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# Bioproduction & Avantor Fluid Handling

**December 2022**



Setting science in motion
to create a better world

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# Disclaimer

## FORWARD-LOOKING STATEMENTS

This presentation contains forward-looking statements. All statements other than statements of historical fact included in this presentation are forward-looking statements. Forward-looking statements discuss our current expectations and projections relating to our financial condition, results of operations, plans, objectives, future performance and business. These statements may be preceded by, followed by or include the words "aim," "anticipate," "believe," "estimate," "expect," "forecast," "intend," "likely," "outlook," "plan," "potential," "projection," "continue," "goal," "objective," "opportunity," "near-term," "long-term," "assumption," "project," "guidance," "target," "trend," "seek," "can," "could," "may," "should," "would," "will," the negatives thereof and other words and terms of similar meaning.

Forward-looking statements are inherently subject to risks, uncertainties and assumptions; they are not guarantees of performance. You should not place undue reliance on these statements. We have based these forward-looking statements on our current expectations and projections about future events. Although we believe that our assumptions made in connection with the forward-looking statements are reasonable, we cannot assure you that the assumptions and expectations will prove to be correct. Factors that could contribute to these risks, uncertainties and assumptions include, but are not limited to, the factors described in "Risk Factors" in our most recent annual report on Form 10-K and subsequent quarterly reports on Form 10-Q. All forward-looking statements attributable to us or persons acting on our behalf are expressly qualified in their entirety by the foregoing cautionary statements. In addition, all forward-looking statements speak only as of the date of this presentation. We undertake no obligations to update or revise publicly any forward-looking statements, whether as a result of new information, future events or otherwise other than as required under the federal securities laws.

## NON-GAAP FINANCIAL MEASURES

To evaluate our performance, we monitor a number of key indicators at the consolidated level and, in certain cases, at the segment level. As appropriate, we supplement our results of operations determined in accordance with U.S. generally accepted accounting principles ("GAAP") with certain non-GAAP financial measurements that are used by management, and which we believe are useful to investors, as supplemental operational measurements to evaluate our financial performance. These measurements should not be considered in isolation or as a substitute for reported GAAP results because they may include or exclude certain items as compared to similar GAAP-based measurements, and such measurements may not be comparable to similarly-titled measurements reported by other companies. Rather, these measurements should be considered as an additional way of viewing aspects of our operations that provide a more complete understanding of our business. We do not provide GAAP financial measures on a forward-looking basis because we are unable to predict with reasonable certainty and without unreasonable effort items such as acquisition-related charges, the costs associated with integrating acquired businesses, the timing and amount of future restructuring actions, and the early retirement of debt.

We strongly encourage investors to review our consolidated financial statements in their entirety and not rely solely on any one, single financial measurement.

# Bioproduction



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# Biopharma overview

*Enabling life-altering breakthrough treatments to improve patient outcomes*

## AVANTOR EXPOSURE

~$4B

2021 AVANTOR SALES

52%

OF REVENUE

## AVANTOR FOCUS AREAS

### 1. RESEARCH & DEVELOPMENT



~50%

of Biopharma Revenue

### 2. CLINICAL & BIOREPOSITORY



~10%

of Biopharma Revenue

### 3. BIOPRODUCTION



~40%

of Biopharma Revenue

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Note: All % based on management estimate.

# Unique position in Biopharma production

**CUSTOMIZED MATERIALS**



Creating customized materials for use in highly regulated, demanding applications



