+44 20 8123 2220
info@marketpublishers.com

Global Gene Therapy Market Analysis & Forecast to 2022

https://marketpublishers.com/r/G99E8358534EN.html
Date: February 2017
Pages: 310
Price: US$ 4,900.00 (Single User License)
ID: G99E8358534EN

Abstracts

This report provides the reader with:

Current Global Market Worth and Forecast with CAGR Through 2022

Sub-Market Worth by Therapeutic Area (Cancer, Rare Diseases, Cardiovascular, Neurological, Ocular) and Forecast with CAGR Through 2022

Sub-Market Worth by Geography (Americas, Europe, RoW) and Forecast with CAGR Through 2022

Sub-Market Worth by Technology (Gene Product, Service, Viral Vectors) and Forecast with CAGR Through 2022

Insight into gene therapy technologies, challenges associated with developing therapeutic genes and disadvantages of gene therapy.

Full outline of the gene therapy industry from the formative years through to products discovered during 1990 and 2017.

Detailed descriptions of commercialized products approved between 2003 and 2017 that include: Gendicine, Rexin-G, Oncorine, Neovasculgen, Glybera, Imlygic, Strimvelis, Zalmoxis, Kymriah, Yescarta and Luxturna.

Description of seven of the Phase III product candidates that include: Generx, Collategene, LentiGlobin, Lenti-D, VM-202, Invosa and GS-010.

Description of 21 Phase II product candidates that are set to have significant market share.

Commercialization status of gene therapies in by geographic region

Evaluation of gene therapy pricing

Description of the firstever warranty offer by GSK for Strimvelis.

A detailed analysis of various types of viruses used as vectors.

Description of clinical applications of gene therapy and the various genetic and infectious diseases addressed by gene therapy.

Description of 77 companies that are directly and indirectly associated with gene therapy industry.

1.3 Key Questions Answered in this Report

What is the size of gene therapy market?

What is the CAGR and market size over the next five years?

What are the different sub-markets and their worth/CAGR over the next five years?

What is gene augmentation therapy?

What is suicide gene therapy?

How is ex vivo gene delivery different from in vivo gene delivery?

What are the types of gene therapies classified on the basis of targeted cell types?

What is the role of CRISPR technology in gene therapy?

What are the approved gene therapy products?

+44 20 8123 2220
info@marketpublishers.com

How many gene therapy product candidates have reached the Phase III stage?

How many Phase II gene therapy product candidates are there?

What is the commercialization status of gene therapies in E.U. member countries?

What are the prices of gene therapy products?

What are the reasons for this extortionate pricing of gene therapies?

Which company is offering warranty for its gene- therapy product?

What is the current strength of gene therapy industry?

Is it true that the real strength of gene therapy industry is based on the number of clinical trials?

What is the total number of ongoing clinical trials as of 2017?

What is the distribution of clinical trials by geography?

Which countries are associated with gene therapy clinical trials?

What are the major indications addressed by the clinical trials?

Which genes are transferred in these clinical trials?

How many Big Pharma are associated with the gene therapy industry?

What are non-viral and viral vectors?

What are the various features of viral vectors?

Which viral vectors are predominantly used in gene therapy clinical trials?

What are the major diseases addressed by therapeutic genes?

Where is the gene therapy market heading, and what opportunities and challenges will it face?

EXECUTIVE SUMMARY

Growing at a CAGR of over x% the global gene therapy market is forecast to hit $363 million by 2022 from $x million in 2017. Strengthened by recent approvals of Kymriah, Yescarta and Luxturna in the US, and a committed European, Japanese and Chinese environment, gene therapy is set to become a significant player in the bio-pharmaceutical industry. The space covers many therapeutic areas specifically, oncology, rare diseases, Parkinson's, HIV, severe combined immuno-deficiencies (SCID) and hemophilia. Gene therapy is driven by over 2,200 clinical trials globally, with over 55% of this occurring in the US, followed by Europe, Canada and China. Recently, in November 2017, the FDA indicated that gene therapies will now qualify for a fast approval process, which will bring more therapies to market faster. However, the space also has significant challenges, such as manufacturing logistics, reimbursement and its high cost. This 310 page market analysis cutting-edge report tackles this growing but challenging industry, it highlights its strengths, weaknesses and opportunities and provides a comprehensive account of major companies, clinical trials and technological advancement.

Since the FDA approved Kymriah (tisagenlecleucel), Yescarta (Axicabtagene ciloleucel) and Luxturna (voretigene neparvovec-rzyl) in 2017, the US gene therapy space has expanded significantly, underlined by the fact that over 55% of completed and ongoing trials are located in this geographic. Growth in the gene therapy industry has resulted in new commercial initiatives and the emergence of new startups and spin-off biotechs. Furthermore, gene therapy specifically has raised well over $600 million of venture capital in the last five years. Early stage companies have raised seed, Series A and Series B investment steadily since the market took off, including Spark Therapeutics, Avalanche Biotech, uniQure, Voyager Therapeutics, Editas Medicine and GenSight.

In 2017, the gene therapy market for technologies, services and products was estimated to be worth $x million, with a potential to reach $363 million by 2022. The main market space is cancer which currently holds x% market share. This indication generated $x million in 2017 and will generate $x million in 2022. This is followed by rare diseases, cardiovascular, neurological and ocular indications. Looking at the market by technology, at present, gene product therapeutics generate the majority of revenue with over $x million in 2017, growing to $x million by 2022. Viral vectors are set

to generate $x million in 2017, and will rise to $x million in 2022, and by then gene therapy services such as vector development and transfection will hit $x million. At present, the Americas have penetrated the market significantly with 65% geographic share, followed by Europe (x%) and the RoW (x%).

Gene therapy products approved between the years 2003 and 2017 include Gendicine, Oncorine, Rexin-G, Neovasculgen, Glybera, Imlygic, Strimvelis, Zalmoxis, Kymriah, Yescarta and Luxturna. Gendicine was approved for head and neck squamous cell carcinoma and has been in the Chinese market since 2003. Rexin-G was approved in the Philippines back in 2007 for the treatment of primary and metastatic cancer. Oncorine was approved in China in 2005 for nasopharyngeal carcinoma. The Russian market has Neovasculgen from 2011 for the treatment of peripheral arterial disease (PAD) and critical limb ischemia. The first gene therapy approved in E.U. was Glybera in 2012 for the treatment of familial lipoprotein lipase deficiency (LPL), however in October 2017 it was pulled from the market due to lack of patient demand. In 2015, Imlygic was approved in E.U. and also in the U.S. to treat melanoma, and Phase II results released in 2017 indicated its efficacy in combination with the checkpoint-inhibitor, Yervoy. In the E.U., Strimvelis was approved in 2016 for the treatment of adenosine deaminase severe combined immunodeficiency (ADA-SCID). In 2016, Zalmoxis was approved in E.U. for the treatment of leukemia. 2017 was a bumper year for gene therapy with Kymriah, Yescarta and Luxturna all gaining FDA approval.

