Delivering Next Generation Cell Therapy Manufacturing Faster without Compromising Quality

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Kite is 100% dedicated to the promise of cell therapy and has all critical functions **vertically integrated** and **exclusively focused** on this highly specialized treatment

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Kite by the Numbers…

14,300+
Patients Treated
(Clinical & Commercial Patients)

2
Global Commercial
Products on Market

5
Approved Indications
in CAR T-cell Therapy*

4,000+
Employees

1 million+
Square Feet of Cell Therapy
Manufacturing and R&D Space

20+
Countries
with Reimbursed Product

(Data on File as of 4/2023)
*Approved indication number varies per market

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Kite's Strong Global Presence

Commercial Manufacturing

Clinical Manufacturing and Development

Corporate Offices

Research and/or Development

Joint Venture or License Collaboration

* Q422 announced planned transfer of Japan Marketing Authorization to Gilead Sciences K.K. (Japan) and expect completion in 2023.

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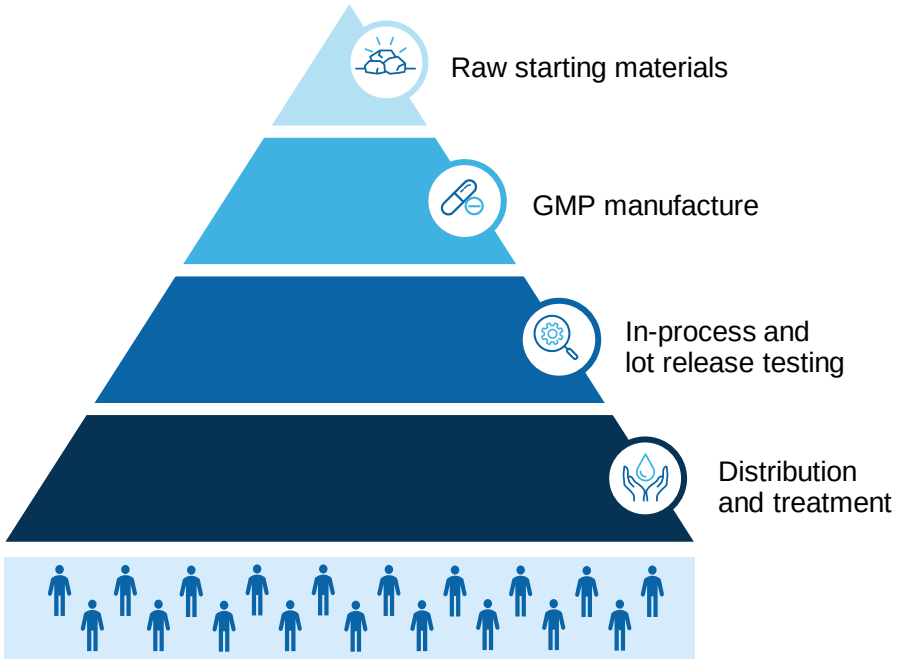
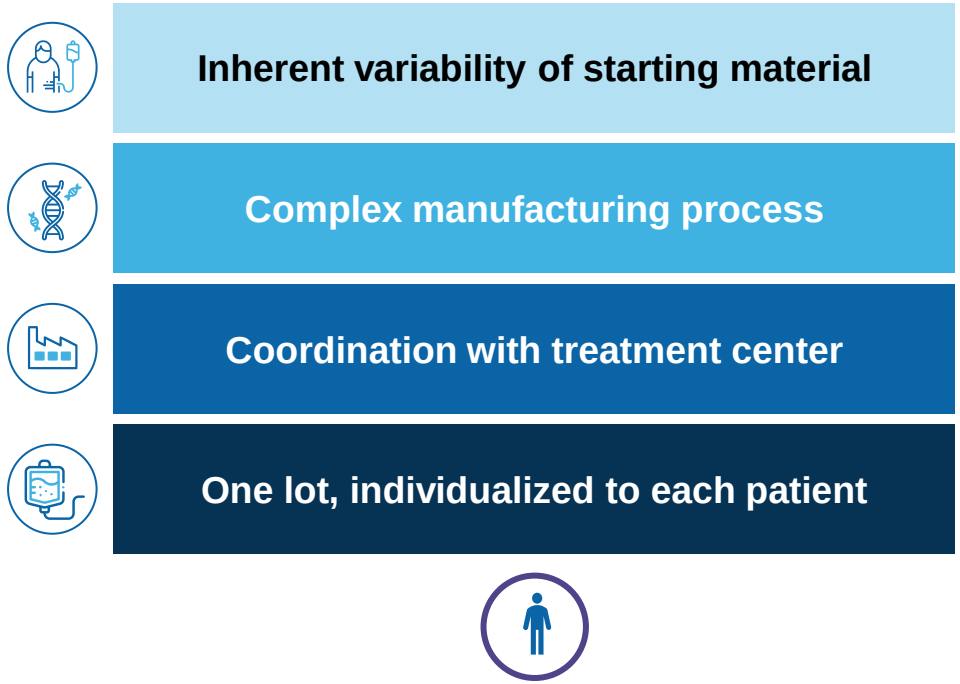
CAR T-cell Manufacturing Is Fundamentally Different Than Conventional Pharmaceutical Production