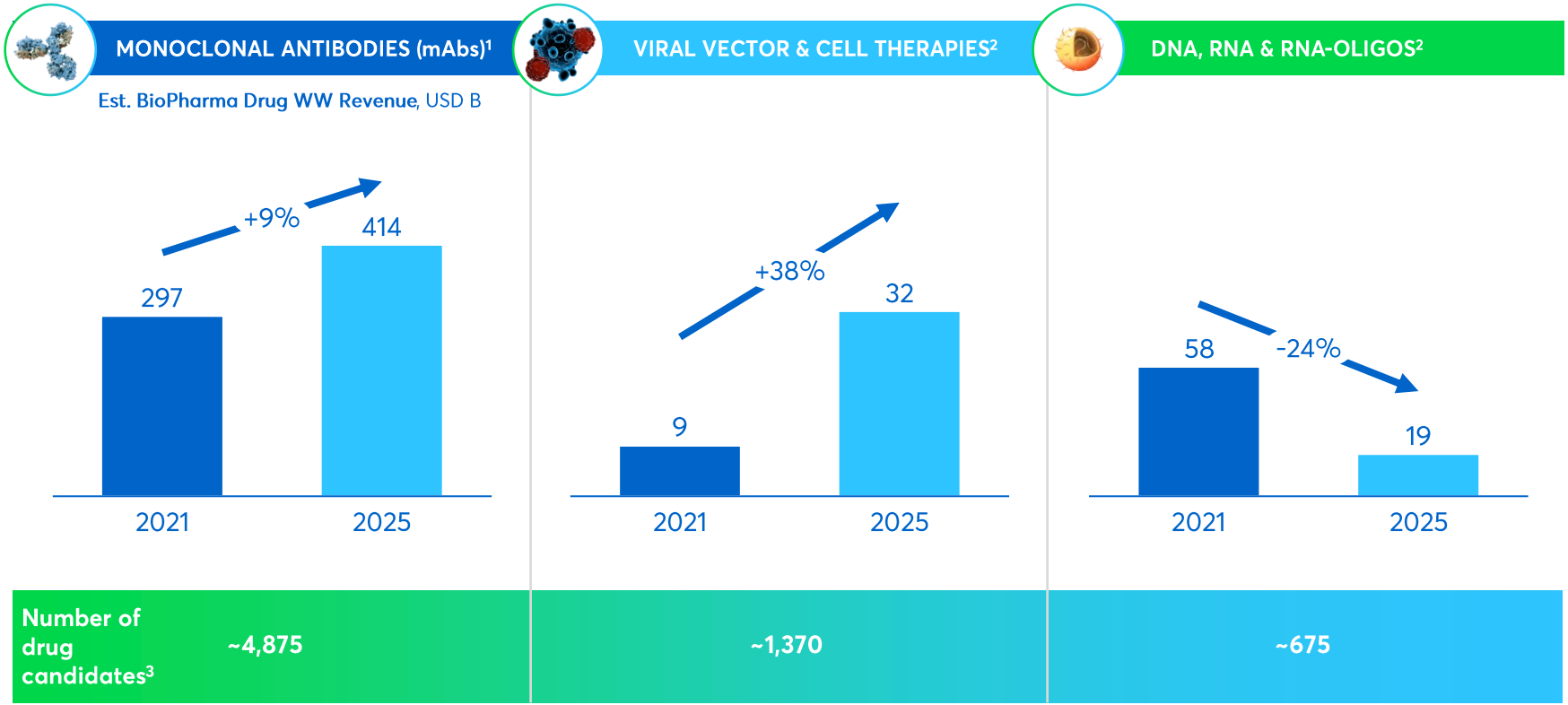

**Bioproduction materials**
(Chemicals, reagents, serum)

**Single-use solutions**
(including Masterflex® pumps)

**Bioproduction services**
(downstream process optimization)

1. Based on EvaluatePharma data for FY21
2. Based on FY21
3. TAM = Total Addressable Market. Market size per company estimates

