Vaccine Preparation

Cole-Parmer has the products you need for your vaccine production workflow.

Vaccine development starts in the laboratory identifying one or more antigens against a specific pathogen—either a virus or bacteria.

DEVELOPMENT PROCESS

Stage 1 – Pathogen Production

Stage 2 – DNA/RNA (cDNA)

Stage 3 – PCR

Stage 4 – Amplified DNA/cDNA

Stage 5 – Recombinant DNA

Stage 6 – Multiplication

Stage 7 – Purification

1. Antigens are the components of a pathogen that can elicit an immune response. Attenuated pathogens, weakened to have their virulence disabled, or specific subunits of microorganisms can be safely purposed in vaccine development.

2. Genetic material is extracted from the pathogens in the form of DNA or RNA. RNA is converted to cDNA through a process called Reverse Transcription.

3. qPCR can be used in virus quantification to determine the virus concentration in both the R&D and production stages.

4-5. Amplified DNA from the pathogen is engineered into a plasmid vector and inserted into living cells.

6. Transformed cells are propagated using cell culture techniques that generate multiple copies of the plasmid.

7. Purified plasmids are then extracted from host cells and growth media using filters and other separation techniques.
Cole-Parmer has a wide range of products spanning your needs from laboratory to fill/finish in your vaccine workflow: from basic labware from Argos Technologies®, to our cloud-based TraceableLive® capable products for remotely monitoring your vaccine cold store. We provide instruments and consumables for every stage of the vaccine workflow, providing global market-leading products from Masterflex®, Ismatec®, Traceable®, Techne®, Stuart®, PCRmax®, Kinesis®, and TELOS®.

8. Stabilizers, adjuvants and preservatives are added to vaccine formulations to enhance vaccine quality, efficacy and to prevent unwanted bacterial and fungal growth.

9. Various techniques are used in vaccine QC to test for the physicochemical and immunological properties.

10. Our peristaltic pumping technology in combination with single-use disposable sensors can be utilized during production.

11. Cloud-connected devices can help monitor temperatures during shipment and while being stored in a warehouse facility.

12. Freezer thermometers can be used to monitor temperatures out in the field.
Polymerase Chain Reaction Vaccine Preparation

Vaccine development is a complex process that requires close control and monitoring of the vaccine consistency and quality. Polymerase chain reaction (PCR) has been used in almost all stages of vaccine preparation as one of the tools that contributes to the evaluation of vaccine safety, quality and efficacy. When choosing a system, it is important to choose one that is efficient, rapid, sensitive, with reliable performance and reproducibility. The PCRmax® Eco 48 fulfils these aspects and is ideal for vaccine development.

PCRMax Eco 48 qPCR system is a MIQE compliant, high specification, multiplexing, economically priced real-time thermal cycler that accommodates a unique 48-well polypropylene PCR plate utilising the same geometry as standard 384-well plates, with only 1/8 of the size.

Fast, uniform temperature control is important because accurate dwell temperatures ensure primers bind most efficiently and polymerase enzymes work optimally, generating the maximum yield of target DNA, thus ensuring specificity and efficiency. The unique thermal block design of Eco 48 achieves this with a heating and cooling system that provides accurate ±0.1°C uniformity at 95°C with 0 sec settle time.

Critical Temperature Monitoring Solutions

Vaccines are temperature-sensitive and must be stored within specified ranges. According to Melinda Suchard, Head of the Centre for Vaccines and Immunology at the National Institute for Communicable Diseases, "Live vaccines such as measles may lose potency if stored at temperatures that are too high. Diluent [liquid mixed with some vaccines] may also become a problem if it’s stored too cold and accidentally freezes. Vaccines for tetanus, human papillomavirus, pneumococcal disease and rotavirus, for example, are destroyed by accidental freezing."

Appropriate temperature conditions are essential; reliable and accurate monitoring systems ensure the integrity of the vaccines, preserving the viability of biological components and the vaccine’s effectiveness from storage to administration. Having a Digital Data Logging (DDL) thermometer is critical to knowing the vaccine’s integrity is maintained at all stages of the process—from manufacturing to refrigerated storage to transportation up to its final injection to the patient.

The Traceable® dedicated range of vaccine monitoring solutions helps you stay compliant at any step of the process—either during transportation with the TraceableGO™ re-usable transport data logger or with the TraceableOne™ single-use transportation data logger used for refrigerator/freezer storage. The Excursion-Trac™ data logger features vaccine probes and TraceableLive with 24/7 constant monitoring through the cloud and push notifications and alerts to your mobile device, tablet or PC.

Wherever your place on the vaccine supply chain, there is a Traceable® product for you.

Data Logger Monitoring
Automatically measure, monitor & record parameters over a defined period. View, download & analyze collected data.

Cloud Monitoring
Securely & wirelessly monitor critical environments & get 24/7 alerts with TraceableLive® compatible products.

PCRmax® Eco48
Real-Time PCR System

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