Renewed interest has encouraged start-up companies to affiliate with academic centers for tech know-how. As clinical trials advance towards licensure, more meticulous product characterization using improved analytical methods and progressively higher regulatory compliance will be required. Some of the ongoing clinical trials are closing on to produce promising results, including one for hemophilia B caused by the deficiency of Factor IX using a recombinant adeno-associated virus (AAV) as a vector. The product candidate if succeeds will be a relatively cheaper alternative to the expensive and lifelong factor replacement therapy.

A second example of a successful outcome in gene therapy are studies conducted by independent laboratories focusing on sub-retinal delivery of recombinant AAV expressing retinal pigment epithelial RPE65 for Leber Congenital Amaurosis Type 2. A third example is the clinical trial involving nine children with X-linked severe combined immunodeficiency (SCID-X1) treated with autologous bone marrow CD34+ cells transduced with a self-inactivating (SIN) ?-retroviral vector expressing the IL-2 receptor ?-chain. The most significant achievement in gene therapy is the spectacular clinical results obtained by many independent teams using CAR-T-cell technology. This novel

strategy involves ex vivo gene transfer using recombinant retroviral or lentiviral vectors of chimeric antigen receptors consisting of antibody-binding domains fused to T-cell-signaling domains into patient T lymphocytes.

As gene therapies are generally meant for one time or short duration treatments, they are customized to individuals confined to small patient populations. Therefore, manufacturing firms are expected to seek premium prices for these therapies. Because of this, these therapies will have to face valuation and reimbursement challenges. Stakeholders will show reservations about the hefty price tags and they will require significant data to be convinced. With the removal of Gylbera from the EU market in 2017, due to the fact that only one patient was treated with the drug, all eyes are focused on the number of end patients that will be treated, and their ability to pay. To that end, launching of new drugs may have to be delayed in order to collect more data for payers. Furthermore, annuity based reimbursement agreements and pay-for-performance scenarios will have to be tackled.

+44 20 8123 2220
info@marketpublishers.com

Contents

1.0 INTRODUCTION

1.1 Executive Summary
1.2 About this Report
1.3 Key Questions Answered in this Report

2.0 GENE THERAPY: THE BASICS

2.1 Gene Therapy Techniques
  2.1.1 Gene Augmentation Therapy
  2.1.2 Gene Inhibition Therapy
  2.1.3 Suicide Gene Therapy
2.2 Gene Therapy Routes
  2.2.1 Ex Vivo Gene Delivery Route
  2.2.2 In vivo Gene Delivery Route
2.3 CRISPR: Latest Technology in Gene Therapy
2.4 Challenges Associated with Developing Gene Therapies
2.5 Disadvantages of Gene Therapy
  2.5.1 Short-Lived Nature of Gene Therapy
  2.5.2 Immune Response
  2.5.3 Problems with Viral Vectors
  2.5.4 Multigenic Disorders
  2.5.5 Insertional Mutagenesis
2.6 Concept to Product Candidates and Products

3.0 HISTORIC OVERVIEW OF GENE THERAPY

3.1 The Formative Years of Gene Therapy
3.2 The Productive Years of Gene Therapy
  3.2.1 Gendicine
  3.2.2 Oncorine
  3.2.3 Rexin-G
  3.2.4 Neovasculgen
  3.2.5 Glybera
  3.2.6 Imlygic
  3.2.7 Strimvelis
  3.2.8 Zalmoxis

+44 20 8123 2220
info@marketpublishers.com

4.0 GENE THERAPY PHASE III PRODUCT CANDIDATES

4.1 CardioNovo (Generx)
4.2 Collategene
4.3 LentiGlobin
4.4 Lenti-D
4.5 VM-20244
4.6 Invossa
4.7 GS010
4.8 ADA-Lentiviral Gene Therapy

5.0 GENE THERAPY PHASE II PRODUCT CANDIDATES

5.1 hF-IX gene/Hemophilia B
5.2 NaGlu gene/San Fillipo B Syndrome
5.3 StarGen/Stargardt disease
5.4 UshStat/Usher Syndrome Type 1B
5.5 Retinostat/Wet AMD
5.6 Lenti-D/Childhood Cerebral ALD
5.7 LentiGlobin/Beta Thalassemia
5.8 SB-728/HIV/AIDS
5.9 CERE-110/Alzheimer’s disease
5.10 AATD/Alpha-1 Antitrypsin deficiency
5.11 RS1 gene/X-linked juvenile Retinoschisis (XLRS)
5.12 SPK-CHM/Choroideremia
5.13 SPK-FIX/Hemophilia B
5.14 AMG0001/Primary Lymphedema
5.15 AMG0001/Ischemic heart disease
5.16 WASp /Wiskott-Aldrich syndrome
5.17 X-linked CGD
5.18 GSK2696273/ADA gene
5.19 VM106/Chronic Granulomatous Disease53
5.20 VY-AADC01/Parkinson’s disease

6.0 COMMERCIALIZATION, COST AND WARRANTY OF GENE THERAPIES

6.1 Reasons for the Extortionate Price
  6.1.1 High Cost of Manufacturing

6.1.2 High Cost of Delivery
6.1.3 Lack of Comparative Studies as Evidence for Reimbursement Scheme
6.1.4 Lack of Competition
6.1.5 Potential for Cure
6.2 Strategies to Make Gene Therapy Affordable
6.3 The Age of First-Ever Warranty for Gene Therapy

7.0 THE STRENGTH OF GENE THERAPY INDUSTRY

7.1 Development of Appropriate Gene Delivery Vehicles
7.2 CRISPR-Based Therapy
7.3 Early Clinical Gene Therapy Protocols
7.4 Worldwide Scenario of Gene Therapy Clinical Trials
7.4.1 Geographical Distribution of Gene Therapy Clinical Trials
7.4.2 Gene Therapy Clinical Trials by Country
7.4.3 Major Indications Addressed by Gene Therapy Clinical Trials
7.4.4 Gene Types Transferred
7.4.5 Status of Gene Therapy Clinical Trials
7.5 Big Pharma's Bold Venturing into Gene Therapy
7.5.1 Novartis' Deal with GenVec
7.5.2 Strategic Alliance between GlaxoSmithKline and Fondazione Telethon
7.5.3 Amgen's Acquisition of BioVex
7.5.4 Chiesi's Rights to uniQure's Glybera
7.5.5 Bayer's Collaboration with Dimension Therapeutics
7.5.6 Genzyme's (Sanofi) Collaboration with University of Florida
7.5.7 Pfizer's Collaboration with Spark Therapeutics
7.5.8 Biogen Idec's Collaboration with AGCT
7.5.9 Sanofi's Tie-Up with Voyager Therapeutics
7.5.10 Bristol Myers Squibb's Investment in uniQure
7.5.11 Joint Venture between Bayer and CRISPR Therapeutics AG
7.5.12 Flow of Funds to Gene Therapy Companies
7.6 Venture Investments by Body Systems
8.0 Vectors for Gene Delivery