# Strong industry fundamentals

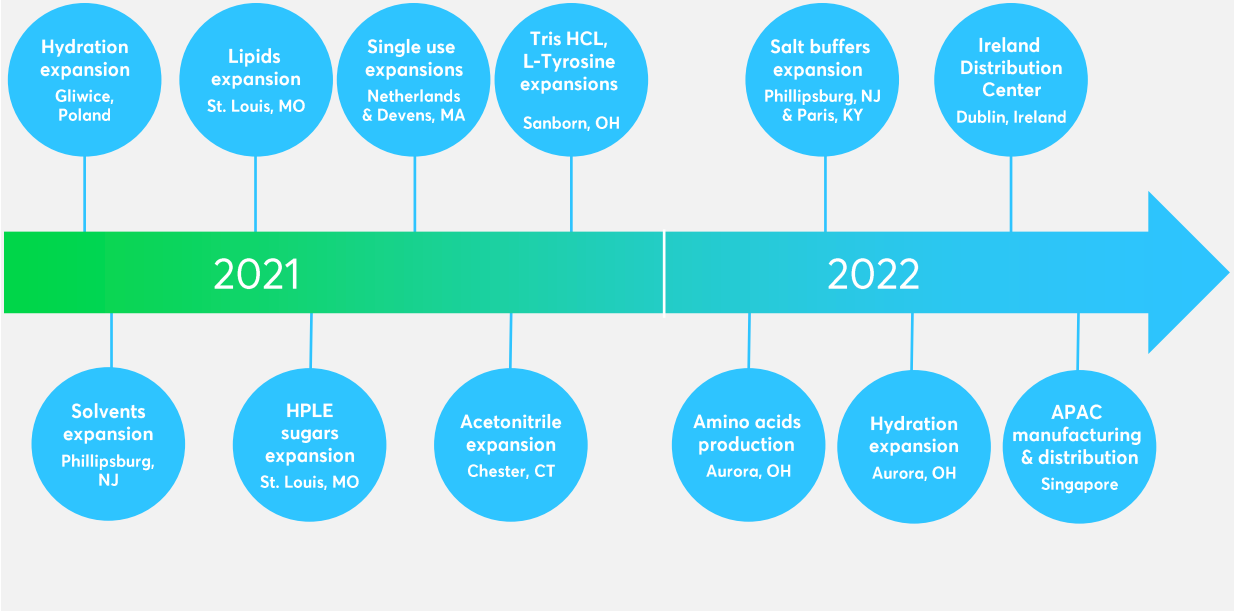



Source: EvaluatePharma data as of April 2021
1. Includes traditional mAbs, recombinants and other protein-based therapeutics
2. Includes vaccine candidates for each respective modality
3. Includes preclinical, phase I/II and phase III candidates

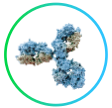
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# Investing for growth in bioproduction

## RECENT CAPACITY INVESTMENTS

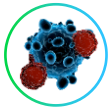



## NEW PRODUCT INTRODUCTIONS



### MONOCLONAL ANTIBODIES

- Viral inactivation
- Hydrated solutions



### VIRAL VECTOR & CELL THERAPIES

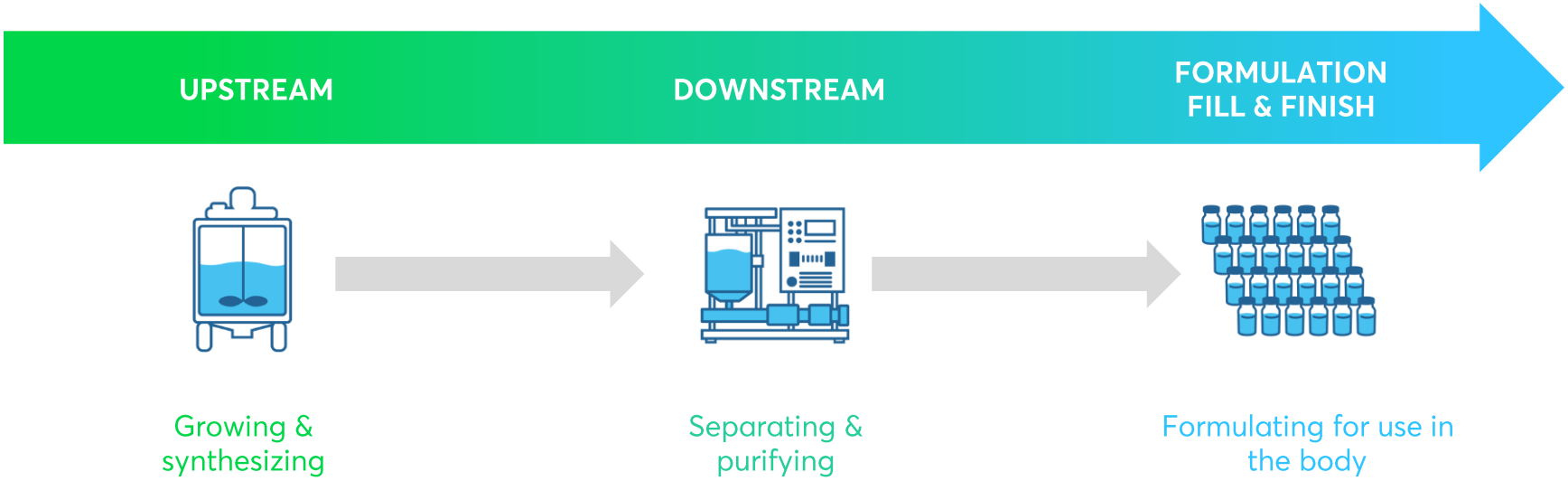
- Cell lysis
- Endonuclease
- GMP plasmids



