

Medical Sector Report

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Emerging Technologies

Disposable Manufacturing Systems

- Allows for fully contained manufacture of therapeutics/vaccines from in-coming raw materials to final dosage forms.
 - Bioreactors, mixing, buffer addition, harvest, downstream purification, final fill can all be performed in a closed, sterile disposable system.
- **Benefits**
 - Ability to set up manufacture of MCM under virtually any conditions including 'war zone'.
 - Turn-key systems
 - Faster delivery
 - Significantly reduced capital investment.

Improved Expression Systems

- Bacterial fermentation methods that provide for rapid optimized strain identification & high yields
 - Viral systems capable of producing recombinant proteins at yields similar to CHO cells
 - Virus Like Particle (VLP) technology for improved antigen presentation
 - Transgenic plants
 - Continual increase in yields from mammalian systems result of optimized media development
- = Lower Cost/Dose

Adjuvants

- Dose sparing
- Increased efficacy
- 1 FDA approved adjuvant: Aluminum Hydroxide
- Most adjuvants have been small molecule based

On the horizon:

- Biologics: Pieces of virus, toll like receptors, liposomes

Benefits

- Enhanced immune response
- Up to 10x reduction in the amount of vaccine required