Gene Therapy: How Companies Can Prepare for Healthcare's New Frontier

Gene therapy could reach full potential in the next 5 to 10 years—but first, there are technological and operational challenges to overcome.

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New advances in gene therapies continue to draw excitement—and investment—from biopharma companies. In 2019 alone, we saw a slew of deals as more companies bet on the rapidly progressing technology: Roche bought Spark Therapeutics, which specializes in adeno-associated virus-based (AAV) gene therapies, for $4.8 billion, to gain access to a platform. Pfizer purchased a 15% stake in Vivet Therapeutics, a French gene therapy company, and continued to make sizable investments in manufacturing.

This uptick in investments isn't surprising. The market continues to ride high with groundbreaking developments in curative and life-saving treatments for a variety of intractable diseases. Luxturna, a treatment for a form of hereditary blindness, made headlines as the first AAV-based gene therapy approved in the US, opening the door for future treatments. Since then, the US Food and Drug Administration (FDA) has approved promising gene therapies for fatal diseases, including Zolgensma, an AAV-based therapy for spinal muscular atrophy, and Onpattro, an RNA interference-based treatment for hereditary transthyretin-mediated amyloidosis (hATTR).

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These recent approvals and clinical trial successes suggest gene therapy is quickly moving beyond the "proof of concept" stage. Over the next 5 to 10 years, we expect biopharma companies to make continued investments in expanding gene therapy platforms and pipelines, pushing this treatment to its full potential. They'll also engage in market-making activities, such as developing reimbursement, pricing and contracting models, to ensure therapies have a viable pathway to patients.

That timeline may even accelerate. The race to find a Covid-19 vaccine has put a spotlight on gene therapy technologies such as messenger RNA (mRNA) and adenovirus vectors, which carry genetic materials to the cell. Many of these vaccines have progressed to Phase 3 trials, and some have been submitted to the FDA for emergency use authorization in the US. If and when they are approved, the vaccines would further validate these platforms and lead to an influx of investment and innovation.

However, despite the current headway and postpandemic potential, gene therapy has several hurdles to overcome. Biopharma companies and other stakeholders will have to navigate these obstacles and adjust in order to capture opportunities and reach full potential.

Gene therapy faces challenges ahead

A number of challenges threaten to hamper the pace of progress. Despite recent successes, the possibility of efficacy, safety or regulatory setbacks remain, requiring a careful approach to target selection and product development. BioMarin, for example, recently hit a major obstacle when the FDA rejected its AAV-based gene therapy for hemophilia, citing need for additional data on how long the benefits last and probably delaying approval by two years.

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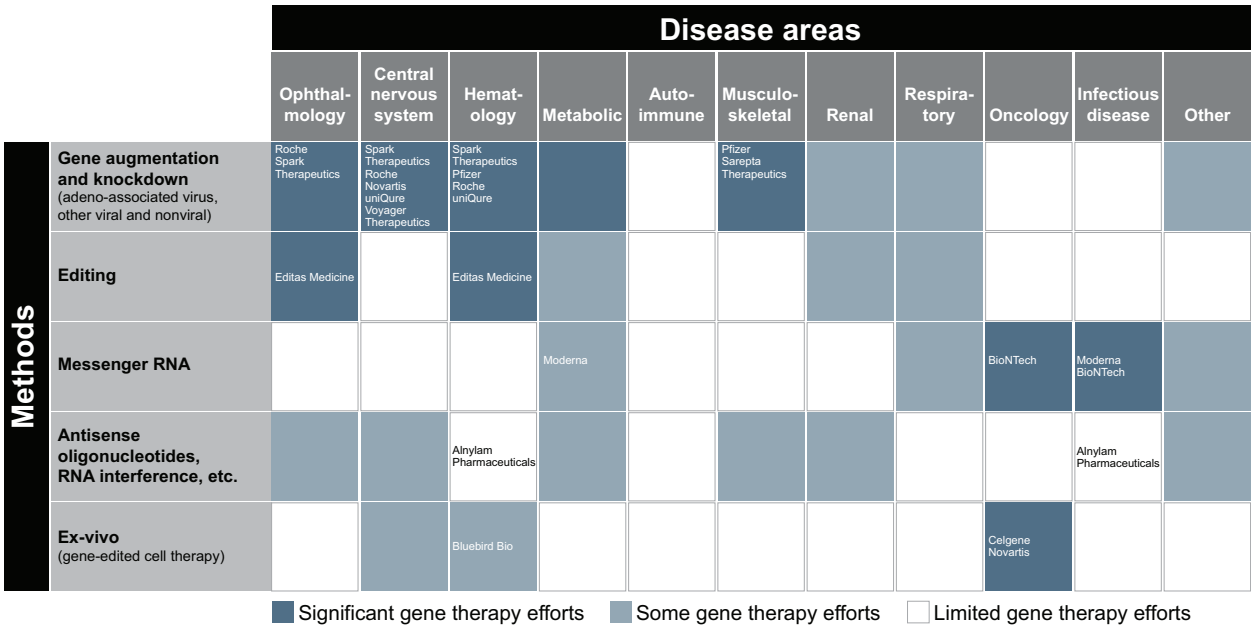
In addition, the sector faces a variety of technological roadblocks. Improvements in production technology, delivery efficiency and cell-targeting specificity remain slow and limited. For some technologies, the efficacy and durability of treatments are still a consideration, as researchers are seeing a relatively high variability in patient outcomes. What's more, with low scalability due to small patient populations, especially for viral technologies, manufacturing costs will remain high. Sponsors also grapple with capacity constraints, due to limited talent and outsourcing options.