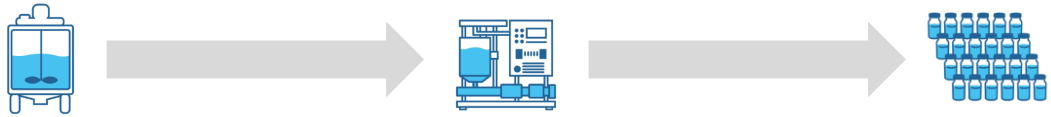
### DNA, RNA & RNA-OLIGOS

- Synthetic lipids
- GMP plasmids

# Avantor offerings span the full bioproduction workflow



# Avantor offerings span the full bioproduction workflow



**UPSTREAM** | **DOWNSTREAM** | **FORMULATION FILL & FINISH**

## BIOPRODUCTION MATERIALS




- Serum
- Carbohydrates
- Vitamins
- Amino acids
- Biological buffers
- GMP plasmids

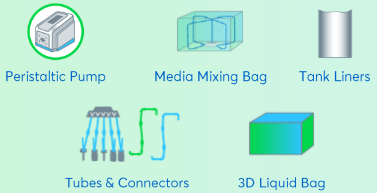



- Mineral salts
- Biological buffers
- Surfactants
- Chromatography resins




**Excipients:**
- Carbohydrates
- Mineral salts
- Biological buffers
- Surfactants
- Antioxidants

## SINGLE USE SOLUTIONS




**Fluid handling solutions:** Single-use assemblies and Masterflex® Peristaltic pumps

**Single use:** Media mixing containers, 2D & 3D bag assemblies, tank liners, sterile fluid connections, aseptic sampling