8.1 NON-VIRAL VECTORS

8.1.1 Inorganic Particles
8.1.1.1 Poly(lactic-co-glycolic acid) (PLGA) and poly lactic acid (PLA)
8.1.1.2 Chitosan

8.1.1.3 Poly(ethylene imine) (PEI)
8.1.1.4 Dendrimers
8.1.1.5 Polymethacrylates
8.1.2 Synthetic/Natural Biodegradable Particles
8.1.2.1 Cationic Liposomes
8.1.2.2 Lipid Nanoemulsions
8.1.2.3 Solid Lipid Nanoparticles (SLN)
8.1.2.4 Poly-L-Lysine
8.1.3 Physical Methods
8.1.3.1 Needle Injection
8.1.3.2 Gene Gun
8.1.3.3 Electroporation
8.1.3.4 Sonoporation
8.1.3.5 Photoporation
8.1.3.6 Magnetofection
8.1.3.7 Hydroporation
8.2 Viral Vectors for Gene Therapy
8.2.1 Key Properties of Viral Vectors
8.2.2 Best-Suited Viral Vectors for Gene Therapy
8.2.3 Potential Barriers for the Use of Viral Vectors
8.2.4 Types of Viral Vectors
8.2.4.1 Adenovirus Vectors
8.2.4.2 Retrovirus Vectors
8.2.4.3 Adeno-Associated Virus (AAV)
8.2.4.4 Lentivirus Vectors
8.2.4.5 Vaccinia Virus
8.2.5 Clinical Translation of Viral Vectors
8.2.6 Viral Vectors used in Clinical Trials
8.2.7 Culture Systems for Viral Vector Production

9.0 CLINICAL APPLICATIONS OF GENE THERAPY

9.1 Leber Congenital Amaurosis (LCA)
9.1.1 Frequency
9.1.2 Genetic Basis of Leber Congenital Amaurosis
9.1.3 Pattern of Inheritance
9.1.4 Gene Therapy for LCA
9.2 Stargardt Macular Degeneration (SMD)
9.2.1 Frequency of SMD

+44 20 8123 2220
info@marketpublishers.com

9.2.2 Genetic Basis of SMD
9.2.3 Pattern of Inheritance
9.2.4 Gene Therapy
9.3 Choroideremia
9.3.1 Frequency
9.3.2 Genetic Basis of Choroideremia
9.3.3 Pattern of Inheritance
9.3.4 Gene Therapy
9.4 Leber Hereditary Optic Neuropathy (LHON)
9.4.1 Frequency of LHON
9.4.2 Genetic Basis of LHON
9.4.3 Pattern of Inheritance
9.4.4 Gene Therapy
9.5 Parkinson Disease
9.5.1 Frequency of Parkinson Disease106
9.5.2 Genetic Basis of Parkinson Disease
9.5.3 Inheritance of Parkinson Disease
9.5.4 Current Treatment for Parkinson Disease
9.5.5 Gene Therapy for Parkinson Disease
9.6 Spinal Muscle Atrophy
9.6.1 Genetic Basis
9.6.2 Pattern of Inheritance
9.6.3 Gene Therapy
9.7 Alzheimer Disease
9.7.1 Frequency
9.7.2 Genetic Basis
9.7.3 Pattern of Inheritance
9.7.4 Gene Therapy
9.8 Cystic Fibrosis
9.8.1 Genetic Basis
9.8.2 Inheritance of CF
9.8.3 Frequency of CF
9.8.4 Currently Available Treatments for CF
9.8.5 Gene Therapy for Cystic Fibrosis
9.9.1 Frequency
9.9.2 Genetic Basis
9.9.3 Pattern of Inheritance
9.9.4 Currently Available Treatments
9.9.5 Gene Therapy

+44 20 8123 2220
info@marketpublishers.com

9.10 X-Linked Adrenoleukodystrophy115
9.10.1 Frequency
9.10.2 Genetic Basis
9.10.3 Pattern of Inheritance
9.10.4 Gene Therapy
9.11 Pompe Disease
9.11.1 Frequency
9.11.2 Genetic Basis
9.11.3 Pattern of Inheritance
9.11.4 Gene Therapy
9.12 Batten Disease (CLN3 Disease)
9.12.1 Frequency of Batten Disease
9.12.2 Genetic Basis of Batten Disease
9.12.3 Pattern of Inheritance
9.12.4 Gene Therapy for Batten Disease
9.13 Metachromatic Leukodystrophy119
9.13.1 Frequency
9.13.2 Genetic Basis
9.13.3 Pattern of Inheritance
9.13.4 Gene Therapy
9.14 Sanfilippo Syndrome
9.14.1 Frequency
9.14.2 Genetic Basis
9.14.3 Patern of Inheritance
9.14.4 Gene Therapy
9.15 Hunter Syndrome
9.15.1 Genetic Basis
9.15.2 Pattern of Inheritance
9.15.3 Gene Therapy
9.16 Adenosine Deaminase Severe Combined Immunodeficiency (ADA-SCID)
9.16.1 Frequency
9.16.2 Genetic Basis
9.16.3 Pattern of Inheritance
9.16.4 Gene Therapy
9.17 X-Linked SCID
9.17.1 Frequency
9.17.2 Genetic Basis
9.17.3 Pattern of Inheritance
9.17.4 Gene Therapy

