

INTRODUCTION	XVIII
STUDY GOAL AND OBJECTIVES	XVIII
REASONS FOR DOING THE STUDY	XVIII
CONTRIBUTION OF THE STUDY AND FOR WHOM	XVIII
SCOPE AND FORMAT	XIX
INFORMATION SOURCES	XIX
ANALYST CREDENTIALS	XIX
RELATED BCC REPORTS	XIX
BCC ON-LINE SERVICES	XIX
DISCLAIMER	XX
 SUMMARY.....	 XXI
<i>SUMMARY TABLE GLOBAL VALUE OF AMINO ACIDS IN SYNTHESIS</i>	
<i>APPLICATIONS, THROUGH 2009 (\$ MILLIONS)</i>	XXII
<i>SUMMARY FIGURE GLOBAL VALUE OF AMINO ACIDS IN SYNTHESIS</i>	
<i>APPLICATIONS, 2002-2009 (\$ MILLIONS)</i>	XXII
 OVERVIEW	 1
BRIEF DESCRIPTION.....	1
CHEMICAL PROPERTIES	1
CHEMICAL STRUCTURE	2
<i>TABLE 1 CHEMICAL STRUCTURE OF AMINO ACIDS</i>	2
TYPES/CATEGORIES OF AMINO ACIDS.....	2
<i>TABLE 2 WORLDWIDE MARKET FOR AMINO ACIDS BY CATEGORY, THROUGH</i>	
<i>2009 (\$ MILLIONS)</i>	3
NATURAL	3
<i>TABLE 3 NATURAL AMINO ACIDS: BIOLOGICAL FUNCTION AND CHEMICAL</i>	
<i>NAMES</i>	4
<i>TABLE 3 (CONTINUED)</i>	5
Alanine	6
<i>TABLE 4 WORLDWIDE ALANINE PRODUCTION, THROUGH 2009 (METRIC</i>	
<i>TONS)</i>	6
<i>TABLE 5 ALANINE MANUFACTURERS</i>	6
Arginine	7
<i>TABLE 6 WORLDWIDE ARGININE PRODUCTION, THROUGH 2009 (METRIC</i>	
<i>TONS)</i>	7
<i>TABLE 7 ARGININE MANUFACTURERS</i>	7
Asparagine	8
<i>TABLE 8 WORLDWIDE ASPARAGINE PRODUCTION, THROUGH 2009 (METRIC</i>	
<i>TONS)</i>	8
<i>TABLE 9 ASPARAGINE MANUFACTURERS</i>	8
Aspartic Acid.....	9
<i>TABLE 10 WORLDWIDE ASPARTIC ACID PRODUCTION, THROUGH 2009</i>	
<i>(METRIC TONS)</i>	9
<i>TABLE 11 MANUFACTURERS OF ASPARTIC ACID</i>	9
L-Cysteine	10
<i>TABLE 12 WORLDWIDE CYSTEINE PRODUCTION, THROUGH 2009 (METRIC</i>	
<i>TONS)</i>	10

TABLE 13	MANUFACTURERS OF CYSTEINE.....	10
	Glutamine	11
TABLE 14	WORLDWIDE GLUTAMINE PRODUCTION, THROUGH 2009 (METRIC TONS).....	11
TABLE 15	GLUTAMINE MANUFACTURERS.....	11
	Glutamic Acid	11
TABLE 16	WORLDWIDE GLUTAMIC ACID PRODUCTION, THROUGH 2009 (METRIC TONS).....	12
TABLE 17	GLUTAMIC ACID MANUFACTURERS	12
	Glycine	13
TABLE 18	WORLDWIDE GLYCINE PRODUCTION, THROUGH 2009 (METRIC TONS).....	13
TABLE 19	GLYCINE MANUFACTURERS.....	13
	Histidine.....	14
TABLE 20	WORLDWIDE HISTIDINE PRODUCTION, THROUGH 2009 (METRIC TONS).....	14
TABLE 21	HISTIDINE MANUFACTURERS.....	14
	Isoleucine	15
TABLE 22	WORLDWIDE ISOLEUCINE PRODUCTION, THROUGH 2009 (METRIC TONS).....	15
TABLE 23	ISOLEUCINE MANUFACTURERS.....	15
	Leucine.....	15
TABLE 24	WORLDWIDE LEUCINE PRODUCTION, THROUGH 2009 (METRIC TONS).....	16
TABLE 25	LEUCINE MANUFACTURERS.....	16
	Lysine	16
TABLE 26	WORLDWIDE LYSINE PRODUCTION, THROUGH 2009 (METRIC TONS).....	17
TABLE 27	LYSINE MANUFACTURERS.....	17