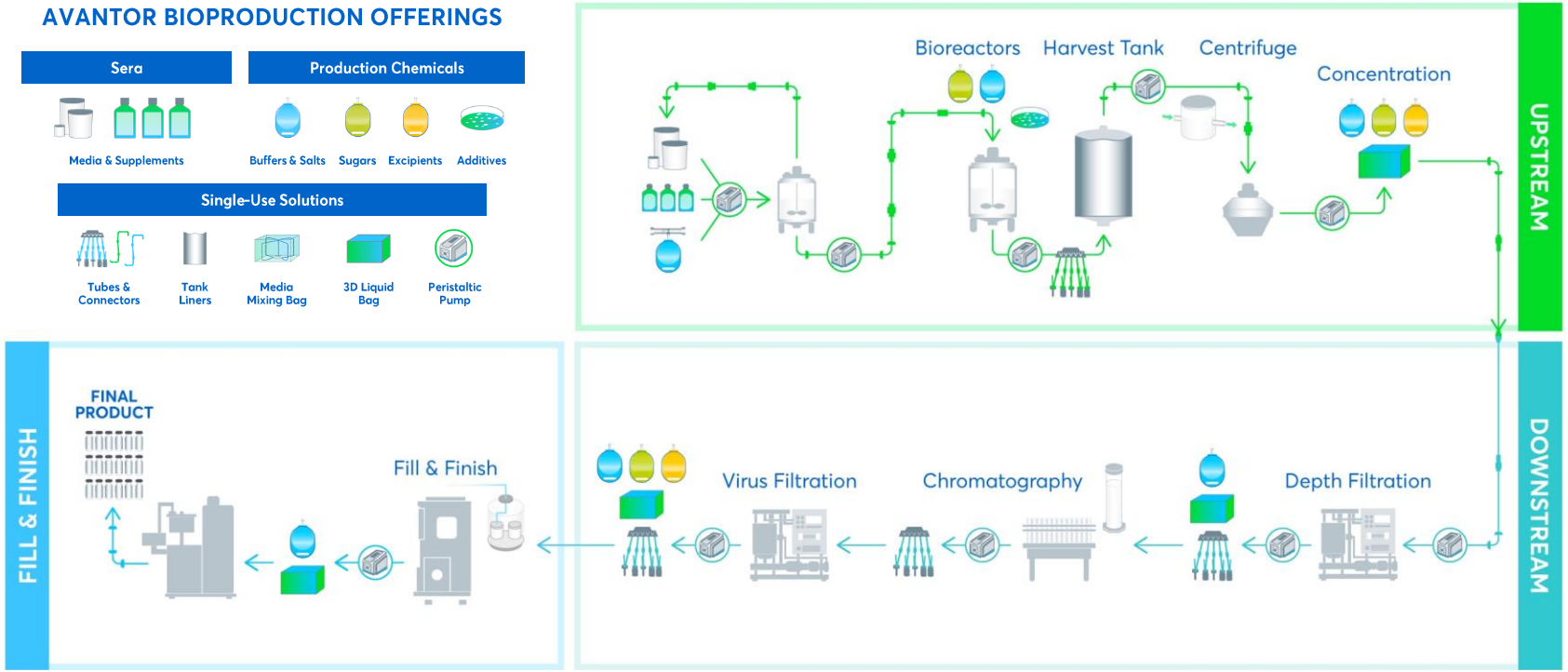
## BIOPRODUCTION SERVICES

**Downstream process optimization**

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# Avantor offerings span the full bioproduction workflow

*Example: Monoclonal Antibody workflow*




Note: For illustration purposes only

# Avantor Fluid Handling



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# Introduction to Avantor Fluid Handling



**World class fluid handling and single-use provider** with global manufacturing footprint, stringent quality standards & specification-driven products



**Single source for our customers' end-to-end fluid transfer needs,** further enhanced with **Masterflex®** peristaltic pumps and tubing



