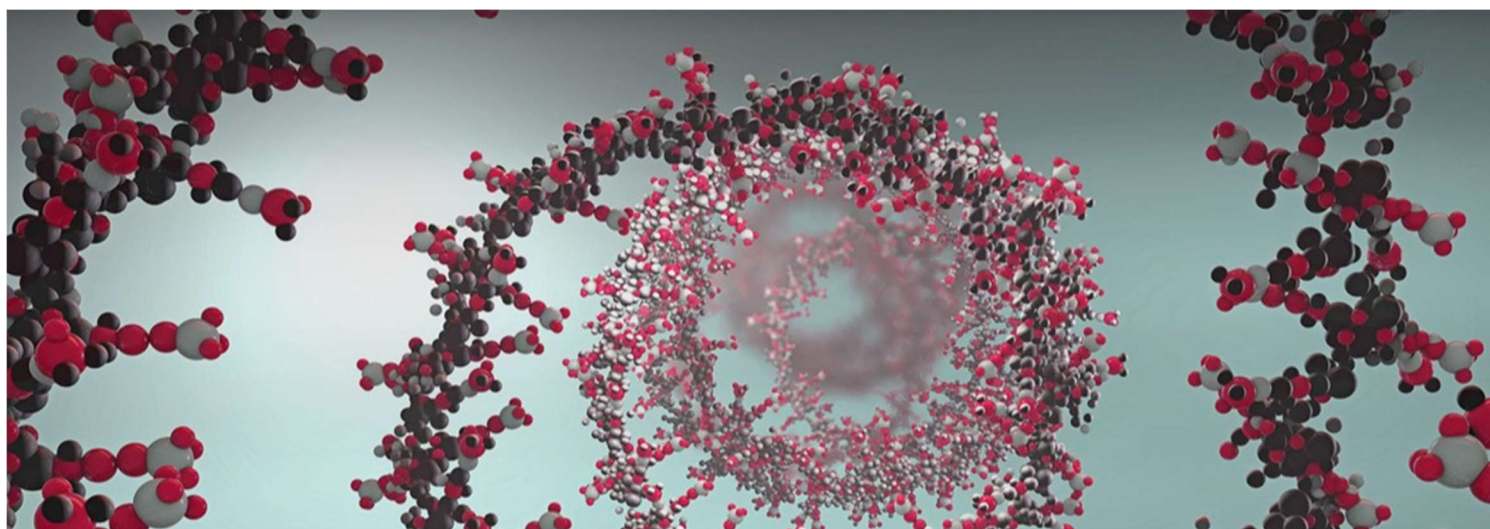


RESEARCH REPORT



Oligonucleotide Synthesis Markets

Forecasts by Oligo Length, Application, and Product. With Executive and Consultant Guides and including Customized Forecasting and Analysis.

2022 to 2026





Howe Sound Research is a market research and consulting company based in Vancouver, British Columbia, Canada. In our spare time we like to sail in a large body of water nearby called Howe Sound. We publish market research reports that address scientific industries with an emphasis on Biotechnology and Clinical Diagnostic markets. We consider ourselves experts in these areas.

We approach market research differently than other companies. At any one time we have a limited number of reports, and we update them frequently, sometimes several times a year. Our reports are prepared by people who understand the industry and have worked and studied in the area. This contrasts with the many research mills who produce canned reports on the Handbag market one day and the XRay market the next.

Our intellectual property is encryption protected. If you have issues with this or would like to upgrade to a corporate license that is not encrypted, please contact us at the email above.

Please feel free to contact us if you have any questions. We believe in customer service and are more than willing to provide after sales assistance and custom data.

All Rights Reserved. This document contains copyrighted intellectual property. No part of it may be circulated, copied, quoted, or otherwise reproduced without the approval of Howe Sound Research.

Please respect our intellectual property and do not distribute this document beyond the terms of your license.

