Presenters

Dr. Markus Kuehberger
Senior Director Business Line Chemical & Pharma Separation
Mail: markus.kuehberger@gea.com

Chris Proud
Global Account Manager
Lyophilization
Mail: christopher.proud@gea.com
GEA in human vaccine processes

**Cell separation**
- Microorganism
- Substrate
- Aeration
  - Fermentation
  - Self-ejecting or nozzle separator

**Non-Live vaccine processing**
- Further processing
  - Harvest tank
- Waste
  - Kill tank
- Live vaccine processing
  - Waste
  - Additives
  - Kist tank

**Non-Live vaccines**
- Influenza
- Cholera
- Bubonic plague
- Hepatitis A or hepatitis B
- Whooping cough
  (pertussis)
- Tetanus
- Diphtheria
- Pneumococcal bug
- Covid

**Live vaccines**
- Measles
- Mumps
- Rubella
- Yellow fever
- Chickenpox
- BCG
  (+ tuberculosis vaccine)
- Typhus
- Human rotaviruses
- Whooping cough
  (pertussis)

GEA pharma Separator line aseptic
GEA pharma Separator line pure

GEA kytero® single-use pharma Separator
GEA kytero® pharma Separator

All our competence in an easy-to-operate single-use system.

GEA kytero® 500

GEA kytero® 2000

GEA kytero® is registered as a trademark in several countries worldwide.
Freeze Drying

Why is freeze drying done?

The main reasons are:

- Good conservation
- Good solubility/reconstitution
- Good opportunity if drug is sensitive to heat

How is freeze drying done?

Freeze drying is removal of water from a product by freezing and a combination of sublimation and desorption.
**Lyophilization (freeze drying)**

Vial manufacturing

- Dispensing
- Solution Preparation
- Filtration
- Filling
- Freeze Drying
- Vial Closing
- Inspection
- Secondary Packaging

GEA core technology

Strategic partnership

Sourced technology
Further state-of-the-art components for liquid pharma processing

GEA Hilge Sterile Pumps

GEA pharma Valves

GEA pharma Homogenizers

Complete portfolio Separation, Valves, Pumps, Homogenizers:
gea.com/energizing-pharma