**Product offering across all bioproduction platforms** including mAbs, vaccines, Cell & Gene therapy, and mRNA



**Leverages Avantor channel** to service each customer at the local level with the backing of a global network

# Avantor fluid handling product portfolio

**Tubing assemblies & bottle manifolds that solve fluid handling challenges from upstream to fill finish**





**Bioprocessing bags and containers including disposable mixing solutions**





**Specialty components designed to solve unique challenges in connectivity expanded with Masterflex tubing & fittings**



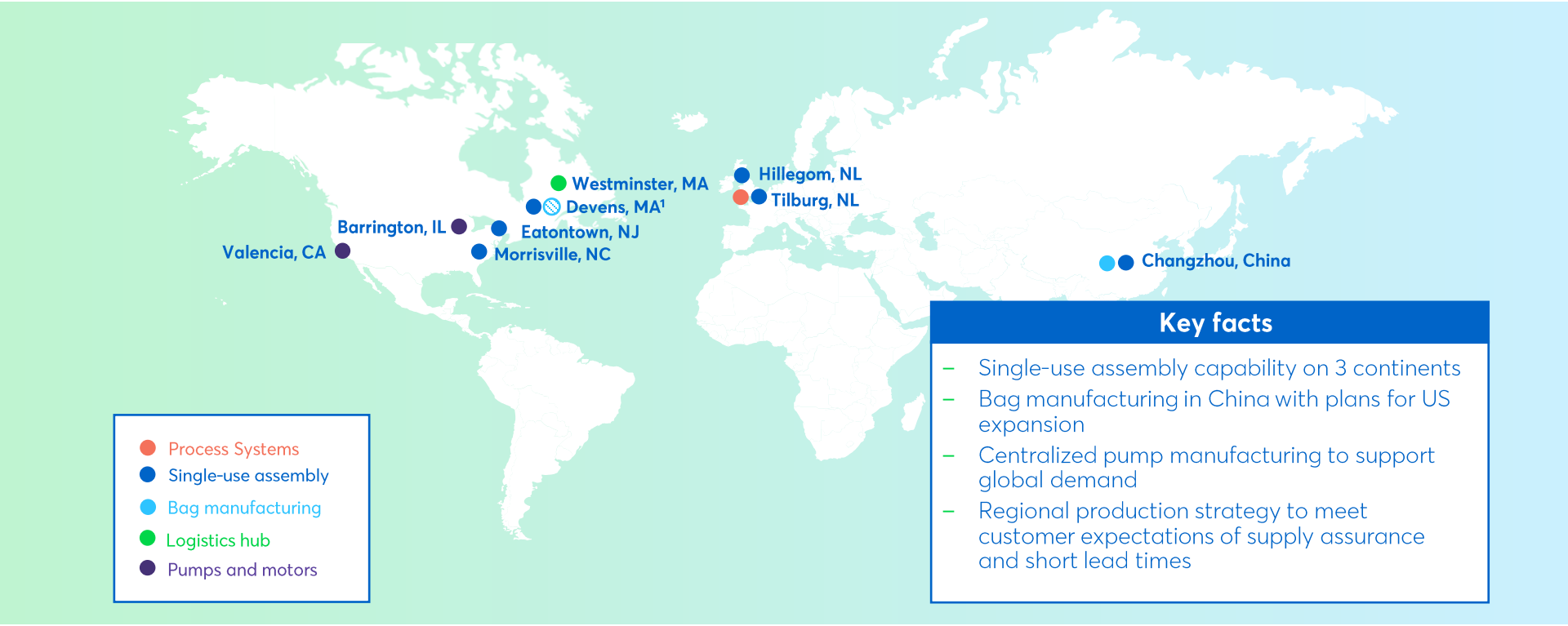


**Process systems with disposable fluid paths & industry leading peristaltic pump technology**





# Global manufacturing footprint




## Key facts

- Single-use assembly capability on 3 continents
- Bag manufacturing in China with plans for US expansion
- Centralized pump manufacturing to support global demand
- Regional production strategy to meet customer expectations of supply assurance and short lead times

1. Currently in planning phase for bag manufacturing capacity at Devens, MA.

# Single-use market drivers in biopharma

## OPERATIONAL DRIVERS

- Faster start-up time to commercialization & reduced capital expenditure
- Cleaning requirements eliminated & contamination risks reduced
- Improved flexibility for multi-product facilities

## MARKET DRIVERS

- Drug approvals with higher implementation of Single Use technology
- Process intensification driving smaller batch sizes
- CGT fully embracing a single use model



**Single Use Facility**



**Traditional Biopharma Facility**

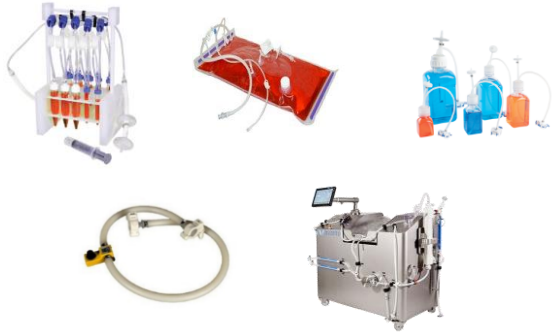
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# Single use manufacturing process overview

**COMPONENT SUPPLY & INSPECTION** | **CLEANROOM ASSEMBLY & STERILIZATION** | **DELIVERY TO CUSTOMER**







**+ COMPONENT PARTNERS**

**+ STERILIZATION PARTNERS**

- **MONOCLONAL ANTIBODIES**
- **VIRAL VECTOR & CELL THERAPIES**
- **DNA & RNA**