

Table of Contents

Genomics, proteomics and metabolomics in diagnostics

Executive summary 14

Market overview 14

Biomarkers 14

Microarrays and microfluidics 16

Lab-on-a-chip proteomics 16

Bioinformatics 17

Emerging applications 18

Applications market 18

Competitive landscape 19

Patent analysis 20

Geographic analysis 20

Company profiles 21

Chapter 1 Market overview 24

Summary 24

Emerging trends focus on survival rates and non-invasive methods 25

Accuracy remains the key for next generation omics-based diagnostics 26

Biomarkers setting standards for ideal diagnostic methodology 27

Key market drivers & resistors 29

Chapter 2 Biomarkers 32

Summary 32

Defining biomarkers 33

The biomarker market 33

Market drivers 33

Restraints 35

Emerging applications of biomarkers 37

Omics technologies 37

Disease predisposition 38

Pre-natal testing 38

Biomarkers and translational medicine 38

Proteomics and biomarker applications 39
Post-genomic biomarker technologies 39
Innovative technologies provide patient centric data 39
Genomic technologies play a significant role in nutritional research 40
Molecular diagnostics 40
Mass spectrometry (MS) 40
Gel electrophoresis 41
Metabolomics 42
Imaging biomarkers 42
Confluence of diagnostics and pharmaceutical companies 43

Challenges 43

High investment hampers advance biomarker research 43
Validation challenge 44
Lack of IT solutions 44

Chapter 3 Microarrays and microfluidics 46

Summary 46

Microarrays and microfluidics 47

Market drivers 47
Market restraints 49

DNA microarrays 51

Fabrication technologies 51
Printing with fine-pointed pins onto glass slides 51
Photolithography using pre-made masks 52
Ink-jet printing 52
Analytical methods 52
mRNA profiling 53
Genetic imbalance detection 53
Gene expression profiling 53
SNP detection 54
DNA microarrays in in vitro diagnostics (IVD) 54