+44 20 8123 2220
info@marketpublishers.com

9.18 Chronic Granulomatous Disease (CGD)
9.18.1 Prevalence of CGD
9.18.3 Pattern of Inheritance
9.18.4 Current Treatments for CGD
9.18.5 Gene Therapy for CGD
9.19 Wischott Aldrich syndrome (WAS)
9.19.1 Frequency
9.19.2 Genetic Basis
9.19.3 Pattern of Inheritance
9.20 Hemophilia
9.20.1 Frequency of Hemophilia
9.20.2 Genetic Basis
9.20.3 Inheritance of Hemophilia
9.20.4 Currently Available Treatments for Hemophilia
9.20.5 Gene Therapy for Hemophilia
9.21 Sickle Cell Anemia
9.21.1 Frequency of Sickle Cell Anemia
9.21.2 Genetic Basis of Sickle Cell Anemia
9.21.3 Inheritance of Sickle Cell Anemia
9.21.4 Current Treatment for Sickle Cell Anemia
9.21.5 Gene Therapy for Sickle Cell Anemia
9.22 Beta Thalassemia
9.22.1 Frequency
9.22.2 Genetic Basis
9.22.3 Pattern of Inheritance
9.22.4 Gene Therapy
9.23.1 Frequency
9.23.2 Genetic Basis
9.23.4 Gene Therapy
9.25 Limb Girdle Muscle Dystrophy 2C/2D
9.25.1 Frequency
9.25.2 Genetic Basis
9.25.3 Pattern of Inheritance
9.25.4 Gene Therapy
9.26 Duchenne and Becker Muscular Dystrophy
9.26.1 Frequency
9.26.2 Genetic Basis
9.26.3 Pattern of Inheritance
9.27 Human Immunodeficiency Virus (HIV)

9.27.1 Currently Available Treatments
9.28 Epidermolysis Bullosa
9.28.1 Frequency
9.28.2 Genetic Basis
9.28.3 Pattern of Inheritance
9.28.4 Gene Therapy
9.29 Leukemia
9.29.1 Currently Available Treatments
9.29.2 Genetic Basis of Leukemia
9.29.3 Gene Therapy Strategies for Leukemia
9.30 Ovarian Cancer
9.30.1 Frequency of Ovarian Cancer
9.30.2 Genetic Basis of Ovarian Cancer
9.30.3 Currently Available Treatments for Ovarian Cancer
9.30.4 Gene Therapy for Ovarian Cancer
9.31 Pancreatic Cancer
9.31.1 Frequency of Pancreatic Cancer149
9.31.2 Currently Available Treatments for Pancreatic Cancer
9.31.3 Genetic Basis
9.31.4 Gene Therapy for Pancreatic Cancer
9.32 Head and Neck Cancers151
9.32.1 Frequency of Head and Neck Cancers
9.32.2 Currently Available Treatments for Head and Neck Cancers
9.32.3 Gene Therapy for Head and Neck Cancers
9.33 Melanoma
9.33.1 Frequency of Melanoma
9.33.2 Genetic Basis of Melanoma
9.33.3 Pattern of Inheritance
9.33.4 Available Treatments for Melanoma
9.33.5 Gene Therapy for Melanoma
9.34 Prostate Cancer157
9.34.1 Frequency of Prostate Cancer
9.34.2 Genetic Basis of Prostate Cancer
9.34.3 Pattern of Inheritance
9.34.4 Currently Available Treatments for Prostate Cancer
9.34.5 Gene Therapy for Prostate Cancer
9.35 Breast Cancer
9.35.1 Frequency of Breast Cancer
9.35.2 Genetic Basis of Breast Cancer

9.35.3 Pattern of Inheritance
9.35.4 Currently Available Treatments for Breast Cancer
9.35.5 Gene Therapy
9.36 Fabry Disease
9.36.1 Frequency of Fabry Disease
9.36.2 Genetic Basis of Fabry Disease
9.36.3 Pattern of Inheritance
9.36.4 Currently Available Treatments for Fabry Disease
9.36.5 Gene Therapy for Fabry Disease
9.37 Hypercholesterolemia
9.37.1 Frequency of Hypercholesterolemia
9.37.2 Genetic Basis of Hypercholesterolemia
9.37.3 Current Medications for Hypercholesterolemia
9.37.4 Gene Therapy for Familial Hypercholesterolemia
9.38 Huntington Disease
9.38.1 Frequency of Huntington Disease
9.38.2 Genetic Basis of Huntington Disease
9.38.3 Inheritance of Huntington Disease
9.38.4 Current Treatment for Huntington Disease
9.38.5 Gene Therapy for Huntington Disease
9.39 Tay-Sachs Disease
9.39.1 Frequency of Tay-Sachs Disease
9.39.2 Genetic Basis of Tay-Sachs Disease
9.39.3 Pattern of Inheritance
9.39.4 Currently Available Treatments
9.39.5 Gene Therapy for Tay-Sachs Disease

10.0 MARKET ANALYSIS171

10.1 Global Market for Gene Therapy by Market Segment
10.2 Global Gene Therapy Market by Geography
10.3 Commercialization of Gene Therapy in China
10.4 Commercialization of Gene Therapy in the Philippines
10.5 Commercialization of Gene Therapy in Russia
10.6 Commercialization of Gene Therapy in Europe
10.6.1 Gene Therapy in France
10.6.2 Gene Therapy Landscape in U.K.
10.6.3 Gene Therapy Efforts in Germany
10.6.4 Australia’s Participation in Gene Therapy

10.6.5 New Regulatory Framework in Japan
10.7 Gene Therapy in the U.S.
10.7.1 Likely FDA Approval for Leukemia Treatment
10.8 Commercialization of Gene Therapy in South Korea
10.9 Additional Addresseable Markets for Gene Therapy
10.10 Challenges for Existing and Prospective Players
10.10.1 Challenges in Valuation
10.10.2 Challenges in Reimbursement
10.10.3 Challenges in Commercialization
10.11 Future Outlook for Gene Therapy
10.12 Potential Market for Gene Therapy Product Candidates
10.12.1 CardioNovo (Generx)
10.12.2 Collategene
10.12.3 Lentiglobin BB305
10.12.4 VM-202187
10.12.5 Invossa
10.12.5 GS010
10.12.7 ADA Lentivirus
10.12.8 Lenti-D

11.0 MANUFACTURING OF VIRAL VECTORS AND LOGISTICS

11.1 Major Manufacturing Companies of Viral Vectors
11.2 Major Diseases Targeted by AAV Vectors in Clinical Trials
11.3 Major Companies Developing Lentiviral Vectors
11.4 Manufacturing Process
11.5 Contract Manufacturing194
11.6 Targeted Delivery of Therapeutic Genes
11.7 Logistics Strategies for Gene Therapies
11.7.1 Threat to Gene Therapeutics during Transit
11.7.2 Impact of Varying Environmental Events on Cell and Gene Therapy Products
11.7.3 Pharmaceutical Cold Chain Logistics
11.6.4 Clinical Logistics
11.7 Cost of Clinical Trials for Biopharmaceuticals including Gene Therapy
11.7.1 Clinical Trial Expenditure by Disease