	Methionine	17
TABLE 28	WORLDWIDE METHIONINE PRODUCTION, THROUGH 2009 (METRIC TONS).....	18
TABLE 29	METHIONINE MANUFACTURERS.....	18
	Phenylalanine.....	18
TABLE 30	WORLDWIDE PHENYLALANINE PRODUCTION, THROUGH 2009 (METRIC TONS).....	19
TABLE 31	PHENYLALANINE MANUFACTURERS.....	19
	Proline	19
TABLE 32	WORLDWIDE PROLINE PRODUCTION, THROUGH 2009 (METRIC TONS).....	20
TABLE 33	PROLINE MANUFACTURERS.....	20
	Serine	20
TABLE 34	WORLDWIDE SERINE PRODUCTION, THROUGH 2009 (METRIC TONS).....	20
TABLE 35	SERINE MANUFACTURERS.....	21
	Threonine	21
TABLE 36	WORLDWIDE THREONINE PRODUCTION, THROUGH 2009 (METRIC TONS).....	21
TABLE 37	THREONINE MANUFACTURERS.....	21
	Tyrosine.....	22
TABLE 38	WORLDWIDE TYROSINE PRODUCTION, THROUGH 2009 (METRIC TONS).....	22
TABLE 39	TYROSINE MANUFACTURERS.....	22

Tryptophan	23
TABLE 40 WORLDWIDE TRYPTOPHAN PRODUCTION, THROUGH 2009 (METRIC TONS)	23
TABLE 41 TRYPTOPHAN MANUFACTURERS	23
Valine	23
TABLE 42 WORLDWIDE VALINE PRODUCTION IN METRIC TONS, THROUGH 2009 (METRIC TONS).....	24
TABLE 43 VALINE MANUFACTURERS	24
UNNATURAL.....	24
TABLE 44 MAJOR UNNATURAL AMINO ACIDS FOR SYNTHESIS APPLICATIONS.....	25
TABLE 45 UNNATURAL AMINO ACIDS: QUANTITIES FOR SYNTHESIS APPLICATIONS WORLDWIDE, THROUGH 2009 (KILOGRAMS).....	25
D-Amino Acids	25
MODIFIED/MANUFACTURED.....	26
TABLE 46 MODIFIED AMINO ACIDS COMMONLY USED IN SYNTHESIS APPLICATIONS	26
MANUFACTURE OF AMINO ACIDS.....	26
L-AMINO ACIDS	26
TABLE 47 MANUFACTURING METHODS FOR MAJOR PHARMACEUTICAL APPLICATIONS OF AMINO ACIDS FOR SYNTHESIS APPLICATIONS	27
TABLE 48 METHODS OF PRODUCING PROTEINOGENIC L-AMINO ACIDS.....	28
Chemical Synthesis	28
TABLE 49 GENERAL METHODS OF ALPHA-AMINO ACIDS SYNTHESIS.....	28
TABLE 50 SUBSTITUENTS USED FOR ALPHA-AMINO PROTECTION	29
TABLE 51 SUBSTITUENTS USED FOR CARBOXY PROTECTION	29
Enzymatic Catalysis	30
Extraction	30
Fermentation	30
METHODS OF PRODUCING AMINO ACID DERIVATIVES (MODIFIED AMINO ACIDS).....	30
METHODS OF PRODUCING UNNATURAL AMINO ACIDS	31
APPLICATIONS FOR AMINO ACIDS	32
TABLE 52 WORLDWIDE MARKET FOR AMINO ACIDS BY APPLICATION TYPE, THROUGH 2009 (\$ MILLIONS)	32
TABLE 53 COMMON HEALTH APPLICATIONS OF SOME AMINO ACIDS	33
TABLE 54 APPLICATIONS FOR AMINO ACIDS	33
COMMERCIAL APPLICATIONS	33
TABLE 55 COMMERCIAL AMINO ACIDS BY APPLICATION AND BY USE	34
INDUSTRIAL APPLICATIONS	35
TABLE 56 AMINO ACIDS COMMONLY USED IN INDUSTRIAL APPLICATIONS.....	35
SYNTHESIS APPLICATIONS FOR AMINO ACIDS.....	35
TABLE 57 THE FOUR BASIC CATEGORIES OF SYNTHESIS APPLICATIONS FOR AMINO ACIDS.....	35
Categories	36