Conventional drug products[1]



CAR T-cell therapies[1–4]



1. Adapted from Scientific and Regulatory Considerations for Gene Modified T Cell Therapy (Nov 2017; available at https://pharm.ucsf.edu/sites/pharm.ucsf.edu/files/cersi/media-browser/Graeme%20Price%20and %20Kristin%20Baird.pdf).
2. YESCARTA SmPC (Jul 2021; available at www.ema.europa.eu).
3. Bersenev A & Kili S. *Cell Gene Ther Insights* 2018; 4:1051–1058.
4. Guidelines on Good Manufacturing Practice specific to Advanced Therapy Medicinal Products (Nov 2017; available at https://ec.europa.eu/health/sites/health/files/files/eudralex/vol-4/2017_11_22_guidelines_gmp_for_atmps.pdf).

Challenges in Autologous Cell Therapy

High Batch Run Rate

- 1 patient = 1 lot
- High number of analytical test results
- Multiple daily label reconciliation & lot disposition activities
- Multiple sensitive shipments coordinated daily to various health care facilities
- Unpredictable lot cancellations

Lifecycle Management

- Improvements in analytical methods or manufacturing processes difficult to deploy
- Unpredictable shifts in technological innovations move faster than regulatory review

Dependence on external testing organizations

- Small number of contract testing organizations
- Increased quality oversight of vector production

Complex Process

- Complicated & unclear link between material/final product specification & CQAs
- Lot-to-lot variability of Raw/Ancillary Materials
- Idiopathic patient factors cause final product lot-to-lot variability

Goals for Advancing Manufacturing Automation

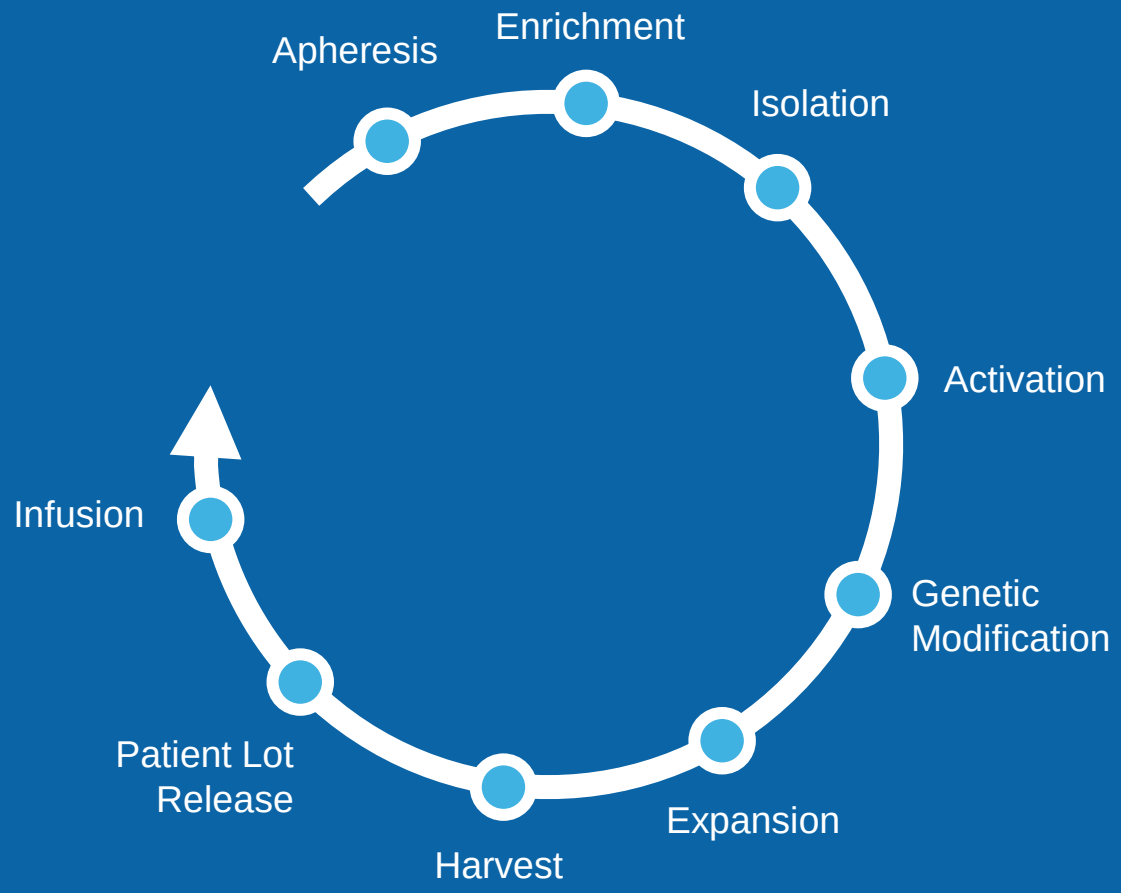
Improve Robustness
Simplify process flow, enable closed system processing, reduce clean room requirements