12.0 COMPANY PROFILES

12.1 4d Molecular Therapeutics LLC

12.1.1 AAV Vectors
12.1.2 4D's Partnership with Pfizer
12.1.3 4D's Partnership with uniQure
12.1.4 4D's Partnership with Roche
12.1.5 4D's Partnership with AGTC
12.1.6 4D's Partnership with Benitec
12.1.7 4D's Product Pipeline
12.2 Abeona Therapeutics LLC
12.2.1 Abeona's Clinical Trial Programs
12.2.1.1 ABO-102 Phase I/II Clinical Trial
12.2.1.2 ABO-101 Phase I/II Clinical Trial
12.3 Advanced Cell & Gene Therapy LLC
12.3.1 Consulting Services
12.4 Advantagene Inc.
12.4.1 Gene Mediated Cytotoxic Immunotherapy (GMCI)
12.5 Adverum Biotechnologies Inc.
12.6 Addgene Inc.
12.6.1 Viral Service
12.7 Agilis Biotherapeutics LLC
12.7.1 Agilis Engineered DNA Therapeutics
12.7.2 DNA Therapeutics for AADC Deficiency
12.7.3 DNA Therapeutics for Friedreich's ataxia (FA)
12.7.4 DNA Therapeutics for Angelman's Syndrome
12.8 Angionetics Inc.
12.8.1 Technology
12.8.2 Generx Therapeutic Positioning
12.8.3 Product Pipeline
12.8.4 Addresseable Market
12.9 Applied Genetic Technologies Corporation (AGTC)
12.9.1 AGTC's Technology
12.10 AnGes MG Inc.
12.10.1 HGF Plasmid
12.10.2 NF-kB Dekoy Oligonucleotide
12.10.3 DNA Therapeutic Vaccines
12.10.4 AnGes' Alliance Partners
12.11 Asklepios BioPharmaceutical Inc.
12.11.1 Asklepios' Collaborators
12.12 Audentes Therapeutics Inc.
12.12.1 Audentes' Technology

12.13 AveXis Inc.
12.13.1 AVXS-101
12.14 AvroBio Inc.
12.14.1 Lentiviral Vectors for Rare Diseases
12.14.2 Cytokine IL-12 for Cancer Immunotherapy
12.14.3 Gene Vector
12.14.4 AvroBio's Programs
12.15 Benitec Biopharma
12.15.1 ddRNAi Technology
12.15.2 Benitec's In-House Programs
12.15.3 Benitecs Licensed Programs
12.16 BioCancell Therapeutic Inc.
12.16.1 The H19 Gene
12.16.2 BC-819
12.16.3 BC-821
12.17 BioMarin Pharmaceutical Inc.
12.17.1 BMN 270
12.18 Bluebird bio Inc.
12.18.1 Bluebird's Program Pipeline
12.18.2 Lenti-D
12.18.3 LentiGlobin
12.18.4 Bluebird's Partnership with Celgene
12.18.5 Bluebird's Partnership with FivePrime
12.18.6 Bluebird's Partnership with Kite Pharma
12.18.7 Bluebird's Partnership with ViroMed
12.19 Brammer Bio LLC
12.19.1 Cell Therapy Services
12.19.2 Ex Vivo Gene Therapy
12.19.3 Viral Vector Manufacturing
12.20 Cellectis S.A.
12.20.1 UCART19
12.20.2 UCART123
12.20.3 UCART38 & UCARTCS1
12.20.4 UCART22
12.21 Clontech Laboratories Inc.
12.22 Cobra Biologics Ltd.
12.22.1 DNA Services
12.22.2 Virus Services
12.22.3 Protein Services

12.22.4 Microbiota Services
12.22.5 Fill and Finish Services
12.23 Copernicus Therapeutics Inc.
12.23.1 Technology
12.23.2 Cystic Fibrosis (CF) Program
12.23.3 Retinitis Pigmentosa (RP) Program
12.23.4 Parkinson's Disease (PD) Program
12.24 Dimension Therapeutics Inc.
12.24.1 Dimension's Gene Therapy Programs
12.25.1 SB Therapeutics
12.26 Editas Medicine Inc.
12.26.1 CRISPR/Cas9 & TALENs
12.27 Fibrocell Sciences Inc.
12.27.1 Fibroblast's Pipeline
12.27.2 FCX-007
12.27.3 FCX-013
12.28 Florida Biologix
12.28.1 Services
12.29 Freeline Therapeutics Ltd.
12.29.1 Freeline's Platform
12.30 Genable Technologies Ltd.
12.30.1 RhoNova
12.31 Genethon
12.31.1 Product Pipeline
12.32 Genlantis
12.32.1 DNA Transfection
12.32.2 siRNA Transfection
12.32.3 Neuronal Transfection
12.32.4 Customer Services
12.32.5 Protein Delivery/Transfection
12.32.6 siRNA Generation Kits
12.32.7 siRNA Transfection
12.32.8 Dicer Enzyme Kits
12.33 GenSight Biologics S.A.
12.33.1 GS010
12.33.2 GS030
12.34.1 AdenoVerse Technology
12.34.2 Antigen Discovery
12.34.3 Cell Lines

12.34.4 GenVec's Product Pipeline
12.34.4.1 GGF166 for Hearing Loss
12.34.4.2 GV2311 – RSV Vaccine
12.34.4.3 GV2207 – HSV-2 Immunotherapeutic
12.35 Ichor Medical Systems Inc.
12.35.1 Technology
12.36 Immune Design Corp.
12.36.2 GLASS
12.37 Immusoft Corp.
12.37.1 Gene Delivery Technology
12.37.2 Key Indications being Addressed
12.38 Inovio Pharmaceuticals Inc.
12.38.1 Inovio's Technology
12.39 Intellia Therapeutics Inc.
12.39.1 CRISPR/CAS9
12.39.2 Intellia's Programs
12.40 Juventa Therapeutics Inc.
12.40.1 Non-Viral Gene Therapy
12.40.2 JVS-100
12.41 Kite Pharma Inc.
12.41.1 Chimeric Antigen Receptor (CAR)
12.41.2 T cell Receptor (TCR)
12.41.3 Cancer Programs
12.41.4 Kite Pharma's Partnership with National Cancer Institute (NCI)
12.41.5 Kite Pharma's Partnership with The Netherlands Cancer Institute (NKI)
12.41.6 Kite Pharma's Partnership with Adimab
12.41.7 Kite Pharma's Collaboration with Alpine Immune Sciences (AIS)
12.41.8 Kite Pharma's Collaboration with Amgen
12.41.9 Kite Pharma's Partnership with Bluebird Bio
12.41.10 Kite Pharma's Partnership with Cell Design Labs
12.41.11 Kite Pharma's Collaboration with Genentech
11.41.12 Kite Pharma's Partnership with GE Global Research
12.41.13 Kite Pharma's Partnership with Leiden University Medical Center
12.41.14 Kite Pharma's Partnership with Leukemia & Lymphoma Society (LLS)
12.41.15 Kite Pharma's Partnership with The Tel-Aviv Sourasky Medical Center
12.41.16 Kite Pharma's Partnership with The UCLA David Geffen School of Medicine
12.42 Kolon Life Sciences Inc.
12.42.1 Invossa261
12.42.2 KLS-1010