High Intensity Sweeteners (HIS).....	36
Pharmaceuticals and Drug Intermediates.....	36
Biomaterials.....	36
Bioresearch.....	36
GOVERNMENT REGULATIONS	37

GOOD-LARGE-SCALE-PRACTICE (GLSP)	37
GOOD-INDUSTRIAL-LARGE-SCALE-PRACTICE (GILSP)	37
GOOD MANUFACTURING PRACTICE (GMP)	37
FDA REGULATIONS	38
INDUSTRY STRUCTURE	39
OVERVIEW	39
MARKET CONTRIBUTING TO THE GROWTH OF THE AMINO ACIDS FOR SYNTHESIS MARKET	39
<i>TABLE 58 OTHER WORLDWIDE MARKETS CONTRIBUTING TO THE GROWTH OF THE AMINO ACIDS FOR SYNTHESIS MARKET, THROUGH 2009 (\$ MILLION)</i>	40
ACTIVE PHARMACEUTICAL INTERMEDIATES.....	40
CATALOG AND RESEARCH PEPTIDE MARKET	40
CHIRAL TECHNOLOGIES.....	41
CONTRACT CHEMISTRY	41
CUSTOM MANUFACTURING	41
NANOTECHNOLOGY	41
HIGH INTENSITY SWEETENERS (HIS)	41
ECONOMIC FRAMEWORK	42
AMINO ACIDS FOR SYNTHESIS MARKET DISTRIBUTION NETWORK	42
<i>FIGURE 1 STRUCTURE OF THE AMINO ACID MARKET FOR SYNTHESIS APPLICATIONS</i>	43
MANUFACTURERS OF AMINO ACIDS FOR SYNTHESIS	43
Primary Producers of Natural Amino Acids.....	44
<i>TABLE 59 PRIMARY PRODUCERS OF NATURAL AMINO ACIDS FOR SYNTHESIS WORLDWIDE</i>	44
<i>TABLE 60 U.S. PRODUCERS OF MODIFIED AMINO ACIDS IN 2003</i>	45
<i>TABLE 61 PRIMARY PRODUCERS OF MODIFIED AMINO ACIDS WORLDWIDE</i>	45
Primary Producers of Unnatural Amino Acids	46
<i>TABLE 62 PRIMARY PRODUCERS OF UNNATURAL AMINO ACIDS</i>	46
DISTRIBUTORS OF AMINO ACIDS FOR SYNTHESIS	46
<i>TABLE 63 DISTRIBUTORS OF NATURAL AMINO ACIDS</i>	47
<i>TABLE 64 U.S. DISTRIBUTORS OF MODIFIED AMINO ACIDS IN 2004</i>	47
<i>TABLE 65 U.S. DISTRIBUTORS OF UNNATURAL AMINO ACIDS IN 2004</i>	48
CUSTOMERS/CONSUMERS OF AMINO ACIDS FOR SYNTHESIS.....	48
<i>FIGURE 2 PRIMARY CUSTOMER CATEGORIES OF THE AMINO ACIDS FOR SYNTHESIS MARKET BY PERCENT OF MARKET, 2004</i>	49
<i>TABLE 66 PRIMARY CUSTOMER CATEGORIES OF AMINO ACIDS FOR SYNTHESIS AND PERCENTAGE OF MARKET, 2004 AND 2009</i>	49
Pharmaceutical Companies.....	49
Biotechnology Companies	50
Toll/Open Market Bulk Drug Companies.....	50
MARKET DYNAMICS	51
MARKET DYNAMICS.....	51

U.S. TRADE IN AMINO ACIDS	52
FIGURE 3 U.S. EXPORTS OF SPECIFIC AMINO ACIDS FOR SYNTHESIS PURPOSES, 2003 (%).....	52
TABLE 67 U.S. EXPORTS OF AMINO ACIDS, 2002 AND 2003.....	53
FIGURE 4 PERCENT BREAKDOWN OF U.S. AMINO ACIDS IMPORTS, 2003 (%).....	54
TABLE 68 U.S. IMPORTS OF AMINO ACIDS, 2002 AND 2003.....	55
INFLUENCES ON AMINO ACIDS PRICING	56
THE ROLE OF AMINO ACIDS IN DRUG DISCOVERY TECHNOLOGIES.....	56
TABLE 69 AMINO ACIDS AND DERIVATIVES UTILIZED IN BIORESEARCH AND DRUG DISCOVERY	57
TABLE 70 AMINO ACIDS IN BIORESEARCH AND DRUG DISCOVERY	57
