating and drinking

Technology	Attributes			
	Single dose	Already licensed technology	Speed of scale production	Current production scale
Inactivated virus	No	Yes	Medium	Medium/high
Attenuated virus	Yes	Yes	Slow	High
DNA-based	No	No	Fast	Medium
RNA-based	No	No	Fast	Low/medium
Viral vector	Maybe	Yes*	Medium	High
Protein-based	No	Yes	Medium/Fast	High


THANK YOU