12.42.3 KLS-2020
12.42.4 KLS3020
12.43 Lentigen Technology Inc.
12.43.1 Lentiviral Vectors for Translational Research
12.43.2 Lenti-Viral Vector Technology
12.43.3 Clinical Trial Support
12.44 Lysogene S.A.S.
12.44.1 Lysogene's rAAV Vectors
12.44.2 CNS Administration
12.44.3 MPS IIIA
12.44.4 GMI Gangliosidosis
12.44.5 Partnership with Alcyone Lifesciences Inc.
12.44.6 Partnership with University of Massachusetts
12.44.7 Partnership with Auburn University
12.44.8 Partnership with University of Manchester
12.45 Medgenics Inc.
12.45.1 Transduced Autologous Restorative Gene Therapy (TARGT)
12.46 Mirus Bio LLC
12.46.1 TransIT – Lenti Transfection Reagent
12.46.2 Ingenio Electroporation Kits
12.47 Mologen AG
12.47.1 Technologies
12.47.1.1 dSLIM
12.47.1.2 EnanDIM
12.47.1.3 MIDGE
12.47.2 Allogeneic Tumor Cell Bank
12.48 NanoCor Therapeutics Inc.
12.48.1 Biological Nanoparticle (BNP) Technology
12.48.2 Carfostin
12.49 Nature Technology Corp. (NTC)
12.49.1 Vector Cell Lines
12.49.2 DNA Manufacturing
12.49.3 Cloning & QC
12.49.4 Protein Products
12.49.5 Technology & Consulting
12.50 NightstaRx Ltd.
12.50.1 Project AAV2 REP1
12.51 Novasep Process SAS
12.51.1 Manufacturing Services for Customers

12.51.2 Contract Manufacturing Services
12.51.3 Purification Technologies
12.52 Omnia Biologics Inc.
12.52.1 Services
12.52.1.1 Preclinical and GMP Manufacturing
12.52.1.2 Process Development
12.52.1.3 Cell and Viral Banking
12.52.1.4 Aseptic Filling
12.53 ORCA Therapeutics B.V.
12.53.1 Technology
12.53.2 ORCA-010
12.53.3 Oncolytic Viruses Expressing p35
12.53.4 RNA Interference
12.54 OrphageniX
12.54.1 Technology
12.55 Oxford BioMedica plc
12.55.1 LentiVector Gene Delivery Technology
12.55.2 OXB-102
12.55.3 OXB-201 (RetinoStat)
12.55.4 CAR-T Cell Therapy
12.55.5 OXB-301 (TroVax)
12.55.6 SAR 422459
12.55.7 SAR421869
12.55.8 Partnership with Sanofi
12.55.9 Partnership with GlaxoSmithKline
12.55.10 Partnership with Novartis
12.55.11 Partnership with Immune Design Corp.
12.56 Oxford Genetics Ltd.
12.56.1 DNA Services
12.56.1.1 High Throughput Cloning Services
12.56.1.2 DNA Design and Protein Optimization Services
12.56.2 Cell Line Services
12.56.2.1 Cell Line Development
12.56.2.2 Custom Cell Engineering
12.56.3 Protein and Virus Services
12.56.3.1 Protein Expression and Antibody Engineering
12.56.3.2 Virus Construction and Production
12.56.4 Standard DNA Services
12.56.4.1 DNA Synthesis

12.56.4.2 Custom Cloning
12.56.4.3 Plasmid Preparation
12.57 REGENXBIO Inc.
12.57.1 NAV Technology
12.57.2 RGX-501
12.57.3 RGX-314
12.57.4 RGX-111
12.57.5 RGX-121
12.57.6 RGX-321
12.58 Renova Therapeutics Inc.
12.58.1 Renova's Pipeline
12.59 RetroSense Therapeutics LLC
12.59.1 RST-001
12.60 Sangamo Biosciences Inc.
12.60.1 Sangamo's Technology
12.60.2 Sangamo's Product Pipeline
12.60.3 Sangamo's Research Collaborations
12.61 Sarepta Therapeutics Inc.
12.61.1 RNA Medicine
12.61.2 RNA Modulation by PMO
12.61.3 Sarepta's Programs for Duchenne Muscular Dystrophy (DMD)
12.61.4 Sarepta's Programs for Infectious Diseases
12.62 Shanghai Sunway Biotech Co. Ltd.
12.62.1 Oncorine
12.63 SiBiono GeneTech Co. Ltd.
12.63.1 Gendicine
12.64 Sirion Biotech GmbH
12.64.1 Adenovirus
12.64.2 Lentivirus
12.64.4 Adeno-Associated Virus
12.64.5 AdenoBOOST & LentiBOOST
12.64.6 AdenONE
12.65 Spark Therapeutics Inc.
12.65.1 Spark Therapeutics' Pipeline
12.66 Takara Bio Inc.
12.66.1 Takara's Gene Therapy
12.66.1.1 Oncolytic Virus HF10
12.66.1.2 Engineered T-Cell Therapy (siTCR Gene Therapy)295
12.66.1.3 CAR Gene Therapy

12.66.1.4 MazF Gene Therapy
12.67 Taxus Cardium Pharmaceutical Group Inc.
12.67.1 Generx
12.68 Tocagen Inc.
12.68.1 Technology
12.68.2 Toca 511 & Toca FC
12.69 ToolGen Inc.
12.69.1 Gene Editing
12.69.2 RNA-Guided Endonucleases (RGEN)
12.70 Transgene SA
12.70.1 TG4010
12.70.2 Pexa-Vec
12.70.3 TG6002
12.70.4 TG1050
12.70.5 TG4001
12.70.6 Immunotherapy against Tuberculosis
12.71 uniQure N.V.
12.71.1 Glybera
12.72 Vascular Biologics Ltd.
12.72.1 VBL's Cancer Platform
12.73 Vical Inc.
12.73.1 Poloxamer Delivery System
12.73.2 ASP0113
12.73.3 HSV-2 Therapeutic Vaccine
12.73.4 CyMVectin Prophylactic CMV Vaccine
12.73.5 VL-2397 Antifungal
12.74 ViroMed Co., Ltd.
12.74.1 VM202
12.74.2 Fast Track Designation for VM202
12.74.3 VM501
12.75 Vivebiotech SL
12.75.1 GMP Solutions
12.75.2 Viral Vector Services
12.75.3 ZELIGEN Technology
12.76 Voyager Therapeutics Inc.
12.76.1 Product Pipeline
12.77 Xenon Pharmaceuticals Inc.
12.77.1 Glybera