CHIRAL TECHNOLOGY	57
The Relationship between Amino Acids and Chiral Technology	57
The Relationship between Amino...(Continued)	58
TABLE 71 AMINO ACIDS COMMONLY USED IN CHIRAL TECHNOLOGY APPLICATIONS	59
FIGURE 5 PERCENT BREAKDOWN OF CHIRAL TECHNOLOGY SALES, 2003 (%).....	59
TABLE 72 CHIRAL TECHNOLOGY SALES, 2003.....	59
TABLE 73 TOP SELLING SINGLE ENANTIOMER DRUGS AND THEIR CHIRAL TECHNOLOGY THAT PRODUCED THEM, FOR 2001	60
COMBINATORIAL CHEMISTRY TECHNOLOGY	60
TABLE 74 TYPES OF COMPOUNDS GENERATED BY COMBINATORIAL CHEMISTRY/DRUG DISCOVERY COMPANIES.....	61
Amino Acids Used in Combinatorial Chemistry	62
CUSTOM PEPTIDE SYNTHESIS	62
Amino Acids and Peptides – What is the relationship?.....	62
Peptide Manufacture	62
FIGURE 6 STEPS OF SOLUTION-BASED PEPTIDE SYNTHESIS	63
TABLE 75 SOLID-PHASE PEPTIDE SYNTHESIS TECHNOLOGIES	63
TABLE 76 CUSTOM PEPTIDE SYNTHESIS COMPANIES.....	64
Fee Structure in Custom Peptide Synthesis	65
Revenues in Custom Peptide Synthesis	65
HIGH INTENSITY SWEETENERS MARKET	65
TABLE 77 CONSUMPTION OF HIGH INTENSITY SWEETENERS FOR THE U.S., EUROPEAN UNION (EU) AND JAPAN, THROUGH 2009 (METRIC TONS).....	65
TABLE 78 AMINO ACID BASED HIGH INTENSITY SWEETENERS.....	66
TABLE 79 AMINO ACIDS USED IN HIGH INTENSITY SWEETENERS	66
APPLICATIONS OF AMINO ACIDS FOR SYNTHESIS	67
OVERVIEW.....	67
TABLE 80 PROJECTED GROWTH IN THE WORLDWIDE AMINO ACIDS FOR SYNTHESIS MARKET BY APPLICATIONS, THROUGH 2009 (\$ MILLIONS).....	67
FIGURE 7 PROJECTED GROWTH IN THE WORLDWIDE AMINO ACIDS FOR SYNTHESIS MARKET BY APPLICATIONS, 2002-2009 (\$ MILLIONS)	68
PHARMACEUTICAL APPLICATIONS OF AMINO ACIDS FOR SYNTHESIS	68
TABLE 81 AMINO ACIDS IN BIORESEARCH AND DRUG DISCOVERY	68

TABLE 82 WORLDWIDE QUANTITIES OF AMINO ACIDS FOR SYNTHESIS APPLICATIONS, THROUGH 2009 (KILOGRAMS).....	69
FIGURE 8 WORLDWIDE QUANTITIES OF AMINO ACIDS FOR SYNTHESIS APPLICATIONS, 2004 AND 2009 (KILOGRAMS)	70
THERAPEUTIC PROTEINS	70
TABLE 83 CURRENT AND PROJECTED REVENUES FOR THERAPEUTIC PROTEINS IN THE U.S., THROUGH 2009 (\$MILLIONS).....	71
Monoclonal Antibodies	71
FIGURE 9 MONOCLONAL ANTIBODIES IN DEVELOPMENT BY PERCENT OF THERAPEUTIC CATEGORY (%).....	72
TABLE 84 MONOCLONAL ANTIBODY DRUGS IN PHASE III DEVELOPMENT.....	73
Recombinant Proteins	74
TABLE 85 RECOMBINANT PROTEIN DRUGS IN PHASE III DEVELOPMENT.....	74
Synthetic Peptide Drugs	75
Insulin	75
TABLE 86 INSULIN DRUGS IN PHASE III DEVELOPMENT.....	75
Therapeutic Vaccines	75
TABLE 87 WORLDWIDE REVENUES IN VACCINES, THROUGH 2009 (\$ MILLIONS)	76