Increase Success Rate
Reduce potential for human, process and equipment errors

Increase Productivity
Reduce cycle time and increase throughput

Reliably Treat More Patients Faster

Kite Manufacturing Process Automation Flow



Cell Therapy Requires a Highly Specialized and Coordinated Team

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Kite's Fit-For-Purpose QS Drives a High Manufacturing Success Rate (96%)

End-to-end Quality By Design Process

- Health care sites qualified & audited by Kite Quality
- Health care sites use Kite owned/operated Quality Systems
- Kite Commercial Team **actively engaged** with health care facility staff

Orchestration of multiple activities

- Patient enrollment linkage to manufacturing slot availability
- High right-first-time manufacturing metrics
- Manufacturing process yields highly predictable harvest day operations (>70%)
- Focus on training program across all commercial sites

Leverage global manufacturing network

Standardize all test methods & process parameters across global manufacturing network:

- Process parameter data reviewed locally & globally per QMRs & CPV programs
- QC method performance assessed globally on a weekly basis

Manufacture retroviral vector in-house

- Quality Oversight of Vector Manufacturing
- Most Vector Analytical Methods brought internal to Kite

Rapid Manufacturing for Cell & Gene Therapy

Role of Quality

Quality Oversight of Manufacturing Changes & QC changes	Quality responsible for review comparability & validation assessments Ensures process validation strategy meets quality & regulatory expectations
Elevated Role of Frontline QA	Controls patient apheresis material inspection & release Oversight during complex manufacturing operations
Review of Manufacturing Records	Real time review of Electronic Batch Manufacturing Records (EBR) EBR review by exception
Batch release (1 lot = 1 patient)	Target release at availability of QC data for all sites, all lots Cross Functional MRB meeting for non-conforming lots

Challenges to Rapid QC Methods in Commercial CAR T space

1. Timelines are critical and method delays have a cascading effect

2. Single-lot testing or low sample batching potential

3. Limited instrument options require trade offs (automation, LIMS integration)

4. “Pioneer’s Burden”
   Disrupting status quo requires robust data packages

5. Single source test materials with potential supply chain risk

6. Investment in early technologies may carry risk

7. At/near biological/technological limit for some assays

To deliver next generation cell therapy manufacturing to patients faster globally, several strategies can be employed, including:

- Expansion of Global Supply: Kite serves our patients and customers with a broad global presence
- Investing in advanced technology: Automation and moving from paper-based to paperless can speed up the development of treatments
- Establishing controls and efficient response systems: Setting up robust capabilities can ensure patients are treated faster
- Teamwork and Expertise: Strong collaboration between process development, manufacturing, supply chain, healthcare providers, regulators, and patients who can help identify bottlenecks in the delivery process and develop solutions to address them.

THANK YOU

The opinions presented are my own and not necessarily representative of Kite Pharma or Gilead.

April 2023