+44 20 8123 2220
info@marketpublishers.com

Index Of Figures

INDEX OF FIGURES

Figure 2.1: Shematic of Gene Therapy using a Virus Vector
Figure 2.2: Schematic to Explain Gene Augmentation Therapy
Figure 2.3: Schematic to Exlain Gene Inhibition Therapy
Figure 2.4: Schematic to Explain Suicide Gene Therapy
Figure 2.5: Ex vivo Route of Gene Delivery in Gene Therapy
Figure 2.6: In Vivo Route of Gene Delivery in Gene Therapy
Figure 7.1: Academic Mettle: Number of Research Papers Published, 1975-2016
Figure 7.2: Number of Gene Therapy Clinical Trials Approved Worldwide, 1989-2016
Figure 7.3: Geographical Distribution of Gene Therapy Clinical Trials, 2016
Figure 7.4: Major Countries Participating in Gene Therapy Clinical Trials, 2016
Figure 7.5: Major Indications Addressed by Gene Therapy Clinical Trials, 2016
Figure 7.6: Top Gene Types Transferred
Figure 7.7: Phases of Gene Therapy Clinical Trials
Figure 7.8: Venture Investment in Gene Therapy by Body System as of 2014
Figure 8.1: Top Five Vectors used in Gene Therapy
Figure 9.1: Global Market for Cystic Fibrosis Therapeutics, 20162022
Figure 9.2: Global Market for Hemophilia Factor Proteins, 2016-2022
Figure 9.3: Global Market for Sickle Cell Anemia, 2016-2022
Figure 9.4: Global Market for HIV Therapeutics, 2016-2022
Figure 9.5: Global Market for Leukemia Drugs, 2016-2022
Figure 9.6: Global Market for Ovarian Cancer Therapeutics, 2016-2022
Figure 9.7: Global Market for Pancreatc Cancer Therapeutics, 2016-2022
Figure 9.8: Global Market for Head & Neck Cancer Therapeutics, 2016-2022
Figure 9.9: Global Market for Melanoma Therapeutics, 2016-2022
Figure 9.10: Global Market for Prostate Therapeutics, 2016-2022
Figure 9.11: Global Market for Breast Cancer Therapeutics, 2016-2022
Figure 9.12: Global Market for Cholesterol Lowering Drugs, 2016-2022
Figure 9.13: U.S. Market for HD Therapeutics, 2016-2022
Figure 10.1: Global Market for Gene Therapy Technologies, Services and Products, 2016-2022
Figure 10.2: Market for Technologies, Services and Products by indication, 2016-2022
Figure 10.3: Percent Share of Gene Therapy Market by Indication, 2016
Figure 10.4: Global Market for Gene Therapy by Market Segment, 2016-2022
Figure 10.5: Percent Share of Gene Therapy market by Geography, 2016
Figure 11.1: Major Ten Companies Developing AAV Vector Candidates

+44 20 8123 2220
info@marketpublishers.com

Figure 11.2: Diseases and Corresponding Number of Drugs Studied using AAV Vectors
Figure 11.3: Major Ten Companies Developing Lentiviral Vector Candidates
Figure 11.4: Overview of a Typical Viral Vector Manufacturing Process
Figure 11.5: Global Cold Chain and Non-Cold Chain Logistics Spending, 2016-2022
Figure 11.6: Global Spending on Logistics Related to Clinical Trials, 2016-2022
Figure 11.7: Estimated Average Per-Patient Clinical Trial Costs by Phase of Study
Figure 11.8: Estimated Per-Patient Clinical Trial Expenditure by Indication

+44 20 8123 2220
info@marketpublishers.com

Index Of Tables

INDEX OF TABLES

Table 2.1: Differences between Somatic Gene Therapy and Germline Gene Therapy
Table 2.2: Few Examples of Suicide Gene Products
Table 2.3: Genetic Diseases Treatable by Ex Vivo Gene Therapyusing Bone Marrow Cells
Table 2.4: Examples of Diseases Treatable by In Vitro Route of Gene Delivery
Table 2.5: Important Gene Therapy Players and Product Candidates
Table 3.1: Approved Gene Therapy Products
Table 4.1: Number of Non-Cancer Phase III Gene Therapy Candidates as of 2016
Table 5.1: Key Players with Phase II Product Candidates
Table 6.1: Commercialization Status of Gene Therapies in E.U. Member Countries
Table 6.2: Prices for Gene Therapy
Table 7.1: Approved and Published Clinical Gene Therapy Protocols
Table 7.2: Number of Gene Therapy Clinical Trials Approved Worldwide, 1989-2016
Table 7.3: Geographical Distribution of Gene Therapy Clinical Trials, 2016
Table 7.4: Gene Therapy Clinical Trials by Country, 2016
Table 7.5: Gene Therapy Clinical Trials by Indications, 2016
Table 7.6: Gene Types Transferred in Gene Therapy Clinical Trials
Table 7.7: Phases of Gene Therapy Clinical Trials
Table 7.8: Timeline of Big Pharma Investment and Licensing in Gene Therapy, 2010-2016
Table 7.9: Funds Raised by Gene Therapy Companies Since 2013
Table 8.1: Most Utilized Non-Viral Vectors in Gene Therapy
Table 8.2: Advantages and Disadvantages of Four Physical Methods in Gene Delivery
Table 8.3: Major Types of Viral Vectors used in Gene Therapy, Advantages and Disadvantages
Table 8.4: Key Properties of Viral Vectors
Table 8.5: Advantages and Disadvantages of Viral Vectors by Type
Table 8.6: Salient Features of Adenovirus Vectors
Table 8.7: Advantages and Disadvantages of Adenovirus Vectors
Table 8.8: Salient Features of Retrovirus
Table 8.9: Advantages and Disadvantages of Retroviral Vectors
Table 8.10: Comparison of Retrovirus and Adenovirus
Table 8.11: Salient Features of Adeno-Associated Virus Vectors
Table 8.12: Advantages and Disadvantages of Adeno-Associated Vectors
Table 8.13: AAV Serotypes