TABLE 88 REGISTERED, MARKETED AND APPROVED THERAPEUTIC VACCINES FOR CANCER	77
TABLE 89 THERAPEUTIC VACCINES FOR CANCER IN PHASE III DEVELOPMENT	77
TABLE 90 THERAPEUTIC VACCINES FOR HIV IN PHASE III DEVELOPMENT.....	78
TABLE 91 THERAPEUTIC VACCINES FOR OTHER INDICATIONS IN PHASE III DEVELOPMENT	78
NUTRITION AND VITAMIN APPLICATIONS	78
L-Threonine	79
TABLE 92 AREAS OF RESEARCH FOR L-THREONINE	79
Low-Carbohydrate Diets, Sports Nutrition, Special Diets, etc.....	79
PRODUCT AND TECHNOLOGY LIFE CYCLE FOR AMINO ACIDS	79
FUTURE DEVELOPMENTS	80
HIGH INTENSITY SWEETENERS	80
U.S. SWEETENERS MARKET	80
TABLE 93 U.S. PRODUCTION OF SUGAR AND SWEETENERS, THROUGH 2009 (\$ MILLIONS)	80
TABLE 94 AMINO ACID COMPONENTS OF HIGH INTENSITY SWEETENERS.....	81
The Manufacturing of Aspartame	81
The Manufacturing of Aspartame (continued)	82
TECHNOLOGIES.....	83
EMERGING TECHNOLOGIES IN THE PRODUCTION OF AMINO ACIDS	83
UNNATURAL AMINO ACIDS IN BACTERIAL ENGINEERING.....	83
MICROORGANISMS PRODUCE A NON-NATURAL AMINO ACID	83

BIOPROTEIN AUTOLYSATE® OPTIMIZES FERMENTATION PROCESS.....	83
SOLID-PHASE PEPTIDE SYNTHESIS AND CHEMOSELECTIVE LIGATIONS.....	83
EMERGING TECHNOLOGIES IN THE USE OF AMINO ACIDS FOR SYNTHETIC PURPOSES.....	84
PROTEOMICS.....	84
TRANSCRIPTOMICS.....	84
IDENTIFICATION OF PROTEINS.....	84
INCORPORATION OF AMINO ACIDS INTO POLYMERS.....	85
ADMET.....	85
MEDICAL PRODUCTS FROM UNIQUE BIOMATERIALS.....	85
Amino Acids in Tissue Engineering.....	86
PEPSCREEN TECHNOLOGY.....	86
PATENT ANALYSIS.....	86
TABLE 95 RECENT U.S. PATENTS WITH AMINO ACID APPLICATIONS.....	87
TABLE 95 (CONTINUED).....	88
TABLE 95 (CONTINUED).....	89
TABLE 95 (CONTINUED).....	90
FIGURE 10 PATENTS FOR AMINO ACIDS FOR SYNTHESIS BY COUNTRY, 1999- 2003.....	91
TABLE 96 NUMBER OF PATENTS FOR AMINO ACIDS FOR SYNTHESIS BY YEAR, 1999-2003.....	92
PATENTS ISSUED BY U.S. PATENT CLASS.....	92
PATENTS ISSUED BY AREA OF APPLICATION.....	93
TABLE 97 PATENTS FOR AMINO ACIDS BY APPLICATION TYPE, 2000-2003.....	93
PATENTS OF NOTE.....	93
Amidase.....	93
Alkylation of Amino Acids.....	93
Azo Amino Acids.....	93
Synthesis of Substituted Amino Acids.....	93
COMPANY PROFILES.....	94
AB FERROSAN.....	94
ADVANCED BIOCONCEPT LTD.....	94
ADVANCED CHEMTECH, INC.....	94
AJINOMOTO USA, INC.....	95
AKORN INC.....	95
AKZO NOBEL, INC.....	96
ALANEX CORPORATION, INC.....	96
ALBANY MOLECULAR RESEARCH, INC.....	96
ALFA WASSERMANN CHEMICAL DIV.....	97
ALPHA DIAGNOSTICS INTERNATIONAL.....	97
AMERICAN PEPTIDE COMPANY.....	97
AMERICAN QUALEX.....	98
AMERICAN RADIOLABELED CHEMICALS, INC.....	98