Table of Contents

1	Market Guides	15
1.1	Situation Analysis	16
1.2	Guide for Executives and Marketing Staff	18
1.3	Guide for Investment Analysts and Management Consultants	19
2	Introduction and Market Definition	20
2.1	What is Oligonucleotide Synthesis?	21
2.1.1	The Enzyme Race	21
2.1.2	Data Storage – The Elephant in the Room.....	23
2.2	Market Definition	24
2.2.1	Market Size	24
2.2.2	Currency	24
2.2.3	Years	24
2.3	Methodology	26
2.3.1	Authors	26
2.3.2	Sources	26
2.4	U.S. Medical Market and Pharmaceutical Research Spending - Perspective...27	
2.4.1	U.S. Expenditures for Pharmaceutical Research	27
2.5	Perspective: Healthcare, the IVD Industry	28
2.5.1	Global Healthcare Spending	28
2.5.2	Spending on Diagnostics	30
2.5.3	Important Role of Insurance for Diagnostics.....	31
3	Oligonucleotide Synthesis.....	32

3.1	Synthesis Technology	33
3.2	Automation.....	35
3.3	Types of Oligonucleotides	35
3.4	PCR Primers	36
3.5	PCR Assays and Panels.....	37
3.6	Sequencing.....	37
3.7	DNA Microarrays	38
3.8	Fluorescence In Situ Hybridization (FISH)	38
3.9	Antisense Oligonucleotides.....	39
3.10	Other Uses of Oligonucleotides	40
3.11	Relationship to CRISPR and Gene Editing.....	41
4	Industry Overview	42
4.1	Players in a Dynamic Market	43
4.1.1	Academic Research Lab.....	43
4.1.2	Genome and Bio Foundries.....	44
4.1.3	Chemical and Food Product Supplier.....	44
4.1.4	Synthetic Gene and Oligo Supplier	44
4.1.5	Diagnostic Manufacturer.....	44
4.1.6	Pharmaceutical Company	44
4.1.7	Audit Body	45
5	Market Factors	46
5.1	Factors Driving Growth	47
5.1.1	The Role of Diagnostics and the Covid Effect	48
5.1.2	The RNA Based Vaccine	48
5.1.3	Genomic Blizzard	48
5.1.4	Antisense Revival	49

5.1.5	New Applications	49
5.2	Factors Limiting Growth	50
5.2.1	Declining Price	50
5.2.2	Technology Lag	50
5.2.3	COVID Realignment	51
5.3	The Next Five Years	52
6	Oligonucleotide Synthesis Recent Developments	53
6.1	Recent Developments – Importance and How to Use This Section	54
6.1.1	Importance of These Developments	54
6.1.2	How to Use This Section	54
6.2	Secarna Pharmaceuticals' and Evotec Achieve Programme Designation	54
6.3	Aligos Discontinues Development of its Antisense Oligonucleotide	55
6.4	Seegene Obtains CE Mark for Oligo Based SARS-CoV-2 Assay	57
6.5	Biofidelity to Launch Mutation Detection Assay	58
6.6	Oligonucleotide Therapeutics Society Holds Meeting	61
6.7	New Oligonucleotide Synthesis Chemistry	62
6.8	Antisense Oligonucleotides Cross Rodents' Blood-Brain Barrier	64
6.9	New Rapid Multiplexed PCR Assay Uses Oligo Probes	66
6.10	MIT Devises Oligo 'File System' for DNA Data Storage	66
6.11	Nuclera Acquires E Ink Digital Microfluidics Business	70
6.12	Twist Bioscience Hits Milestone for DNA Data Storage	70
6.13	Twist Bioscience, Vivlion Partner on RNA Libraries for CRISPR	72
6.14	DNA Script Launching Benchtop Synthesizer for 'DNA on Demand'	73
6.15	RNA Disease Dx to Develop PoC Covid Test	78
6.16	Evonetix and Analog Devices Develop GEN3 DNA Synthesis Platform	78
6.17	ATDBio Receives Grant for Cancer Diagnosis Project	79

6.18	Twist Bioscience Announces SARS-CoV-2 Therapeutic Ab	80
6.19	Drugmakers boost oligo capacity amid Covid-19	81
6.20	Aligos Therapeutics in Study of Oligo Candidate	83
6.21	DNA Script Raises \$89M for SYNTAX Launch	84
6.22	Codexis & Molecular Assemblies Partner for DNA Synthesis	87
6.23	NuProbe Licenses Oligo Technology from Rice	88
6.24	Genome editing with Cas9-oligo conjugates	88
6.25	OliX Pharma and AM Chemicals Partner for RNA Synthesis Support	89
6.26	Twist Bio To Pay \$22.5M To End Trade Secrets Suit	90
6.27	DNA Script, partners get grant for data storage	92
6.28	Xi's STA unit opens oligonucleotide plant	93
6.29	Agilent Doubles Capacity to Produce Oligos	93
6.30	GeneDesign Opens Oligo Development Center	94
7	Profiles of Key Companies	96
7.1	Abbott Diagnostics	97
7.2	Ajinomoto Bio-Pharma	99
7.3	Alnylam Pharmaceuticals	100
7.4	Amyris	102
7.5	Ansa BioTechnologies	103
7.6	ATDBio	104
7.7	ATG biosynthetics	105
7.8	ATUM	106
7.9	Bayer	107
7.10	Beckman Coulter Diagnostics	109
7.11	Becton, Dickinson and Company	110
7.12	Biomatik	112