Table 8.14: Genes Transduced by AAV for Specific Diseases
Table 8.15: Salent Features of Lentivirus Vectors
Table 8.16: Advantages and Disadvantages of Lentiviral Vectors
Table 8.18: Advantages and Disadvantages of Pox/Vaccinia Vectors
Table 8.19: Major Features of Viral Vectors by Type
Table 8.20: Examples of Clinical Trials Using Retroviruses & Lentiviruses
Table 8.21: Examples of Clinical Trials Using Retroviruses & Lentiviruses
Table 8.22: Vectors Used in Gene Therapy Clinical Trials, 2016
Table 8.23: Examples of Virus Vector Manufacturing Systems
Table 9.1: Clinical Applications of Gene Therapy
Table 9.2: Identifying Number, Intervention and Status of Gene Therapy Trials for Blindness
Table 9.3: Gene Therapy Clinical Trial for Eye Disorders
Table 9.4: Genes and Loci Underlying Parkinson Disease
Table 9.5: Gene Therapy Clinical Trials for Parkinson Disease
Table 9.6: U.S. Data on Cystic Fibrosis, 2000-2015
Table 9.7: Gene Therapy Clinical Trials for Cystic Fibrosis
Table 9.8: Gene Therapy Clinical Trials for Pompe Disease
Table 9.9: Gene Therapy Clinical Trials for Batten Disease
Table 9.10: Gene Therapy Clinical Trials for Immune Disorders
Table 9.12: Gene Therapy Clinical Trials for Wiskott-Aldrich Syndrome
Table 9.13: Gene Therapy Clinical Trials for Hemophilia
Table 9.14: Gene Therapy Product Candidates for Hemophilia A and B
Table 9.15: Ongoing Gene Therapy Clinical Trials for Sickle Cell, Fanconi and Thalassemia
Table 9.16: Gene Therapy Clinical Trials for Heart Diseases
Table 9.17: Gene Therapy for Muscular Dystrophies
Table 9.18: Gene Therapy Clinical Trials for HIV
Table 9.19: Gene Therapy Clinical Trials for Blood Cancer
Table 9.20: Gene Therapy Clinical Trials for Ovarian Cancer
Table 9.21: Gene Therapy Clinical Trials for Pancreatic Cancer
Table 9.22: Gene Therapy Clinical Trials for Head and Neck Cancers
Table 9.23: Gene Therapy Clinical Therapy for Melanoma
Table 9.24: Gene Therapy Clinical for Prostate Cancer
Table 9.25: Gene Therapy Clinical Trials for Breast Cancer
Table 9.26: Gene Therapy Clinical Trials for Fabry Disease
Table 9.27: Gene Therapy for Familial Hypercholesterolemia
Table 9.28: Gene Therapy Clinical Trials for Tay-Sachs disease
Table 10.1: Estimated Market for Five Gene Therapy Products in the U.S. in the Next 20

Years
Table 10.2: Market for Technologies, Services and Products by Indication, 2016-2022
Table 10.3: Global Market for Gene Therapy by Market Segment, 2016-2022
Table 10.4: Percent Share of Gene Therapy market by Geography, 2016
Table 10.5: The Estimated Drug Market that is Wide Open for Gene Therapy Product Candidates
Focusing on 13 Diseases183
Table 11.1: Major Ten Companies Developing AAV Vectors
Table 11.2: Diseases and Corresponding Number of Drugs Studied using AAV Vectors
Table 11.3: Major Ten Companies Developing Lentiviral Vector Candidates
Table 11.4: Global Cold Chain and Non-Cold Chain Logistics Spending, 2016-2022196
Table 11.5: Estimated Average Per-Patient Clinical Trial Costs by Phase of Study
Table 11.6: Estimated Per-Patient Clinical Trial Expenditure by Indication
Table 11.7: Patient-Per Clinical Trial Expenditure by Disease Area and Phase
Table 12.1: 4D's Product Pipeline
Table 12.2: Abeona's Product Pipeline
Table 12.3: Advantagene's Program Overview
Table 12.4: Adverum's Pipeline of Gene Therapy Programs
Table 12.5: Agilis DNA Therapeutic Programs
Table 12.6: Generx Product Pipeline
Table 12.7: Potential Economic Opportunity for Generx (Ad5FGF-4)
Table 12.8: AGTC's Ophthalmology Development Programs
Table 12.9: AnGes' Product Pipeline
Table 12.10: Asklepios' Product Pipeline
Table 12.11: Audentes' Pipeline
Table 12.12: AvroBio's Programs
Table 12.13: Benitec's In-House Programs
Table 12.14: Benitecs Licensed Programs
Table 12.15: Bluebird's Program Pipeline
Table 12.16: Product Pipeline from Cellectis
Table 12.17: Dimension's Product Pipeline
Table 12.18: Fibroblast's Product Pipeline
Table 12.19: Genethon's Pipeline
Table 12.20: Summary of GenVec's Product Pipeline
Table 12.21: Immune Design's Product Pipeline
Table 12.22: Inovio's Pipeline of Products
Table 12.23: Types of Genome Editing
Table 12.24: Intellia's Product Pipeline
Table 12.25: Kite's Product Pipeline

+44 20 8123 2220
info@marketpublishers.com

Table 12.26: Lysogene's Product Pipeline
Table 12.27: Medgenics' Product Pipeline
Table 12.28: Mologen's Product Pipeline
Table 12.29: Oxford BioMedica's Product Pipeline
Table 12.30: REGENXBIO's Therapeutic Programs
Table 12.31: Renova's Pipeline
Table 12.32: Sangamo's Product Pipeline
Table 12.33: Sarepta's Product Pipeline for DMD289
Table 12.34: Sarepta's Programs for Infectious Diseases
Table 12.35: Spark Therapeutics' Pipeline
Table 12.36: Tocagen's Product Pipeline
Table 12.37: Transgene's Product Pipeline
Table 12.38: unQure's Pipeline
Table 12.39: VBL's Cancer Pipeline
Table 12.40: Vical's Product Pipeline
Table 12.41: Voyager Therapeutics, Product Pipeline

+44 20 8123 2220
info@marketpublishers.com

I would like to order

Product name: Global Gene Therapy Market Analysis & Forecast to 2022
Product link: https://marketpublishers.com/r/G99E8358534EN.html
Price: US$ 4,900.00 (Single User License / Electronic Delivery)
If you want to order Corporate License or Hard Copy, please, contact our Customer Service:
info@marketpublishers.com

Payment

To pay by Credit Card (Visa, MasterCard, American Express, PayPal), please, click button on product page https://marketpublishers.com/r/G99E8358534EN.html

To pay by Wire Transfer, please, fill in your contact details in the form below:

First name:
Last name:
Email:
Company:
Address:
City:
Zip code:
Country:
Tel:
Fax:
Your message:

**All fields are required

Custumer signature _____

Please, note that by ordering from marketpublishers.com you are agreeing to our Terms & Conditions at https://marketpublishers.com/docs/terms.html

To place an order via fax simply print this form, fill in the information below
and fax the completed form to +44 20 7900 3970