Protein microarrays 55

Protein immobilization strategies 56

Surface chemistries 56

Format of protein chips 56

Complete protein profiling utility 57

Tissue and cell microarrays 58

Chapter 4 Lab-on-a-chip proteomics 60

Summary 60

Introduction 61

Classification of LOCs 61

Market drivers for LOC 62

Drawbacks 64

Chapter 5 Bioinformatics 66

Summary 66

Introduction 67

Market drivers 67

Market restraints 68

Applications in diagnostics 70

Strategic recommendations 72

Advancements in molecular diagnostics and bioinformatics 73

Chapter 6 Emerging applications 76

Summary 76

Quantitative real-time polymerase chain reaction (qPCR) 77

DNA biosensors 78

Flow cytometry 78

DNA methylation 79

Nanotechnology 80

Other novel diagnostic applications 81

DNA testing technologies 81

Mass spectrometry and proteomics 81

H1N1 82

Metabolomics and related diagnosis 82

MicroRNA 83

Use of protein microarrays for early detection of disease 83

Next-generation sequencing technologies and IT technologies 84

Biomarkers 85

Chapter 7 Applications market 88

Summary 88

Application by utility 89

Sequence analysis 90

Structure analysis 91

Function analysis 91

Application by disease 91

Cancer 92

Infectious disease 92

HIV 93

Autoimmune diseases 93

Neurological disorders 93

Cardiovascular and metabolic disease 94

Chapter 8 Competitive landscape 96

Summary 96

Agreements and collaborations 97

New product/service launches 102

Mergers and acquisitions 103

Chapter 9 Patent analysis 106

Summary 106

Introduction 107

Patents by technology 108

Patents by geography 110

Patents by assignee 112

Chapter 10 Geographic analysis 116

Summary 116

Global diagnostics market 117

North America 117

Europe 119

Asia 120

Rest of the World (ROW) 121

Chapter 11 Company profiles 124

Summary 124

Affymetrix 125

Company overview 125

Products and services 125

Strategy and developments 126

Agilent Technologies 126

Company overview 126

Products and services 126

Strategy and developments 127

Amgen 127

Company overview 127

Products and services 128

Strategy and developments 128

Beckman Coulter 128

Company overview 129

Products and services 129

Strategy and developments 129

Bio-Rad Laboratories 129

Company overview 130

Product and services 130

Strategy and developments 130

BG Medicine 130

Company overview 130

Products and services 131

Strategy and developments 131

Biophysical Corp 132

Company overview 132

Products and services 132

Strategy and developments 132

BioSystems International (BSI) 133

Company overview 133

Products and services 133

Strategy and developments 134

Calibrant 134

Company overview 134

Products and services 135

Strategy and development 135

Caprion Proteomics 135

Company overview 135

Products and services 136

Strategy and developments 136

deCODE Genetics 136

Company overview 137

Products and services 137

Strategy and developments 137

Exagen Diagnostics 137

Company overview 138

Products and services 138

Strategy and developments 138

GE Healthcare 138

Company overview 139

Strategy and developments 139

Genedata 140

Company overview 140

Products and services 140

Strategy and developments 140

GeneNews 141

Company overview 141

Products and services 141

Strategy and developments 142

Human Metabolome Technologies (HMT) 142

Company overview 142

Products and services 143

Strategy and developments 143

Illumina, Inc. 143

Company overview 143

Products and services 144

Strategy and development 144

Imgenex 144

Company overview 145

Products and services 145

Strategy and developments 145

InforSense 145

Company overview 146

Products and services 146

Strategy and developments 146

Integromics 146

Company overview 147

Products and services 147

Strategy and developments 147

MDS, Inc. 147

Company overview 148

Products and services 148

Strategy and developments 148

Metabolon, Inc. 148

Company overview 149

Products and services 149

Strategy and developments 149

Metanomics Health GmbH 149

Company overview 150

Products and services 150

Strategy and developments 150

Microchip Biotechnologies 150

Company overview 151

Products and services 151

Strategy and developments 151

MicroDiscovery 151

Company overview 151

Products and services 152

Strategy and developments 152

Molecular Connections 152

Company overview 152

Products and services 153

Strategy and developments 153

NextGen Group PLC 153

Company overview 153

Products and services 153

Strategy and developments 154

Nonlinear USA, Inc. 154

Company overview 154

Products and services 155

Strategy and developments 155

Nuvera Biosciences 155

Company overview 155

Products and services 156

Strategy and developments 156

Ocimum Biosolutions 156

Company overview 156

Products and services 157

Strategy and developments 157

Pam Gene BV 157

Company overview 157

Products and services 157

Strategy and developments 158

Siemens Healthcare 158

Company overview 158

Products and services 158

Strategy and developments 158

Chapter 12 Appendix 160

Patents 160

Methodology 185

List of Figures

Figure 1.1: Evolving trends in diagnostics 25

Figure 1.2: Key features of next generation omics-based diagnostic technologies 27

Figure 2.3: Key market drivers for biomarkers 34

Figure 2.4: Key market restraints for biomarkers 36

Figure 3.5: Key market drivers for microarrays & microfluidics 48

Figure 3.6: Key market restraints for microarrays & microfluidics 50

Figure 5.7: Key market drivers for bioinformatics 68

Figure 5.8: Key market restraints for bioinformatics 69

Figure 5.9: Evolution of bioinformatics 71

Figure 8.10: Diagnostic companies strategies 97

Figure 8.11: Recent developments: agreements & collaborations, 2008 - Jan 10 98

Figure 8.12: Mergers and acquisitions, 2008 - 09 103

Figure 9.13: Total number of patents registered, 2006–09 107

Figure 9.14: Patents by technology, 2006-09 109

Figure 9.15: Patents by geography, 2006-09 110

Figure 9.16: Patents by geography and technology, 2006–09 111

Figure 9.17: Patents by assignee, 2008 113

Figure 10.18: North American diagnostics market (\$m), 2007–14 118

Figure 10.19: European diagnostics market(\$m), 2007–14 119

Figure 10.20: Asian diagnostics market(\$m), 2007–14 121

Figure 10.21: RoW diagnostics market (\$m), 2007–14 122

List of Tables

Table 1.1: Global omics-based diagnostic technology market (\$m), 2007-14 28

Table 2.2: Global biomarker market, by geography, (\$m) 2007–14 37

Table 3.3: Global microarray market, by products, (\$m) 2007–14 50

Table 3.4: Global microarray market, by geography, (\$m) 2007–14 51

Table 3.5: Global DNA microarray market, by geography, (\$m) 2007–14 55

Table 3.6: Global protein microarray market, by geography, (\$m) 2007–14 57

Table 3.7: Global tissue/cell microarray market, by geography, (\$m) 2007–14 58

Table 4.8: Global LOC market, by geography, (\$m) 2007–14 64

Table 5.9: Global bioinformatics market, by geography, (\$m) 2007–14 69

Table 6.10: Global qPCR market, by geography, (\$m) 2007–14 77

Table 6.11: Global DNA biosensors market, by geography, (\$m) 2007–14 78

Table 6.12: Global flow cytometry market, by geography, (\$m) 2007–14 79

Table 6.13: Global DNA methylation market, by geography, (\$m) 2007–14 80

Table 6.14: Global nanotechnology market, by geography, (\$m) 2007–14 81

Table 7.15: Global diagnostics market, by utility, 2007–14 (\$m) 90

Table 7.16: Global diagnostics market, by diseases, 2007–14 (\$m) 92

Table 8.17: Details of recent agreements & collaborations 99

Table 8.18: Details of recent agreements & collaborations (ctd1) 100

Table 8.19: Details of recent agreements & collaborations (ctd2) 101

Table 8.20: Details of recent new product/service/technology launches 102

Table 8.21: Details of recent M&A activity 104

Table 10.22: Omics-based diagnostics market, by geography, (\$m) 2007-14 117

Table 12.23: Japanese patents 160

Table 12.24: Japanese patents (ctd1) 161

Table 12.25: Japanese patents (ctd2) 162

Table 12.26: Japanese patents (ctd3) 163

Table 12.27: Japanese patents (ctd4) 164

Table 12.28: US patents	165
Table 12.29: US patents (ctd1)	166
Table 12.30: US patents (ctd2)	167
Table 12.31: US patents (ctd3)	168
Table 12.32: US patents (ctd4)	169
Table 12.33: US patents (ctd5)	170
Table 12.34: US patents (ctd6)	171
Table 12.35: US patents (ctd7)	172
Table 12.36: US patents (ctd8)	173
Table 12.37: US patents (ctd9)	174
Table 12.38: US patents (ctd10)	175
Table 12.39: US patents (ctd11)	176
Table 12.40: European patents	177
Table 12.41: European patents (ctd1)	178
Table 12.42: European patents (ctd2)	179
Table 12.43: European patents (ctd3)	180
Table 12.44: European patents (ctd4)	181
Table 12.45: European patents (ctd5)	182
Table 12.46: European patents (ctd6)	183
Table 12.47: European patents (ctd7)	184
Table 12.48: European patents (ctd8)	185