

Building a healthier future

# Cell Therapy & Gene Therapy



## Bayer's Strategy

### We are on the cusp of a new wave of innovation in healthcare

For decades, many diseases have been labeled as “intractable”, meaning medicine could not provide an answer for patients beyond addressing their symptoms to a certain extent. By targeting diseases at the cellular or genetic level, we have the potential to shift from treating symptoms to stopping or even reversing disease progression.



Heart failure, neurodegenerative diseases like **Parkinson's disease**, or genetic diseases like **Pompe disease** are just a few examples of where **cell therapies and gene therapies may make a difference** in the lives of patients.

### A pharmaceutical (r)evolution: cell therapy and gene therapy

Bayer's journey began over 125 years ago with small molecule pharmaceuticals like Aspirin™. Large molecules and targeted therapies like Eylea™ for age-related macular degeneration came next. These treatments opened new doors and improved the lives of millions of patients. Researchers are already working on the next wave of innovation: cell therapy and gene therapy. These hold a breakthrough potential for patients living with diseases for which limited or no options are available today.

Three waves of innovation in the pharmaceuticals space:

① Our stronghold  
**Small molecules**



② Our biologics  
**Large molecules & targeted therapies**



③ Our next step  
**Cell Therapy & Gene Therapy**



**POTENTIAL TO REVERSE DISEASE PROGRESSION**







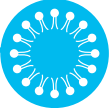
**MOSTLY SYMPTOMATIC TREATMENT, UNDERLYING DISEASE NOT REVERSED**



Between 2019 and 2023, Bayer has invested more than **€ 3.5 billion** in the build-up of a **cell therapy and gene therapy platform**. This includes the acquisition of **BlueRock Therapeutics and AskBio**, as well as collaborations with **Mammoth Biosciences and Acuitas**.

## Pioneering scientific advancement

We believe that a healthier future can be achieved by leveraging science, passion and collaboration. We are combining our internal expertise with external collaborations and acquisitions, jointly advancing the potential of the next wave of innovation in the pharmaceuticals space for the ultimate benefit of patients.

 <p><b>2019</b></p> <p>We ventured into iPSC (induced pluripotent stem cell) therapy acquiring BlueRock Therapeutics, a company co-founded by Leaps by Bayer.</p> 	 <p><b>2020</b></p> <p>We joined forces with Asklepios BioPharmaceutical (AskBio), a gene therapy leader with a rich pipeline and manufacturing capabilities.</p> 	 <p><b>2022</b></p> <p>We entered into a collaboration with Mammoth Biosciences, building gene editing capabilities to enable next-generation cell therapies, gene therapies and drive standalone therapeutic applications.</p> 	 <p><b>2023</b></p> <p>We entered into a collaboration with Acuitas Therapeutics in the field of lipid nanoparticles, an important delivery system for gene therapies.</p> 
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Did you know that there are already **multiple cell therapies and gene therapies** approved for the treatment of various types of cancer, certain blood disorders like hemophilia A and B, as well as other rare diseases such as spinal muscular atrophy?<sup>1,2</sup>


## We are shifting treatment paradigms...

First-generation cell therapies and gene therapies are already impacting the lives of patients around the world. The future is enormously exciting – cell therapy and gene therapy could lead to far more targeted treatments. It could also mean finding a way to finally defeat diseases that we once thought were untreatable.

### ... across multiple areas



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<p><b>Cardiovascular Diseases</b></p> <p>(e.g. congestive heart failure)</p> 	<p><b>Degenerative Diseases</b></p> <p>(like Parkinson's disease or some retinal disorders)</p> 	<p><b>Genetic Diseases</b></p> <p>(such as Multiple System Atrophy disease or Limb-Girdle muscular dystrophy)</p> 
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<sup>1</sup> Source: American Society of Gene and Cell Therapy, and Citeline. Gene, Cell, & RNA Therapy Landscape: Q3 2022 Quarterly Data Report, <https://asgct.org/global/documents/asgct-citeline-q3-2022-report.aspx>. Accessed Dec. 2022.

<sup>2</sup> Source: OCT) JX Yu et al., Nature vol 19, September 2020; AAV) Cortellis; GE) Cortellis; iPSC) JY Kim et al., Stem cell reviews and reports, Springer, September 2021