7.13	bioMérieux Diagnostics.....	113
7.14	Bio-Rad Laboratories, Inc.	115
7.15	Bio-Synthesis	117
7.16	Blue Heron Biotechnology (Eurofins Genomic)	118
7.17	Camena Bioscience	119
7.18	Cepheid (Danaher)	120
7.19	Codexis.....	122
7.20	Diasorin S.p.A.	123
7.21	DNA Script.....	125
7.22	Enzo Life Sciences, Inc.	126
7.23	Eurofins Scientific	128
7.24	Eurogentec (Kaneka)	130
7.25	Evonetix.....	132
7.26	GE Healthcare	133
7.27	Genomatica	134
7.28	Genscript Biotech.....	136
7.29	Hologic	137
7.30	Integrated DNA Technologies (Danaher)	139
7.31	Ionis Pharmaceuticals.....	140
7.32	Janssen Diagnostics	142
7.33	Kern Systems	143
7.34	LGC Biosearch Technologies	144
7.35	Maravai LifeSciences Holdings	145
7.36	Merck & Co., Inc	147
7.37	Microsynth.....	148
7.38	Millipore Sigma	149

7.39	Molecular Assemblies	150
7.40	Nitto Denko (Avecia)	151
7.41	Nuclera.....	153
7.42	Perkin Elmer.....	155
7.43	Primerdesign (Novacyt)	157
7.44	Qiagen Gmbh	158
7.45	Roche Molecular Diagnostics	160
7.46	Seegene.....	162
7.47	Siemens Healthineers.....	164
7.48	Synthego	166
7.49	Thermo Fisher Scientific Inc.....	167
7.50	Twist Bioscience	169
8	Oligonucleotide Synthesis Global Market Overview	170
8.1	Global Market Overview by Country	171
8.1.1	Table – Global Market by Country.....	171
8.1.2	Chart – Global Market by Country	172
8.2	Global Market Size by Length - Overview	173
8.2.1	Table – Global Market by Length	173
8.2.2	Chart – Global Market by Length – Base/Final Year Comparison.....	174
8.2.3	Chart – Global Market by Length – Base Year	175
8.2.4	Chart – Global Market by Length – Final Year.....	176
8.2.5	Chart – Global Market by Length – Share by Year	177
8.2.6	Chart – Global Market by Length – Segment Growth.....	178
8.3	Global Market Size by Application - Overview	179
8.3.1	Table – Global Market by Application	179
8.3.2	Chart – Global Market by Application – Base/Final Year Comparison.....	180

8.3.3	Chart – Global Market by Application – Base Year	181
8.3.4	Chart – Global Market by Application – Final Year	182
8.3.5	Chart – Global Market by Application – Share by Year	183
8.3.6	Chart – Global Market by Application – Segment Growth.....	184
8.4	Global Market Size by Product - Overview.....	185
8.4.1	Table – Global Market by Product.....	185
8.4.2	Chart – Global Market by Product – Base/Final Year Comparison	186
8.4.3	Chart – Global Market by Product – Base Year	187
8.4.4	Chart – Global Market by Product – Final Year	188
8.4.5	Chart – Global Market by Product – Share by Year.....	189
8.4.6	Chart – Global Market by Product – Segment Growth	190
9	Global Market by Length.....	191
9.1	<20 mer Market	192
9.1.1	Table - <20 mer Market by Country	192
9.1.2	Chart - <20 mer Market Segment Growth	193
9.2	21-50 mer Market	194
9.2.1	Table - 21-50 mer Market by Country	194
9.2.2	Chart - 21-50 mer Market Segment Growth	195
9.3	51-100 mer Market	196
9.3.1	Table – 51-100 mer Market by Country.....	196
9.3.2	Chart – 51-100 mer Market Segment Growth.....	197
9.4	>100 mer Market	198
9.4.1	Table – >100 mer Market by Country.....	198
9.4.2	Chart – >100 mer Market Segment Growth.....	199
10	Global Market by Application.....	200
10.1	Research Market	201

