BioReliance®
Pharma & Biopharma
Manufacturing &
Testing Services

Application Note

The Importance of Scalability in Viral Vectors


Eva Fong

Gene therapy has the potential to change countless patients' lives. Diseases that lacked cures or even treatments may be addressed with these new classes of therapeutics. This potential has spurred new investments in the drug development and commercialization space.

Viral vectors are often challenging to produce, especially at the large scales needed to reach the potential of these therapies. The manufacturing process for gene and cell therapies is complex and the current scale-out approach does not support robust industrialization. By developing a process with scale-up capabilities early on, you can address both clinical and commercial needs. This will minimize unnecessary process changes and the comparability studies required to demonstrate product equivalence.

In this article, we'll dive deep into the importance of scalability in viral vectors with Eva Fong, Senior Scientist.

The Importance of Scalability

Early in the development process, Fong explains that "it is critical to design a strategy that supports commercial needs based on clinical indication, patient population size and dosing requirements. Clinical programs that need large amounts of viral vector should develop a process that's scalable to satisfy both the needs of clinical trials as well as those of commercial manufacturing. For instance, this could involve choosing a suspension-based upstream process that offers true scale-up versus an adherent-based upstream process that is limited to scale-out only."

In terms of scalability factors, Fong presented three strong determinants:

1. **Process design:** Understanding your process and its critical, key parameters ensures a consistent product. This process knowledge allows you to develop a control strategy that can be implemented during the scale-up of the process. Choose products and technologies that are well-characterized and amenable to scaling-up.
   - For Upstream, this includes choosing a well-characterized host cell line, using chemically defined media and supplements that are of a quality suitable for cGMP manufacturing, and developing a process that is scalable in bioreactors.
   - For Downstream, select products that offer a range of device formats that allow for initial screening activities through process scale-up.
2. **Raw material selection:** Choose materials that are animal-origin free to reduce the risk of potential contamination from adventitious agents, and utilize material grades that are suitable for cGMP manufacturing. Additionally, suppliers should be vetted for supply chain security and production capacity. By selecting suppliers that can meet your supply chain needs for scaled-up processes, you can ensure meeting the demands of production timelines.
3. **Regulatory requirements:** Designing a process with quality in mind will ensure you can meet regulatory requirements along the developmental pathway.

How We Help Clients Resolve Issues Involving Scalability

We have created the VirusExpress® platform to address scalability for lentivirus production. This platform consists of a suspension-adapted host cell line, an HEK-293T derivative, that has been well characterized for lentivirus production and a chemically defined medium that is compatible with PEI-mediated transfection. From shake flasks to bioreactors, this platform has demonstrated robust performance in terms of scalability.

We provide world-class process development, manufacturing, and testing capabilities for virus-based therapeutics with a demonstrated track record. Additionally, our BioReliance® Manufacturing Services facility in Carlsbad, CA is the CDMO partner of choice for two gene-therapy products that have already been commercialized.

Our team has the knowledge and expertise to ensure that program goals and critical timelines are met, regardless of the potential issues that may arise. Beyond our internal resources, we find ourselves to be a leading supplier in the industry, as Fong concluded.

“As a reputable supplier of products for biopharma manufacturing, we offer products that meet the highest quality and purity standards with extensive documentation and services to ensure regulatory compliance,” said Fong.

With our expertise in cutting edge technology development and viral vector manufacturing, we make a great CDMO partner. Contact us today to learn more about our solutions.

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