AMIA BIOCHEMICAL INDUSTRIAL CO., LTD.....	99
AMINO GMBH.....	99
AMPHOTECH LTD.	100
ANASPEC, INC.....	100
ANGUS BUFFERS AND BIOCHEMICALS	100
ANILAX ENTERPRISES INCORPORATED	101
APPLIED BIOSYSTEMS, INC. USA.....	101
ARQULE, INC.....	101
ASCOT FINE CHEMICALS.....	102
AUSPEP PTY LTD	102
AVECIA BIOTECHNOLOGY.....	102
BACHEM AG	103
BELMONT CHEMICALS, INC.....	103
BEND RESEARCH, INC.....	103
BIOCATALYSIS, INC.....	103
BIOCONCEPT LABORATORIES, INC.....	104
BIOMOL RESEARCH LABORATORIES, INC.....	104
BIOSEARCH TECHNOLOGIES, INC.....	104
BIOSYNTHESIS, INC.....	105
BIOTOOLS INC.....	105
BIOWORLD.....	105
CALAIRE CHIMIE, SNC.....	106
CAMBRIDGE ISOTOPE LABORATORIES	106
CAMBRIDGE RESEARCH BIOCHEMICALS LTD.	106
CARLBIOTECH LTD. A/S.....	107
CEL-SCI CORPORATION.....	107
CHEMICAL SYNTHESIS SERVICES	107
CHEMSHOP BV	108
CHIRON CORPORATION	108
CHIROSCIENCE LTD.....	108
NIELS CLAUSON-KAAS AS	109
CLINALFA, AG.....	109
CLONTECH LABORATORIES, INC.....	109
COAST SCIENTIFIC.....	110
COOKSON CHEMICALS LTD	110
COVANCE BIOTECHNOLOGY SERVICES, INC.....	110
CN BIOSCIENCE, INC.	111
COMMONWEALTH BIOTECHNOLOGIES, INC.....	111
CHRYSALIS BIOTECHNOLOGY	111
COR THERAPEUTICS, INC.....	112
CS BIO INC.....	112
CYBERSYN, INC.....	112
CYCLOPSS BIOCHEMICAL CORPORATION.....	112
DAIICHI PURE CHEMICALS CO., LTD.	113

DANISCO	113
DAVOS CHEMICAL CORPORATION	113
DEGUSSA AG	114
DIAMALT AG	114
DIOSYNTH BV	114
DSM ANDENO BV	115
DOWPHARMA	115
EASTMAN CHEMICAL	115
ENZYME SYSTEMS PRODUCTS, INC. USA	116
EUROPEPTA GMBH.....	116
EXTRASYNTHESE S.A.	117
FARMHISPANIA, SA	117
FERRING PHARMACEUTICALS, INC.	117
FINORGA SA	118
FLAMMA SPA	118
FLUOROCEM LIMITED.....	118
FLUKA CHEMICALS LIMITED, UK.....	119
GADOT BIOCHEMICAL INDUSTRIES LIMITED (GBI).....	119
GENEMED BIOTECHNOLOGIES, INC.....	119
GENOSYS BIOTECHNOLOGIES, INC.	120
GENO TECHNOLOGY, INC.....	120
GENPAK, LTD	120
GENZYME CORPORATION.....	121
GLYCOSYNTH	121
W.R. GRACE	121
GROUPE SNPE	122
GRYPHON SCIENCES	122
HAMMARI CHEMICALS, LTD.	122
HELSINN CHEMICALS SA	123
ICN BIOMEDICALS, INC.....	123
ICON (ISOTOPE) SERVICES, INC. USA	123
INDOFINE CHEMICAL COMPANY, INC.....	124
INTEGRATED BIOMOLECULE CORPORATION	124
INTERCHEM	124
ISIS PHARMACEUTICALS	125
ISOTEC, INC. USA.....	125
JANSSEN PHARMACEUTICA N.V.	125
JBL SCIENTIFIC, INC.	126
JH BIOTECH, INC.	126
KAMIYA BIOMEDICAL CO.	126
KANEKA	126
KATWIJK CHEMIE B.V.	127
KIRALCHEM LTD.....	127
KOWA.....	127

KYOWA HAKKO U.S.A., INC.....	128
LANCASTER SYNTHESIS LTD	128
LEANCARE, LTD.	129
LKT LABORATORIES, INC.	129
LOBA FEINCHEMIE AG.....	129
LOFSTRAND LABORATORIES, LTD	130