10.1.1	Table - Research Market by Country	201
10.1.2	Chart - Research Market Segment Growth.....	202
10.2	Diagnostics Market.....	203
10.2.1	Table – Diagnostics Market by Country	203
10.2.2	Chart – Diagnostics Market Segment Growth	204
10.3	Therapeutics Market	205
10.3.1	Table - Therapeutics Market by Country	205
10.3.2	Chart - Therapeutics Market Segment Growth.....	206
10.4	Data Market.....	207
10.4.1	Table - Data Market by Country.....	207
10.4.2	Chart - Data Market Segment Growth	208
11	Global Market by Product	209
11.1	Oligonucleotides Market	210
11.1.1	Table - Oligonucleotides Market by Country	210
11.1.2	Chart - Oligonucleotides Market Segment Growth	211
11.2	Instruments Market	212
11.2.1	Table – Instruments Market by Country.....	212
11.2.2	Chart – Instruments Market Segment Growth	213
11.3	Reagents Market.....	214
11.3.1	Table - Reagents Market by Country	214
11.3.2	Chart - Reagents Market Segment Growth	215
12	Appendices.....	216
12.1	Typical Oligo Synthesis Price Lists	217
12.2	Medicare Clinical Lab Fee Schedule 2022.....	220
12.3	Share of Pharma R&D by Country	307

Table of Tables

Table 1 Companies Formed to Exploit Enzyme Synthesis	23
Table 2 Market Players by Type.....	43
Table 3 Five Factors Driving Growth	47
Table 4 Three Factors Limiting Growth.....	50
Table 5 Global Market by Country/Region.....	171
Table 6 Global Market by Length	173
Table 7 Global Market by Application.....	179
Table 8 Global Market by Product	185
Table 9 <20 mer Market by Country	192
Table 10 21-50 mer Market by Country	194
Table 11 51-100 mer Market by Country	196
Table 12 >100 mer Market by Country	198
Table 13 Research Market by Country.....	201
Table 14 Diagnostics Market by Country	203
Table 15 Therapeutics Market by Country	205
Table 16 Data Market by Country	207
Table 17 Oligonucleotides Market by Country.....	210
Table 18 Instruments Market by Country.....	212
Table 19 Reagents Market by Country.....	214
Table 20 2022 Clinical Lab Fee Schedule.....	220

Table of Figures

Figure 1 Pharmaceutical Research Spending Global, USA & China	27
Figure 2 Map of Global Healthcare Spending	29
Figure 3 The Global Lab Test Pie - Wholesale and Retail.....	31
Figure 4 Phosphoramidites Structure	33
Figure 5 DNA/Oligonucleotide Synthetic Cycle	34
Figure 6 Growth rates of Oligonucleotide Synthesis by Application	52
Figure 7 Market Size by Country.....	172
Figure 8 Global Market by Length - Base vs. Final Year.....	174
Figure 9 Length Market Base Year	175
Figure 10 Length Market Final Year.....	176
Figure 11 Length Share by Year	177
Figure 12 Length Segment Growth	178
Figure 13 Global Market by Application - Base vs. Final Year.....	180
Figure 14 Application Market Base Year	181
Figure 15 Application Market Final Year	182
Figure 16 Application Share by Year	183
Figure 17 Application Segment Growth.....	184
Figure 18 Global Market by Product - Base vs. Final Year	186
Figure 19 Product Market Base Year	187
Figure 20 Product Market Final Year.....	188
Figure 21 Product Share by Year.....	189
Figure 22 Product Segment Growth	190
Figure 23 Chart – <20 mer Market Growth.....	193

Figure 24 Chart 21-50 mer Market Growth.....	195
Figure 25 Chart – 51-100 mer Market Growth.....	197
Figure 26 Chart – >100 mer Market Growth.....	199
Figure 27 Chart Research Market Growth	202
Figure 28 Chart – Diagnostics Market Growth	204
Figure 30 Chart - Therapeutics market Growth	206
Figure 31 Chart – Data Market Growth	208
Figure 32 Chart Oligonucleotides Market Growth	211
Figure 33 Chart – Instruments Market Growth	213
Figure 34 Chart – Reagents Market Growth	215
Figure 35 Eurofins Price List.....	217
Figure 36 Hokkaido System Science Co. Price List	218
Figure 37 Biobasic Price List	219
Figure 38 Share of Pharma R&D by Country.....	307