Beyond technological and scientific challenges, stakeholders need to address important market and business model questions. Potentially curative gene therapies could disrupt specialized healthcare providers and partners that have built business models around treating a particular disease. If gene therapy proves to cure hemophilia effectively, for instance, how does the role of the hemophilia treatment center change?

Payments are another major issue. With most treatments costing millions of dollars for a small number of patients, price tags could easily become prohibitive and prompt payers to manage utilization. While curative therapies, when compared with the overarching costs of the diseases they treat, could save insurers in the long run, they may not reap the benefits if the patient switches payers or if the efficacy and durability of treatment is lower than expected. Policy makers, payers and providers recognize the need to find innovative payment models to manage pricing and reimbursements across markets.

Figure 1: Biotechs are applying proprietary technologies across disease areas, while pharma companies generally focus on specific areas

Companies involved in gene therapy, by key disease areas



Note: Company list is not exhaustive
Source: Bain & Company

Two approaches to transformative therapies

While business model and market issues are increasingly pressing, at this early stage, most pharma and biotech companies are still trying to fully develop their platforms. Industry leaders are quickly growing the market through two approaches *(see Figure 1)*.

Pharma companies have primarily targeted specific disease areas, taking advantage of scientific and commercial capabilities they've built with existing portfolios in small molecules and biologics. By acquiring Spark Therapeutics and collaborating with 4D Molecular Therapeutics and Dyno, Roche has built a presence in AAV-based gene therapies for the central nervous system, ophthalmology and hemophilia areas, where it has existing products. Similarly, Pfizer is assembling an AAV platform as part of its rare-disease business through a mix of acquisitions and organic investments.

In contrast, biotechs continue to look for opportunities to apply their proprietary technology platforms to a variety of disease areas and organs to maximize total platform value.

Preparing for the gene therapy boom

In the coming years, biopharma companies and other healthcare stakeholders will need to recalibrate their operations for the disruptions and opportunities of gene therapy. To get started, they can address changes in four key areas.

- **Customer value.** Understand the long-term value and impact of treatments for various patient populations.
- **Customer access.** Build up supply chains and patient services to support gene therapy models.
- **Payments.** Consider alternative payment models, such as annuity- and outcomes-based payments, that account for high one-off costs, durability of treatment, patient-to-patient variability and the potential movement of patients between payers.
- **Industry economics.** Prepare for adjustments in provider economics, such as value-based care adoption, as gene therapies replace buy-and-bill specialty medications.

Biopharma companies and stakeholders are navigating uncharted territory, but the financial and human benefits of gene therapy far outweigh the risks. Industry leaders can work together to overcome the technological and operational hurdles of these transformative treatments, combating some of today's most threatening diseases.

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