LONZA BIOLOGICS.....	130
MALLINCKRODT INC.	130
MAYBRIDGE CHEMICAL COMPANY LTD.....	131
MERCK EUROLAB LTD.....	131
MITSUBISHI CHEMICAL AMERICA, INC.	131
MITSUI TOATSU CHEMICALS INC.....	132
MONOMER SCIENCES, INC.	132
MONSANTO COMPANY, INC.	132
MULTIPLE PEPTIDE SYSTEMS, INC.	132
NACALAI TESQUE, INC.	133
NAGASE CHEMTEX CORPORATION	133
NBS BIOLOGICALS.....	133
NEOSYSTEM SA	133
NEWPORT SYNTHESIS IRELAND LTD.....	134
NIPPON FINE CHEMICAL CO., LTD.....	134
NIPPON RIKAGAKUYAKUHIHIN CO., LTD.....	134
OMNIGENE BIOPRODUCTS, INC.....	134
ONCOIMMUNIN, INC.	135
ONYX PHARMACEUTICALS, INC.....	135
ORGANOTECHNIE SA.....	135
ORPEGEN PHARMA GMBH.....	135
OXFORD ASYMMETRY INTERNATIONALS, PLC.....	136
PENINSULA LABORATORIES, INC.....	136
PENTA MANUFACTURING CO., INC.....	136
PEPTIDE LABORATORY	136
PEPTIDES INTERNATIONAL.....	137
PEPTIDE TECHNOLOGIES CORPORATION.....	137
PEPTISYNTHA & CIE S.N.C.	137
PFALTZ AND BAUER, INC.....	137
PHARM-ECO LABORATORIES, INC.	138
POLYPEPTIDE LABORATORIES, INC.	138
POLYSCIENCES, INC.	138
PRIMM LABS	138
PRINCETON BIOMEDICALS CORPORATION	139
PROMEGA CORPORATION.....	139
PROTEIN TECHNOLOGIES, INC.....	139
RAYLO CHEMICALS.....	139
RESEARCH AND DIAGNOSTIC ANTIBODIES.....	140

RESEARCH BIOCHEMICALS INCORPORATED.....	140
RESEARCH GENETICS, INC.	140
RESEARCH ORGANICS, INC.....	140
REXIM SA.....	141
RIA INTERNATIONAL, LLC.....	141
RICHMAN CHEMICAL, INC.....	141
RINTENKO OY.....	141
ROSE SCIENTIFIC, LTD.....	142
ROUSSEL UCLAF, SA.....	142
R.W. GREEFF/PECHINEY WORLD TRADE USA.....	142
SANABO GMBH.....	142
SELECTIDE, INC.....	143
SELTZER CHEMICALS.....	143
SENN CHEMICALS AG.....	143
SIEGFRIED AG.....	143
SIGMA-ALDRICH CORPORATION.....	144
SILANTES GMBH.....	144
SITHEON CORPORATION.....	144
SNPE.....	144
SPECTRUM CHEMICALS & LABORATORY PRODUCTS, INC.	145
SWAMPROGETTI BIOTECNOLOGIE.....	145
SYNGENTA.....	145
SYNPEP CORPORATION.....	145
SYNTHETECH, INC.	146
TORONTO RESEARCH CHEMICALS, INC.	146
TYGER SCIENTIFIC, INC.....	146
UCB PHARMA.....	147
UCB-BIOPRODUCTS, INC.....	147
UNIGENE LABORATORIES, INC.....	147
UNIVERSAL PRESERV-A-CHEM.....	148
UPSTATE.....	148
USB CORPORATION.....	148
VARSAL.....	148
WACKER-CHEMIE GMBH.....	149
WAKO CHEMICALS USA, INC.	149
WESTCO FINE INGREDIENTS.....	149
ZAMBON GROUP S.P.A.	150
APPENDIX.....	151
ABBREVIATIONS AND MOLECULAR WEIGHTS OF AMINO ACIDS...	151
COMMON CONVERSIONS.....	151
METRIC TON.....	151
U.S. PATENT CLASSIFICATIONS FOR U.S. PATENTS DEALING	
WITH CHEMISTRY AND HEALTH, 1999-2004.....	152
U.S. PATENT CLASSIFICATIONS...(CONTINUED).....	153